

APPENDIX A

- A.1 Soil Bore Logs
- A.2 Monitoring Well Bore Logs, Well Construction and Development Forms
- A.3 Water Quality Field Data Sheets
- A.4 Geotechnical Test Results

APPENDIX A1

Soil Bore Logs

Field Bore Log

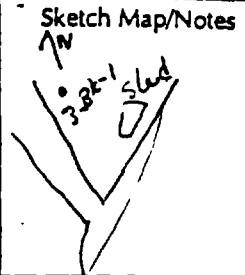
Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type BORE



Date/Time Started 10-20-93 0850

Site ID 3-Bk-1 Dia. of Hole 3 1/2'

Surface Elevation _____

Date/Time Completed 10-20-93 0925

Completion Depth (ft.) 3'

Water Level Initial (ft.): N/A; After N/A Hours _____ (ft)

Equipment and Drilling Method _____

Drilling Company N/A No. Samples 4/2

HAND Auger

Driller N/A

Size and Bit Type _____

Drilling Fluid N/A

Sampler Type N/A Length (ft.) N/A

Diameter (in.) N/A Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date _____

Checked by/Date [Signature] 11/18/93

(Signature) [Signature] 10-20-93

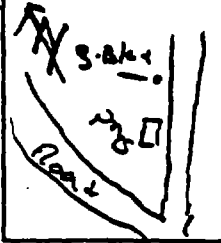
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	5056	2Anks	0-2'	-	CL	0	Silty clay - 40% silt 60% clay - 1072% yellow brown, nonplastic, soft, unconsolidated, Lt. moist. grains at 19"-29"
3	51057 58096	2Anks 10Anks	2-3	-		0	
5	TO 3'						
10							
15							
20							

Field Bore Log

- Sketch Map/Notes

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Site Type BORE

Date/Time Started 10-20-93

Site ID B-Bk-2 Dia. of Hole 3 1/2

Surface Elevation _____

Date/Time Completed 10-20-93

Completion Depth (ft.) 3'

Water Level Initial (ft.): N/A; After N/A Hours N/A (ft)

Equipment and Drilling Method Hand Aug
S.T.

Drilling Company _____ No. Samples 2
Driller _____

Size and Bit Type N/A

Drilling Fluid _____

Sampler Type S.T. Length (ft.) 2'

Diameter (in.) 2 Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date P. W. [Signature] 10-20-93
(Signature)

Checked by/Date [Signature] 5/11/94

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S1054	Hand	0-2"	1	CL	0	Silty Clay - 35% silt 65% clay 10712 1/4 yellow brown - low plastic, soft, unconsolidated, 27 moist.
3	S1055 S8092	Hand 1/20 2x4	2-3'	1		0	
5							T.D. 3'
10							
15							
20							

Field Bore Log

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Site Type Base

Date/Time Started 10-16-93 9:15

Site ID 3-BW-1 Dia. of Hole 4"

Surface Elevation _____

Date/Time Completed 10-16-93 12:05

Completion Depth (ft.) 3'

Water Level Initial (ft.): N/A; After N/A Hours N/A (ft)

Equipment and Drilling Method MSA
CME 75 - Push -

Drilling Company PC Exploration No. Samples 2

Driller R. Smith

Size and Bit Type "A

Drilling Fluid N/A

Sampler Type ST Length (ft.) 1 1/2

Diameter (in.) 3 1/2 Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date R. Wain 10-16-93
(Signature)

Checked by/Date P. White 10/25/93

Sketch Map/Notes
ROAD
3-BW-1
ROAD

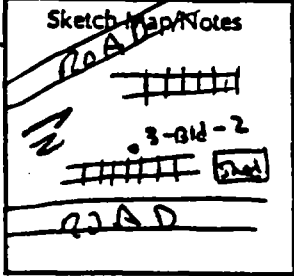
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				1-1	Gly CL	0	Silty clayey Gravel 20% silt 3% clay 50% gravel 7.5% ω Brown - nonplastic, soft, unconsolidated. moist - cracks in soil fill
1							
2	50005 50006 50007 50008	3000 9A B	2' 3'	1-1	ML CL	0	clayey silt fine sand - 15% sand, 50% silt 25% clay - low plastic, soft, unconsolidated, dry - platy layers \approx 4-5mm thick Lm 2 1/2 - 3' 10% ω LT yellow brown
3							TO 3'
10							
15							
20							

Field Bore Log

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Site Type BARE

Date/Time Started 10-16-93 1010

Site ID 3-Bld-2 Dia. of Hole 4"

Surface Elevation ?

Date/Time Completed 10-16-93 1020

Completion Depth (ft.) 3'

Water Level Initial (ft.): N/A; After N/A Hours N/A (ft)

Equipment and Drilling Method HSA
CME 75 Push

Drilling Company PC Exploration No. Samples 2
Driller R. Smith

Size and Bit Type N/A

Drilling Fluid N/A

Sampler Type 57 Length (ft.) 1 1/2

Diameter (in.) 3 1/2 Driving WL (lbs.) N/A Drop (in.) N/A

Geologist/Date R. White 10-16-93
(Signature)

Checked by/Date R. White

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				1-1	Gy GC	0	Silty Clayey Gravel 20% silt, 30% clay 50% gravel 7.5T 5/8 Brown, nonplastic, soft, unconsolidated, moist, Initial fill
1.2'							
2	S1026 S027 S028 S02A	300A 4A 10-16-93	2-3	1-1	ml CK	0	Clayey Silt w/ Trace Sand - 15% sand 50% silt 10% 2 35% clay - low plastic, soft, unconsolidated, dry - platy layers ~ 4-6mm thick (2.8-3') LT yellow brown
10							TD-3'
15							
20							

Field Bore Log

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Site Type BORE

Date/Time Started 10-16-93 1035

Site ID 3-Bld-3 Dia. of Hole 4"

Surface Elevation _____

Date/Time Completed 10-16-93 1050

Completion Depth (ft.) 3'

Water Level Initial (ft.): N/A ; After N/A Hours N/A (ft)

Equipment and Drilling Method HSA

Drilling Company PL Exploration No. Samples 2

RMF 75 - Push -

Driller R. Smith

Size and Bit Type N/A

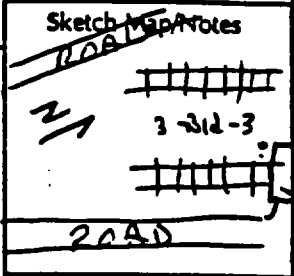
Drilling Fluid N/A

Sampler Type ST Length (ft.) 1 1/2

Diameter (in.) 3 1/2 Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date R. White 10-16-93
(Signature)

Checked by/Date R. White 10/25/93

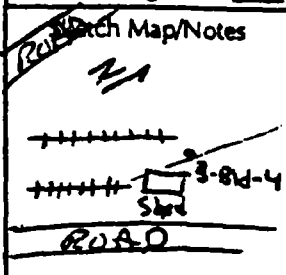


Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				1-1	GM GC	0	Silt, Clayey Sand - 20% silt 70% clay soft general 7.5% plastic, silt, unconsolidated moist - fill.
2	S1024 S1035 S1036 S1037	Buon Hand	2-3'	1-1	ML CL	0	Clayey silt - 55% silt - 45% clay - low plastic. 10% LT yellow brown - soft, unconsolidated - Dry - cemented 2 1/2 - 3'
10							
15							
20							

Field Bore Log

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Site Type BARE

Date/Time Started 10-16-93 1100

Site ID 3-BD-4 Dia. of Hole 4"

Surface Elevation _____

Date/Time Completed 10-16-93 1107

Completion Depth (ft.) 3'

Water Level Initial (ft.): N/A ; After N/A Hours N/A (ft)

Equipment and Drilling Method HSA
CME 75 'Push'

Drilling Company PC Exploration No. Samples 2

Driller R. Smith

Size and Bit Type N/A

Drilling Fluid N/A

Sampler Type ST Length (ft.) 1 1/2

Diameter (in.) 3 1/2 Driving Wt.(lbs.) N/A Drop (in.) N/A

Geologist/Date C. W. [Signature] 10-16-93
(Signature)

Checked by/Date [Signature] 10/25/93

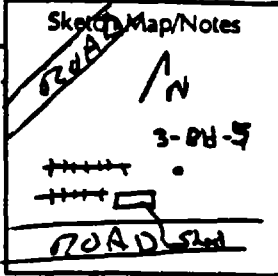
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				1-1	CL	0	Silty Clay - 45% silt 55% clay (Trace gravels 1-2") 10TR 4/3 Brown, mod plastic, soft, unconsolid, moist
1							
1.5							
2	S1042	3WA	2'-3'	17	CL	0	no change
2.25	S1043	4A					
2.5	S1044						
2.75	S1045						
3							TD 3'
10							
15							
20							

Field Bore Log

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Site Type BORE

Date/Time Started 10-10-93 020

Site ID 3-04-5 Dia. of Hole 3 1/2

Surface Elevation _____

Date/Time Completed 10-1-93 1330

Completion Depth (ft.) 3'

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method Hand

Drilling Company _____ No. Samples 1

Auger

Driller _____

Size and Bit Type n/a

Drilling Fluid n/a

Sampler Type Auger Length (ft.) 5

Diameter (in.) 3 1/2 Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date [Signature]

Checked by/Date [Signature] 10/25/93

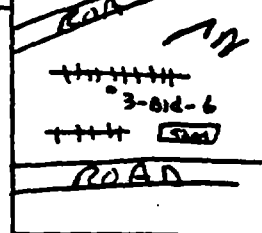
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				n/a	CL	0	Silty Clay - 40% silt - 60% clay 10YR 4/3 fine brown soft, low plastic, dry - unconsolidated
2	S1050	S1051	2-3'	n/a	GP	0	gravel at bottom - none came up auger - just heard it grinding
3	S1052	S1053	3'				TD. 3'
10							
15							
20							

RU
10/16/93

Field Bore Log

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Sketch Map/Notes

ROAD


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Site Type BORE

Date/Time Started 10-16-93 1130

Site ID 3-01d-6 Dia. of Hole 4"

Surface Elevation _____

Date/Time Completed 10-16-93 1137

Completion Depth (ft.) 3'

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method HS A
CME 75 PUSH

Drilling Company PL Exploration No. Samples 2
 Driller R. Smith

Size and Bit Type n/a

Drilling Fluid n/a

Sampler Type ST Length (ft.) 1 1/2

Diameter (in.) 3 1/2 Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date R. Wey 10-16-93
 (Signature)

Checked by/Date [Signature] 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0					CL	0	Silty clayey (brown) 25% silt, 30% clay 45% gravel 10% 1/2 Dk gray brown, nonplastic, soft, moist, unconsolidated
1					CL		8" silty clay - 40% silt 60% clay DIR 1/4 Lt yellowish brown, soft, nonplastic, Lt moist unconsolidated -
2	51062	3WA	2'-3'				- 2 1/2 - 3' med cemented -
2	51063	4 Amber					
2	51064						
2	51065						
3							
10							
15							
20							

10-16-93

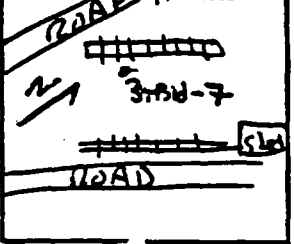
Field Bore Log

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Sketch Map/Notes



Site Type BOR E

Date/Time Started 10-16-93 1158

Site ID 3-BIA-7 Dia. of Hole 4"

Surface Elevation _____

Date/Time Completed 10-16-93 1225

Completion Depth (ft.) 3' feet

Water Level Initial (ft.): n/a ; After n/a Hours 1/2 (ft)

Equipment and Drilling Method HSA
CME 75" PUSH"

Drilling Company PC Exploration No. Samples 2

Driller R Smith

Size and Bit Type n/a

Drilling Fluid n/a

Sampler Type ST Length (ft.) 1 1/2

Diameter (in.) 3 1/2 Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date R. [Signature] 10-16-93
(Signature)

Checked by/Date _____

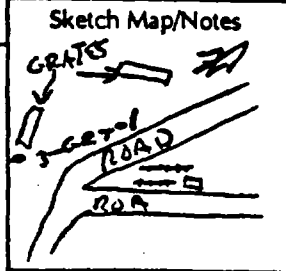
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				ML-CL	GC/GS		Silty Clayey Gravel - 30% silt 30% clay 40% gravel 10 YR 4/4 dk yellow brown, soft, plastic, moist unconsolidated
1							
2	9070 S1071 S1072 S1073	3BIA 4A sub	2'- 3'		CL		Silty Clay - 40% silt 60% clay 10 YR 6/6 brownish yellow, low plastic, soft, lt moist, unconsolidated, fine sand 20% at 2'-2 1/2'
3							TO 3'
10							
15							
20							

Field Bore Log

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Site Type BORE

Date/Time Started 10-16-93 1402

Site ID 3-GET-1 Dia. of Hole 3 1/2

Surface Elevation _____

Date/Time Completed 10-16-93 1412

Completion Depth (ft.) 3'

Water Level Initial (ft.): n/a ; After n/a Hours n/a (ft)

Equipment and Drilling Method Hand

Drilling Company _____ No. Samples 1

Auger

Driller _____

Size and Bit Type n/a

Drilling Fluid n/a

Sampler Type Hand Auger Length (ft.) 6"

Diameter (in.) 3 1/2 Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date R. W. [Signature]
(Signature)

Checked by/Date [Signature] 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				n/a	cl	0	Silty Clay - 35% silt 65% clay - 10% R ₄ . Lt yellowish brown, soft, low plastic, unconsolidated, dry.
1							
2	SD78 S107A	300A	2-	n/a	GR	0	- rocks grinding against Auger
10-6-93 3	S1080 S1081	444	3'				3'-TD
10							
15							
20							

Field Bore Log

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Sketch Map/Notes

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Site Type BORE

3-62T-2
GRAB

Date/Time Started 10-16-93 1420

Site ID 3-62T-2 Dia. of Hole 3 1/2

Surface Elevation

Date/Time Completed 10-16-93 1435

Completion Depth (ft.) 3'

Water Level Initial (ft.): n/a ; After n/a Hours n/a (ft)

Equipment and Drilling Method Hand

Drilling Company No. Samples 1

Auger

Driller

Size and Bit Type n/a

Drilling Fluid n/a

Sampler Type Hand Auger Length (ft.) 6"

Diameter (in.) 3 1/2 Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date RW/2 10-16-93

Checked by/Date [Signature] 10/25/93

(Signature)

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				n/a	CL	0	Silty Clay - 40% silt 60% clay - 10TR % LT yellow brown, soft, low plastic, unconsolidated Dry -
2	91086 10-16-93 51087 51088 51089	300A [Signature]	2'-3'	n/a		0	- no change w/ depth.
3							T.D. 3'
10							
15							
20							

Field Bore Log

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Sketch Map/Notes

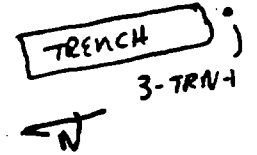
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Site Type Surface Sample



Date/Time Started 10-17-93 1300 Site ID 3-TRN-1 Dia. of Hole n/a

Surface Elevation _____ Date/Time Completed n/a

Completion Depth (ft.) .2" Water Level Initial (ft.): n/a ; After n/a Hours n/a (ft)

Equipment and Drilling Method n/a Drilling Company _____ No. Samples 1

Driller _____

Size and Bit Type n/a Drilling Fluid _____

Sampler Type n/a Length (ft.) n/a Diameter (in.) n/a Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date RW 10-17-93 (Signature) Checked by/Date [Signature] 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S1090 S1091 S1092 S1093	2WA Hand	0-2"	1	CL	0	Silty clay - 40% silt 60% clay - 1072% yellow brown - med plastic, soft, uncemented, moist.
5							
10							
15							
20							

Field Bore Log

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Sketch Map/Notes

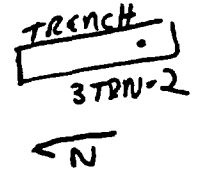
Tooele Army Depot - South Area

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Site Type Surface Sample



Date/Time Started 10-17-93 1306

Site ID 3-TRN-2 Dia. of Hole N/A

Surface Elevation 1017-93

Date/Time Completed N/A

Completion Depth (ft.) 2"

Water Level Initial (ft.): N/A; After N/A Hours N/A (ft)

Equipment and Drilling Method N/A

Drilling Company - No. Samples 1

Driller -

Size and Bit Type N/A

Drilling Fluid -

Sampler Type N/A Length (ft.) N/A

Diameter (in.) N/A Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date [Signature] 10-17-93
(Signature)

Checked by/Date [Signature] 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	51094 51095 51096 51097	200A 4A 4B	0-2"	-	CL	0	Silty clay 40% silt 60% clay 10R 2/4 yellow brown - mod plastic, soft, unconsolidated, moist
5							
10							
15							
20							

Field Bore Log

Sketch Map/Notes

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TRENCH -
3-TRN-3

Site Type Surface Sample

Date/Time Started 10-17-93 1312

Site ID 3-TRN-3 Dia. of Hole N/A

Surface Elevation _____

Date/Time Completed N/A

Completion Depth (ft.) 2"

Water Level Initial (ft.): N/A ; After N/A Hours N/A (ft)

Equipment and Drilling Method N/A

Drilling Company _____ No. Samples 1

Size and Bit Type N/A

Driller _____

Sampler Type N/A Length (ft.) N/A

Drilling Fluid _____

Geologist/Date R. WEINGARTZ
(Signature)

Diameter (In.) N/A Driving Wt. (lbs.) N/A Drop (in.) N/A
Checked by/Date [Signature] 9/25/93

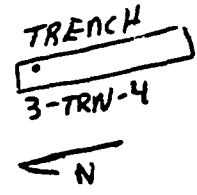
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	51098 51099 51100 51101	2WA 4Ambx	0-2"	-	CL	0	Silty clay. 40% silt, 60% clay. 10% R 1/4 yellow Brown, mod plastic, soft, unconsolidated, moist
5							
10							
15							
20							

Field Bore Log

Sketch Map/Notes

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Site Type Surface Sample

Date/Time Started 10-17-93 - 1321

Site ID 3-TRN-4 Dia. of Hole N/A

Surface Elevation _____

Date/Time Completed N/A

Completion Depth (ft.) .2"

Water Level Initial (ft.): N/A ; After N/A Hours N/A (ft)

Equipment and Drilling Method N/A

Drilling Company _____ No. Samples 1

Driller _____

Size and Bit Type N/A

Drilling Fluid _____

Sampler Type N/A Length (ft.) N/A

Diameter (in.) N/A Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date [Signature] 10-17-93
(Signature)

Checked by/Date [Signature] 9/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S1102 S1103 S1104 S1105	22A Hand	0-2"	N/A	CL	0	Silty Clay - 40% silt, 60% clay 10% 1/4 yellow brown - mud plastic, soft, unconsolidated, moist
5							
10							
15							
20							

Field Bore Log

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Sketch Map/Notes

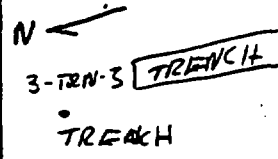
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Site Type Surface Sample



Date/Time Started 10-17-93 1527

Site ID 3-TRN-5 Dia. of Hole N/A

Surface Elevation _____

Date/Time Completed N/A

Completion Depth (ft.) 2'

Water Level Initial (ft.): N/A ; After N/A Hours N/A (ft)

Equipment and Drilling Method N/A

Drilling Company _____ No. Samples 1

Size and Bit Type N/A

Driller _____ Drilling Fluid _____

Sampler Type N/A Length (ft.) N/A

Diameter (in.) N/A Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date [Signature] 10-17-93
(Signature)

Checked by/Date [Signature] 9/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	51106 51108 51109 51107	200A 4A	0-2"	N/A	CL	0	Silty Clay 40% clay 60% silt, 10TR 1/4 yellow brown and soft, med plastic, uncemented, moist
5							
10							
15							
20							

Field Bore Log

Page 1 of 1

Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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3TRN-6
← N
TRENCIL

Site Type Surface Sample

Date/Time Started 10-17-93 1330 Site ID 3-TRN-6 Dia. of Hole n/a

Surface Elevation _____ Date/Time Completed n/a

Completion Depth (ft.) .2' Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method n/a Drilling Company _____ No. Samples 1
Driller _____

Size and Bit Type n/a Drilling Fluid _____

Sampler Type n/a Length (ft.) n/a Diameter (in.) n/a Driving Wt. (lbs) n/a Drop (in.) n/a

Geologist/Date [Signature] (Signature) 10-17-93 Checked by/Date [Signature] 9/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S1110 S1111 S1112 S1113	dup 4 Amber	0-2"	-	CL	0	Silty Chy - 40% silt, 60% clay 10YR2/4 yellow brown, mod plastic, soft, uncemented, soft moist
5							
10							
15							
20							

Field Bore Log

5-84-~~2~~¹ RTC 10/20/93

Page 1 of 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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RTC 10/20/93

Site Type Bore

Date/Time Started 10/20/93 0846

Site ID 5-84-¹ Dia. of Hole 3 inch

Surface Elevation _____

Date/Time Completed 10/20/93 0910

Completion Depth (ft.) 3.0

Water Level Initial (ft.): Dry; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B-53

Drilling Company Bayles Brothers No. Samples 2

Driller Jay Hulse

Size and Bit Type Split Spoon

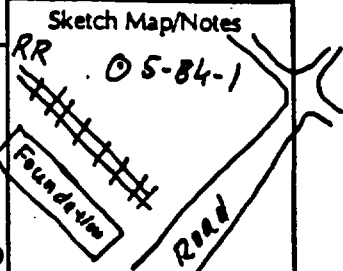
Drilling Fluid None

Sampler Type Spoon Length (ft.) 2

Diameter (in.) 3 Driving Wt. (lbs.) push Drop (in.) NA

Geologist/Date R.T. Canon
(Signature) 10/20/93

Checked by/Date [Signature] 10/25/93



Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S0135		0-0.2	1.5	Fill		Fill: Sand, gravel, and clay; loose; moist; 10YR 4/3 brown (10%) RTC 10/20/93
1				1.5			0.5 ft clay (70%); some silt (20%); trace very fine grained sand; low-moderately plastic; 10YR 8/2 very br RTC 10/20/93 pale brown; medium stiff; NC; dry
2				1.5	CL		
3		S0136	2-3	1.5	CH		2.7 ft clay → see below
4							TD at 3.0 ft
5							2.7 ft clay (90%); trace silt (10%); high plasticity; 5Y 4/2 olive grey; medium stiff; NC; dry

R.T.C.

Field Bore Log

5-Bk-2

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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Site Type Bore

Date/Time Started 10/20/93 0815

Site ID 5-Bk-2 Dia. of Hole 3 inch

Surface Elevation _____

Date/Time Completed 10/20/93 0842

Completion Depth (ft.) 3.0 ft

Water Level Initial (ft.): dry; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B-53

Drilling Company Bayes Brothers No. Samples 2

Driller Jay Hulse

Size and Bit Type Split Spoon

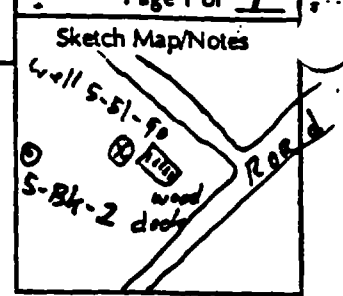
Drilling Fluid None

Sampler Type Spoon Length (ft.) 2

Diameter (in.) 3 Driving Wt (lbs.) push Drop (in.) NA

Geologist/Date R.T. Canon
(Signature) 10/20/93

Checked by/Date [Signature] 10/25/93



Depth (ft)	Well Construction	Sample Type and Number	ft Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	SO137		0-0.2		Fill		Fill: gravel, sand, and clay; moist; loose; 104R 4/3 brown
1	RTC 10/20/93		1.5	1.5	CL		0.8 ft clay (70%); some silt (20%); trace very fine grained sand (10%); low-moderate plasticity;
2			1.5	1.5	CH		1.5 ft clay (90%); trace silt (10%); high plasticity;
3	SO138		2-3	1.5	CH		5Y 4/2 olive grey; stiff; NC; dry
4							TD = 3.0 ft
5							104R 8/2 very pale brown; medium silt; NC; dry

R.T.C.

Field Bore Log

Tooele Army Depot - South Area

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Task 3 Group 2 SWMUs

Site Type GRAB/BORE

Date/Time Started 10-5-93/1335

Site ID 3-BLD-1 Dia. of Hole 2 1/2 inch

Surface Elevation NA

Date/Time Completed 10-5-93/1359

Completion Depth (ft.) 4.5 ft

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method CHE 75

Drilling Company PC Exploration No. Samples 2

split spoon sampler driven

Driller R. Smith

Size and Bit Type NA

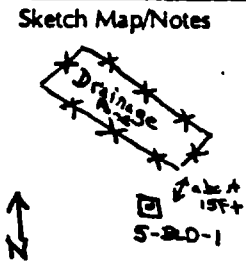
Drilling Fluid NA

Sampler Type split spoon Length (ft.) 1.5

Diameter (in.) 2 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date J. White

Checked by/Date Paul White 10/20/93



Blow Counts

5/9/10

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G*	0-0.2	NA	ML	0	0-0.2 ft f-c sandy silt w/ some clay and trace gravel (20% clay, 40% silt, 30% f-c sand, 10% f-c gravel); very pale brown (10YR 7/3); soft; dry; not cemented; low plasticity
1							
2	NA	BS**	2-3	1/1.5	HL	0	0.2 - 2 Ft same as above w/ increasing silt content w/ depth and decreasing gravel and sand
3							
4		333 10543					2 - 4.5 Ft Silt w/ some fine sand, some clay, and trace gravel (20% clay, 70% fine sand, 5% gravel, 55% silt); very pale brown (10YR 7/3); soft; dry; not cemented; low plasticity
5							
10							* 30057, 30058, and 30059 ** 30060, 30061, and 30062
15							
20							

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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Site Type GRAB/BORE

Date/Time Started 10-6-93 / 0826

Site ID 5-BLD-2 Dia. of Hole 3 inch

Surface Elevation NA

Date/Time Completed 10-6-93 / 0908

Completion Depth (ft.) 4

Water Level Initial (ft.): NA ; After NA Ho's NA (ft)

Equipment and Drilling Method CMEIS

Drilling Company PC Exploration No. Samples 2

split spoon sampler driven

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type Split Spoon Length (ft.) 2

Diameter (in.) 1.0 Driving Wt.(lbs.) 140 Drop (in.) 30

Geologist/Date [Signature] 10-6-93

Checked by/Date [Signature] 10/21/93

Blow Counts

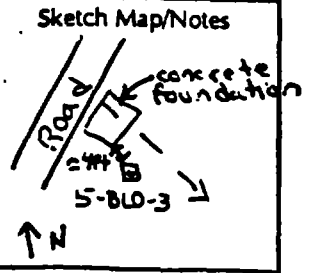
13/17/25/
26

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval Ft	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0-0.2	NA	G*	0-0.2	NA	ML	0	F-c sandy silt w/ some clay and some gravel (15% clay, 40% silt, F-sand 30%, 15% gravel); 10YR 5/3 brown; dry; not cemented; soft; no plasticity
0.2-2.5	NA	S**	2-3	1/2	ML	0	0.2-2.5 ft same as above w/ less gravel and sand increasing clay + silt content
2.5-4							2.5 - 4 ft clayey silt w/ some fine-med sand and trace gravel (30% clay, 45% silt, 20% sand, 5% gravel); 10YR 5/4 yellowish brown; dry; not cemented; low-med plasticity; medium stiff
4							@ 4ft predominately clayey silt - sample is compacting in tip of sampler
							* S0063, S0064, + S0065 ** S0066, S0067, + S0068

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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Site Type GRAB/BORE

Date/Time Started 10-6-93/0908

Site ID 5-BLD-3 Dia. of Hole 3 inch

Surface Elevation NA

Date/Time Completed 10-6-93/0958

Completion Depth (ft.) 4

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CME75
split spoon sampler driven

Drilling Company PC Exploratics; No. Samples 2

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2

Diameter (in.) 2.5 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date J. Dale - Buz
(Signature) 10-6-93

Checked by/Date Paul White 10/21/93

Blow Counts

7/13/18/
12

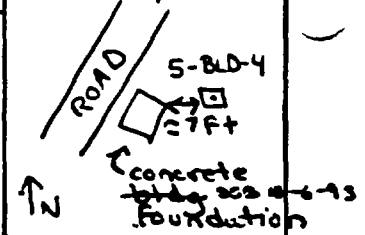
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G*	0-0.2	NA	ML	0	0-0.2 Ft f-c sandy silt w/ some gravel and trace clay (10% clay, 40% silt, 30% sand, 15% gravel)
1							
2	NA	S**	2-3	1/2	ML	0	10YR 5/3 brown; dry, soft, no plasticity, not cemented; roots
3							
4							
5							0.2 - 2 Ft same as above w/ increasing clay and silt decreasing gravel + sand
10							2 - 4 Ft clayey silt w/ some fine sand and trace gravel (35% clay, 45% silt, 15-18% sand, and 2% gravel); 10YR 5/4 yellowish brown; dry; not cemented; low-med. plasticity; med. stiff
15							@ 4 ft predominately clayey silt - sample is compacting in tip of sampler
20							* S0069, S0070, + S0071 ** S0072, S0073, + S0074

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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Sketch Map/Notes



Site Type GRAB/ CORE

Date/Time Started 10-6-93/1200

Site ID 5-BLD-4 Dia. of Hole 3 inch

Surface Elevation NA

Date/Time Completed 10-6-93/1240

Completion Depth (ft.) 3.5

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method CME 75

Drilling Company Pc Exploration No. Samples 2

split spoon sampler driven

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type Split Spoon Length (ft.) 2

Diameter (in.) 2.5 Drilling Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date [Signature] 10-6-93
(Signature)

Checked by/Date [Signature] 10/20/93

Blow Counts

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G*	0-0.2	NA	ML	0	0-0.2 ft f-c sandy silt w/ some clay and some gravel (15% clay, 40% silt, 30% sand, 15% gravel)
1	NA	S*	2-3	1.25/2	ML	0	10YR 5/3 brown; dry; not cemented; soft; no plasticity; roots
2	NA						0.2 - 0.5 ft same as above
3	NA						0.5 - 2.0 ft decreasing gravel and sand content increasing clay and silt
4	NA						2.0 - 3.5 ft clayey silt w/ fine sand (30% clay, 50% silt, 20% sand); 10YR 5/4 yellowish brown; dry; not cemented; stiff, low-medium plasticity
5							* 50075, 50076, + 50077
10							** 50078, 50079, + 50080
15							
20							

11/10/11/20

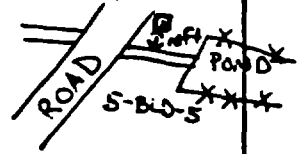
REF 10/10/93

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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Sketch Map/Notes



Site Type GRAB/BORE

Date/Time Started 10-6-93 / 1250

Site ID 5-BD-5 Dia. of Hole 3 inch

Surface Elevation NA

Date/Time Completed 10-6-93 / 1335

Completion Depth (ft.) 3.5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CME75

Drilling Company P.C. Exploration No. Samples 2

Split spoon sampler driven

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type Split Length (ft.) 2

Diameter (in.) 2.5 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date [Signature] 10-6-93
(Signature)

Checked by/Date [Signature] 10/21/93

Blow Counts

13/17/8/9

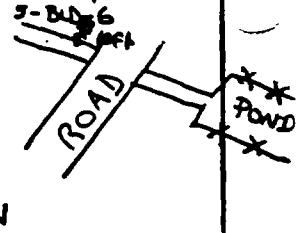
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G*	0-0.2	NA	ML	0	0-0.2 ft f-c sandy silt w/some clay and some gravel (15% clay, 40% silt, 30% sand, 15% gravel)
1					sh		
2	NA	S**	2-3	1.75/2	ML	0	10YR 5/3 brown; dry; not cemented; soft; no plasticity; roots
3							
4							
5							0.2 - 0.5 ft same as above
							0.5 - 1.0 ft decreasing sand + gravel, increasing silt and clay
							1.0 - 1.5 ft silty clay (60% clay, 40% silt); 10YR 5/3 brown; dry, not cemented; ^{very} stiff; med. plasticity
							1.5 - 3.5 ft clayey silt w/some fine sand (30% clay, 50% silt, 20% sand); 10YR 5/4 yellowish brown; dry; not cemented; stiff; ^{low to med.} plasticity
							* 50081, 50082, + 50083
							** 50084, 50085, + 50086

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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Sketch Map/Notes



Site Type GRAB/BORE

Date/Time Started 10-6-93/1350

Site ID 5-BD-6 Dia. of Hole 3 inch

Surface Elevation NA

Date/Time Completed 10-6-93/1430

Completion Depth (ft.) 3.5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CME75 split spoon sampler driven

Drilling Company P.C. Exploration No. Samples 2

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2

Diameter (in.) 2.5 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date J. DeL. Berg (Signature) 10-6-93

Checked by/Date [Signature] 10/31/93

Blow Counts

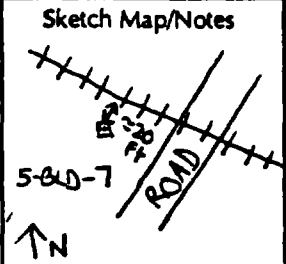
8/7/4/6

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G*	0-0.2	NA	ML	O	0-0.2 ft f-e sandy silt w/ some clay and some gravel (30% sand, 10% 20% gravel, 40% silt); 104R 4/5 brown; dry; roots; not cemented; soft no plasticity
1							
2	NA	S**	2-3	2/2	ML	O	0.2 - 2.0 ft same as above w/ cobble size mat'l noted at 0.5 to 1 ft and gravels/sand decreasing w/ depth
3							
4							
5							
10							2-3.5 ft clayey silt w/ some fine sand (30% clay, 50% silt, 20% fine sand); 104R 5/4 yellowish brown; dry, soft to medium, low-med plasticity, not cemented
15							
20							* 50087, 50088, + 50089 ** 50090, 50091, + 50092

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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Site Type GRAB/BORE

Date/Time Started 10-7-93/1215

Site ID 5-840-7 Dia. of Hole 3 inch

Surface Elevation NA

Date/Time Completed 10-7-93/1255

Completion Depth (ft.) 4

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CME 75
split spoon sampler driven

Drilling Company P.C. Exploration No. Samples 2

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2

Diameter (in.) 2.5 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date [Signature]

Checked by/Date [Signature] 10/21/93

(Signature) SSB 10-7-93

Blow Counts

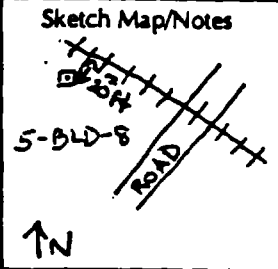
7/7/5/7

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G*	0-0.2	NA	ML	0	0-0.2 ft F-c sandy silt w/some gravel and trace clay (15% gravel, 35% sand, 40% silt, 10% clay);
1							
2	NA	S*	2-3	2/2	ML	0	104R 5/2 grayish brown; soft; dry; low to no plasticity; not cemented; roots
3							
4							
5							0.2 - 1 ft same as above w/ decreasing sand + gravel increasing clay + silt SSB 10-7-93
10							1 - 4 ft Fine sandy silt w/ trace clay (40% sand, 50% silt, 10% clay); 104R 5/4 yellowish brown; soft; dry; low plasticity; not cemented
15							
20							* 50093, 50094, + 50095 ** 50096, 50097, + 50098

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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Site Type GRAB / BORE

Date/Time Started 10-7-93 / 1300

Site ID 5-BLD-8 Dia. of Hole 3 inch

Surface Elevation NA

Date/Time Completed 10-7-93 / 1345

Completion Depth (ft.) 4.0

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method CME TS

Drilling Company P.C. Exploration No. Samples 2

Split spoon sampler driven

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type Split Spoon Length (ft.) 2

Diameter (in.) 2.5 Driving WL (lbs) 140 Drop (in.) 30

Geologist/Date J. Dyer-Bryer 10-7-93
(Signature)

Checked by/Date Paul White 10/21/93

Blow Counts

7/13/10/8

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G*	0-0.2	NA	ML	0	0-0.2 ft f-c sandy silt w/ some gravel and trace clay (15% gravel, 35% sand, 40% silt, 10% clay);
1							
2	NA	S**	2-3	1.5/2	ML	0	10YR 5/2 grayish brown; soft; dry; no plasticity; not cemented; roots
3							
4							
5							0.2-1.5 ft same as above w/ decreasing sand + gravels w/ depth - cobble encountered at 2.0 ft (slough from top pink)
10							1.5-4.0 ft Fine silt sandy silt w/ trace clay (10% clay, 30% sand, 60% silt); 10YR 5/6/3 pale brown; soft; dry; low plasticity; not cemented
15							
20							* 50099, 50100, + 50101 ** 501702, 50103, + 50104

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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Site Type GRAB/BORE

Date/Time Started 10-7-93 / 1350

Site ID 5-BD-9 Dia. of Hole 3 inch

Surface Elevation NA

Date/Time Completed 10-7-93 / 1425

Completion Depth (ft.) 4

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CME 75

Drilling Company RC Exploration No. Samples 2

Split spoon samples driven

Driller R. Smith

Size and Bit Type NA

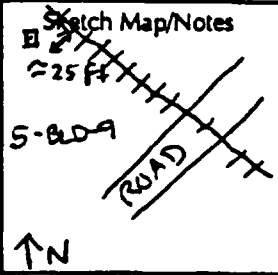
Drilling Fluid NA

Sampler Type Split Spoon Length (ft.) 2

Diameter (in.) 2.5 Driving Wt (lbs.) 140 Drop (in.) 30

Geologist/Date D. Duff-Buys
(Signature) 10-7-93

Checked by/Date Paul White 10/21/93
SSG 10-7-93



Blow Counts

12/17/11/16

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G*	0-0.2	NA	ML	0	0-0.2 ft f-c sandy silt w/some gravel and trace clay (20% gravel, 30% sand, 40% silt, 10% clay); 10YR 5/3 brown; soft; dry; low plasticity, not cemented, little roots
1	NA	SXX	2-3	2/2	ML	0	
2							0.2 - 0.75 ft Same as above w/ decreasing gravel and sands
3							0.75 ft - 4 ft fine sandy, clayey silt (25% clay, 25% sand, 50% silt); 10YR 6/3 pale brown; stiff; dry; red + low plasticity; not cemented, no roots
4							
5							
10							
15							
20							

* 50105, 50106, 50107
** 50108, 50109, 50110

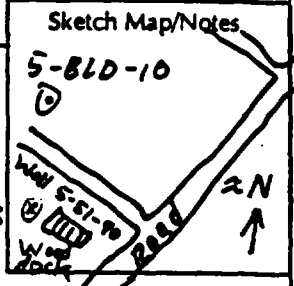
Field Bore Log

5-BLD-10

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Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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Lakewood, Colorado 80228



Site Type Bore

Date/Time Started 10/10/93 1429

Site ID 5-BLD-10 Dia. of Hole 3 inches

Surface Elevation _____

Date/Time Completed 10/10/93 1531

Completion Depth (ft.) 3.0

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B-53

Drilling Company Boyles Brothers No. Samples 2
Driller Jay Hulse

Size and Bit Type Split Spoon

Drilling Fluid None

Sampler Type Spoon Length (ft.) 2

Diameter (in.) 3 Driving Wt. (lbs.) push Drop (in.) NA

Geologist/Date R. J. Canon
(Signature) 10/10/93

Checked by/Date [Signature] 10/25/93

DTC 10/10/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft.)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	SO111, SO112, SO113		0-0.2	2.0	Fill	⊕	Fill: gravel, sand, and clay; moist; NC loose; 10YR 4/3 brown
1				2.0	CL		0.9 ft Silty clay (97%); silt (2%); trace very fine sand (10); low-moderate plasticity; very pale brown 10YR 8/2; NC; stiff; dry
2	SO114, SO115, SO116		2-3	1.0			
3				1.0			
4							TD at 3.0 ft

Field Bore Log

5-BLD-11

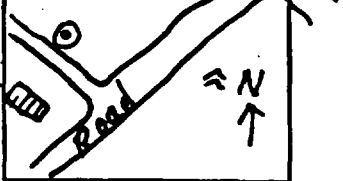
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Tooele Army Depot - South Area

Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

BLD-11



Site Type Bore

Date/Time Started 10/18/93 1532

Site ID 5-BLD-11 Dia. of Hole 3 inch

Surface Elevation _____

Date/Time Completed 10/19/93 1104

Completion Depth (ft.) 3.0

Water Level Initial (ft.): Dry; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B-53

Drilling Company Boyles Brother No. Samples 2

Driller Jay Hulse

Size and Bit Type Split spoon

Drilling Fluid None

Sampler Type Spoon Length (ft.) 2

Diameter (in.) 3 Drilling Wt. (lbs.) push Drop (in.) NA

Geologist/Date R.T. Canon
(Signature) 10/18/93

Checked by/Date [Signature] 10/25/93

10/18/93
RTC

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	50117, 50118, 50119		0-0.2		Fill		Fill: gravel, sand, and clay; moist; 10YR 4/3 brown; NC, loose
1				1.5 / 1.5	CL		
2				1.5 / 1.5	CL		1.1 ft clay (70); silty (20%); trace very fine grained sand (10%); moderately plastic; NC; dry; stiff
3	50120, 50121, 50122		2-3.0	1.5 / 1.5			TD at 3.0 ft
4							
5							
6							
7							
8							
9							
10							

Note: The 0-0.2 ft sample was collected on 10/18/93. The 2-3 ft sample was collected on 10/19/93.

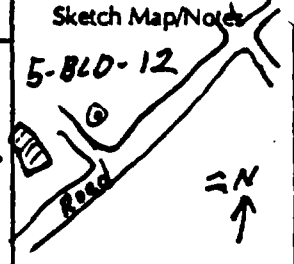
Field Bore Log

5-BLD-12

Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228
wood dock →



Site Type Bore

Date/Time Started 10/19/93 1105

Site ID 5-BLD-12 Dia. of Hole 3 inch

Surface Elevation _____

Date/Time Completed 10/19/93 1135

Completion Depth (ft.) 3.0

Water Level Initial (ft.): dry; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B-53

Drilling Company Boyles Brothers No. Samples 2
Driller Jay Hulse

Size and Bit Type Split Spoon

Drilling Fluid None

Sampler Type Spoon Length (ft.) 2

Diameter (in.) 3 Driving Wt. (lbs.) push Drop (in.) NA

Geologist/Date R.T. Canon
(Signature) 10/19/93

Checked by/Date Paul White 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft.)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	collected on 10/18/93		0-0.2				Fill: gravel, sand, and clay; moist; 104R 4/3 brown; NC; loose
1				1.5			
2				1.5			
2-3	S0126 S0127 S0128		2-3	1.5	CL		1.0 clay (70%); silty (20%); trace very fine grained sand (10%); moderate plasticity; 104R 8/2 very pale brown; NC; stiff; dry
3							TD at 3.0 ft
4							
5							
6							
7							
8							
9							
10							

R.T.C.

Note: The 0-0.2 ft sample was collected on 10/18/93. The 2-3 ft sample was collected on 10/19/93.

Field Bore Log

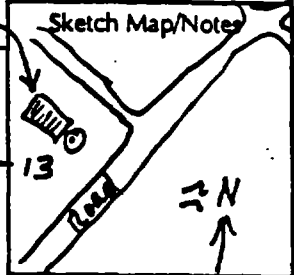
5-BLD-13

wood dock

Page 1 of 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

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Site Type Bore

Date/Time Started 10/19/93 1136

Site ID 5-BLD-13 Dia. of Hole 3 inch

Surface Elevation _____

Date/Time Completed 10/19/93 1200

Completion Depth (ft.) 3.0 ft

Water Level Initial (ft.): Dry; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B-53

Drilling Company Boyles Brothers No. Samples 1

Driller Jay Hulse

Size and Bit Type Split Spoon

Drilling Fluid None

Sampler Type Spoon Length (ft.) 2

Diameter (in.) 3 Driving Wt. (lbs.) push Drop (in.) NA

Geologist/Date R.T. Canon
(Signature) 10/19/93

Checked by/Date [Signature] 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				1.5	Fill		Fill: gravel, sand, and clay fill; moist from 0-1.0 ft; dry 1.0-1.5 ft; 10YR 4/3 brown; NC; loose
1				1.5	1.5H		
2				1.5	CL		clay (70%); silty (20%); trace sand (10%) very fine grained; low-moderate plasticity; 10YR 8/2 very pale brown; NC; silty; dry
3		SO132 SO133 SO134	2-3	1.5			
4							TD at 3.0 ft

R.T.C.

Field Bore Log

ETC BL 5-BLD-14

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

10/19/93

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228
wood dock

Site Type Bore

Date/Time Started 10/19/93 1204

Site ID 5-BLD-14 Dia. of Hole 3 inch

Surface Elevation _____

Date/Time Completed 10/19/93 1230

Completion Depth (ft.) 3.0

Water Level Initial (ft.): Dry; After NA Ho. s NA (ft)

Equipment and Drilling Method Mobile B-53

Drilling Company Bayles Brothers No. Samples 1

Driller Jay Hulse

Size and Bit Type Split Spoon

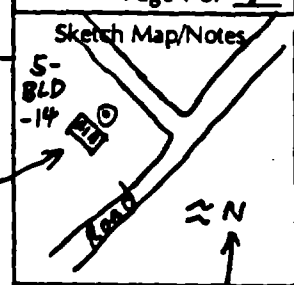
Drilling Fluid None

Sampler Type Spoon Length (ft.) 2

Diameter (in.) 3 Drilling Wt. (lbs.) push Drop (in.) NA

Geologist/Date R.T. Canon
(Signature) 10/19/93

Checked by/Date [Signature] 10/25/93



Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				1.4	Fill		Fill: gravel, sand, and clay; moist 0 - 0.5 ft. Low moisture 0.5 - 1.0 ft; loose; NC 1.0 ft
1				1.5			
2				1.5	CL		clay (70%); some silt (20%); trace very fine grained sand (10%); low moderate plasticity; 10YR 8/2 very pale brown; NC; stiff; dry 2.2 ft See below
3	50843 50844 50845		2-3	1.5	CH		
4							TD at 3.0 ft - 2.2 ft clay (90%); trace silt (10%); high plasticity; 5Y 5/2 Olive grey; NC; stiff; dry 3.0 ft

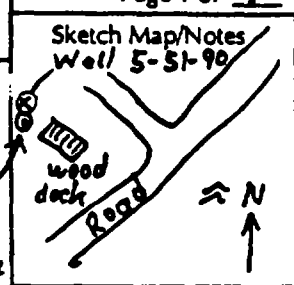
R.T.C.

Field Bore Log

S- BLD- 15

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228
S- BLD- 15



Site Type Bore

Date/Time Started 10/19/93 1234

Site ID S- BLD- 15 Dia. of Hole 3 inch

Surface Elevation _____

Date/Time Completed 10/19/93 1307

Completion Depth (ft.) 3.0

Water Level Initial (ft.): Dry ; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B-53

Drilling Company Boyles Brothers No. Samples 1

Driller Jay Hulse

Size and Bit Type Split Spoon

Drilling Fluid None

Sampler Type Spoon Length (ft.) 2

Diameter (in.) 3 Driving Wt.(lbs.) push Drop (in.) NA

Geologist/Date R. T. Canon
(Signature) 10/19/93

Checked by/Date [Signature] 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				1.1	Fill		Fill: sand, gravel, and clay; 10 YR 4/3 brown; loose; moist
1				1.5	CL	⊕	1.0 ft clay (70%); some silt (30%); trace sand very fine grained (10%); low-moderate plasticity; 10 YR 8/2 very pale brown; NC; stiff; dry
2	50849			1.5	CH		2.1 ft clay (95%); trace silt (5%); high plasticity; 5Y 5/2 olive grey; NC; stiff; dry
3	50850 50851	2-3		1.5	CH		
4							TD at 3.0 ft
5							
6							
7							
8							
9							
10							

R.T.C.

Field Bore Log

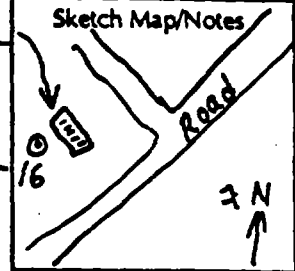
5-BLD-16

wood deck

Page 1 of 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
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Lakewood, Colorado 80228



Site Type Bore

Date/Time Started 10/19/93 1309

Site ID 5-BLD-16 Dia. of Hole 3 inch

Surface Elevation _____

Date/Time Completed 10/19/93 1331

Completion Depth (ft.) 3.0

Water Level Initial (ft.): Dry; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B-53

Drilling Company Boyles Brothers No. Samples 1

Driller Jay Hulse

Size and Bit Type Split Spoon

Drilling Fluid None

Sampler Type Spoon Length (ft.) 2

Diameter (in.) 3 Driving Wt. (lbs.) push Drop (in.) NA

Geologist/Date R.T. Canon
(Signature) 10/19/93

Checked by/Date [Signature] 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				1.0 / 1.5	Fill	⊙	Fill: gravel, sand, and clay; moist; 10YR 4/3 brown; loose; NC
1				1.5 / 1.5	CL		1.8 ft clay (70%); some silt (20%); trace very fine grained sand (10%); low-moderate plasticity; 10YR 8/2 very pale brown; NC; stiff; dry
2	S0855		2-3	1.5 / 1.5	CL		
3	S0856						
3	S0857						
4							TD at 3.0 ft
5							
6							
7							
8							
9							
10							
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14							
15							
16							
17							
18							
19							
20							

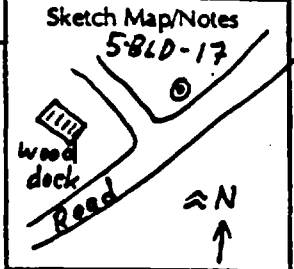
R.T.C.

Field Bore Log

5-BLD-17

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Bore

Date/Time Started 10/19/93 1332

Site ID 5-BLD-17 Dia. of Hole 3 inch

Surface Elevation _____

Date/Time Completed 10/19/93 1358

Completion Depth (ft.) 3.0

Water Level Initial (ft.): Dry; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B-53

Drilling Company Boyles Brothers No. Samples 1

Driller Jay Huise

Size and Bit Type Split Spoon

Drilling Fluid None

Sampler Type Spoon Length (ft.) 2

Diameter (in.) 3 Driving Wt (lbs.) push Drop (in.) NA

Geologist/Date R.T. Canon
(Signature) 10/19/93

Checked by/Date [Signature] 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				1.3	Fill		Fill: gravel, sand, and clay; moist; loose; 10YR 4/3 brown
1				1.5			
2				1.5	CL		1.2 ft clay (70%); some silt (20%); trace sand, very fine grained (10%); low-moderate plasticity; 10YR 8/2 very pale brown; NC; medium; dry
2-3	SO861 SO862 SO863		2-3	1.5			
3							
4							TD at 3.0 ft

R.T.C.

Field Bore Log

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Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type BORE

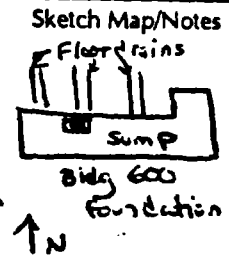
Date/Time Started 10-27-93/1545

Site ID 5-BLD-18

Dia. of Hole 3.5 in SSS 10-28-93

Surface Elevation NA

Date/Time Completed 10-28-93/1020



Completion Depth (ft.) 3.5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Concrete

Drilling Company Boyles Bros No. Samples 2

Coring Bit / Split Spoon sampler

Driller T. Giles

Size and Bit Type Coring - Diamond bit

Drilling Fluid NA for split spoons / water for coring Approved well SSS 10-27-93

Sampler Type Spoon Length (ft.) 2

Diameter (in.) 3.0 Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date A. J. B... Signature 10-27-93

Checked by/Date Paul White 11/2/93

Blow Counts

pushed

pushed

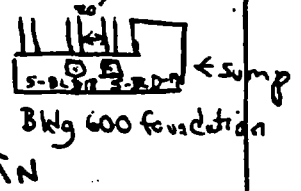
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-0.2	1.8 / 2.0	CL	0	Note 0' = depth of ground surface beneath concrete sump foundation. sump is 3ft below grade; concrete is 5 1/2 inches thick. <small>SSS 10-28-93</small>
2	NA	S	2-3	1.5 / 1.5	CL	0	0-0.2 ft silty clay w/ some gravel and f-c sand (45% clay, 25% silt, 15% f-c sand, 15% gravel); 15% R G/2 light brownish gray; wet (due to water used in coring operation); med. plasticity; not cemented; stiff, small chips of concrete
3							0.2 ft - 3.5 ft clay w/ some silt and trace fine sand (70% clay, 20% silt, 10% sand); 10% R G/2 light brownish gray; med. moist; med-high plasticity; not cemented; very stiff; <small>SSS 10-28-93</small>
5							
10							
15							
20							

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type BORE

Date/Time Started 10-28-93 / 1044

Site ID S-BLD-19 Dia. of Hole 3.5 inch

Surface Elevation NA

Date/Time Completed 10-28-93 / 1115

Completion Depth (ft.) 3.5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Mobile

Drilling Company Boyles Bros. No. Samples 2

B53 concrete casing bit, split

Driller T. Giles

split samplers pushed

2.5 ID / 3.5 OD

Size and Bit Type Diamond bit string

Drilling Fluid Aggregated well water for coring only

Sampler Type Split Length (ft.) 2

Diameter (in.) 3.0 Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date [Signature] 10-28-93

Checked by/Date [Signature] 11/2/93

Blow Counts

shed
pushed

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D. ppm	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-2	1.5 / 2.0	CL	0	Note 0' = depth of ground surface beneath concrete sump foundation. Sump is 3ft below grade; concrete is about 5 inches thick. 0 - 1 ft silty clay w/ some fine to medium sand (50% clay, 30% silt, 20% f-m sand); 10 YR 6/2 pale brown; moist → to medium moist (moisture decreases w/ depth); very stiff, med plasticity, not cemented.
1	NA	S	2-3	1.5 / 1.5	CL	0	
2							1 - 3.5 ft silty clay w/ some fine sand (45% clay, 35% silt, 20% sand); 10 YR 6/2 pale brown; med. moist; med. plasticity; stiff to very stiff, not cemented.
3							
5							
10							
15							
20							

Field Bore Log

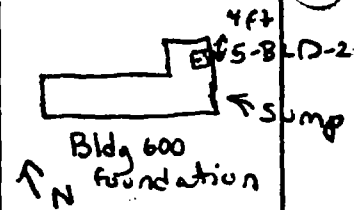
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Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Task 3 Group 2 SWMUs

Sketch Map/Notes



Site Type BORE

Date/Time Started 10-28-93/1144

Site ID 5-BLD-20 Dia. of Hole 3.5 inch

Surface Elevation NA

Date/Time Completed 10-28-93/1235

Completion Depth (ft.) 3.5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Mobile

Drilling Company Boyles Bros No. Samples 2

B53 rig; coring bit, split spoon sampler pushed

Driller T. Giles

Size and Bit Type 2.5 1.0 2.5 0.0
split diamond bit coring

Drilling Fluid Approved well water for coring only

Sampler Type split spoon Length (ft.) 2

Diameter (in.) 3.0 Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date J. D. [Signature] 10-28-93

Checked by/Date [Signature] 11/2/93

Blow counts

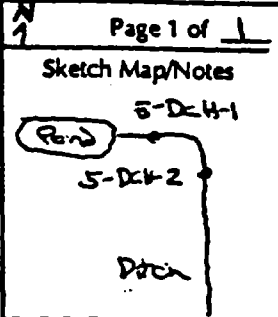
pushed
pushed

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval Ft	Recovery (ft./ft.)	USCS Abbreviation	P.I.D. ppm	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-0.2	1.0	CL	0	0 - 0.25 ft silty clay w/ trace fine sand (70% clay, 25% silt, 5% fine sand); 104R 7/2 light gray; moist. med-high plasticity; not cemented stiff.
1				2.0	CL		
2	NA	S	2-3	1.5	CL	0	0.25 - 2.0 Ft silty clay w/some fine sand (50% clay, 30% silt, 20% sand); 104R 6/2 light brownish gray; med. moist; med. plasticity; firm to stiff; not cemented
3				1.5	CL		
5							2.0 - 3.5 Ft fine sandy, silty clay (40% clay, 30% silt, 30% sand); 104R 6/3 fine brown; med. moist to little moisture; low to med. plasticity; medium to medium stiff; not cemented.
10							
15							
20							

A.1-39

NOTE: 0' = depth of ground surface beneath concrete sump foundation. Sump is 3ft below grade; concrete is about 5 inches thick.

Field Bore Log



Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Hand Auger

Date/Time Started 10/28/93, 1130

Site ID 5-DCH-2 Dia. of Hole 3 in

Surface Elevation NA

Date/Time Completed 10/28/93, 1150

Completion Depth (ft.) 3 FT

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method Hand Auger

Drilling Company Ebasco No. Samples 3

Driller Rich Borden

Size and Bit Type NA

Drilling Fluid NA

Sampler Type NA Length (ft.) NA

Diameter (in.) NA Driving Wt (lbs.) NA Drop (in.) NA

Geologist/Date M. Z. M. 10/28/93
(Signature)

Checked by/Date [Signature] 11/2/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		SC030	0 - 0.2		ML	0	light yellow brown (2.5Y 6/4) loose little moisture, very fine sandy (10%) clayey (10%) silt (80%) By 1.5 ft is weakly carbonate cemented with streaks of white (2.5Y 8/2) CaCO ₃ cemented soil, some almost 100% CaCO ₃
1		SC031	0.5 - 1			-1	
2		SC032	1 - 2			0	
3			2 - 3				TD = 3 ft
4							NOTE: 0 - 0.2' SAMPLE COLLECTED ON 10/27/93
5							

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Site Type Hand Auger

Date/Time Started 10/28/93, 1025 Site ID 5-DCH-3 Dia. of Hole 3 in

Surface Elevation NA Date/Time Completed 10/28/93, 1040

Completion Depth (ft.) 3 Ft Water Level Initial (ft.): NA; After NA Hours NA (ft)

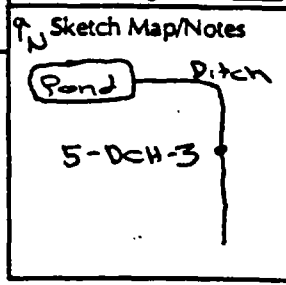
Equipment and Drilling Method Hand Auger Drilling Company Ebasco No. Samples 3

Driller Rich Borden

Size and Bit Type NA Drilling Fluid NA

Sampler Type NA Length (ft.) NA Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date MGM 10/28/93 Checked by/Date [Signature] 11/2/93
 (Signature)



Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S0233	0 - 0.2			0	At surface - organic rich, brown (10YR 4/4) clayey (10%), very fine sandy (20%) silt (70%) loose with little moisture.
0.5		S0234	0.2 - 0.5			0	By 0.5 ft the soil is the same except no organics, med stiff, light brown (10YR 6/2)
2		S0235	2 - 3		ML	0	Below 2 ft soil is yellow brown (2.5Y 6/4) clayey (25%) silt (75%) with very minor fine sand and 5% clasts of white (2.5Y 8/2) very hard calcium carbonate cemented soil (caliche) some clasts 2 100% CaCO ₃
3							
3.5							
4							
5							

TD = 3 Ft

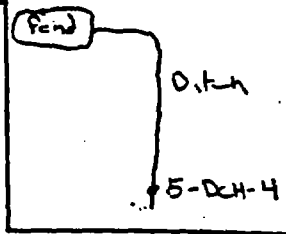
NOTE: 0 - 0.2' SAMPLER COLLECTED ON 10/27/93

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Hand Auger

Date/Time Started 10/25/93, 0850

Site ID 5-DCH-4 Dia. of Hole 3 in

Surface Elevation NA

Date/Time Completed 10/25/93, 0935

Completion Depth (ft.) 3 ft

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method hand Auger - RB powered

Drilling Company Ebasco No. Samples 3

Driller Rich Borden

Size and Bit Type NA

Drilling Fluid NA

Sampler Type NA Length (ft.) NA

Diameter (in.) NA Driving Wt.(lbs.) NA Drop (in.) NA

Geologist/Date M.R.M. 10/25/93
(Signature)

Checked by/Date [Signature] 11/15/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbrivation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S0236	0-0.2			0	light brown (10YR 6/6) loose, little moisture very fine qtz sandy (30%) clayey (10%) silt (60%)
0.2		S0237	0.2-0.5			0	
1			1		ML		At 1.5 ft becomes a med brown gray (10YR 6/2), stiff, little moisture very fine qtz sandy (30%) clayey (10%) silt (60%)
2			2				
2.75		S0238				0	
3			3				TD = 3ft
3.75							
4							
5.25							

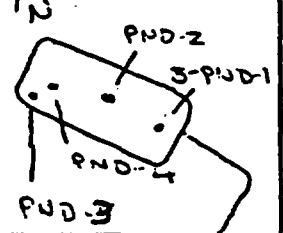
Field Bore Log

Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Task 3 Group 2 SWMUs

Sketch Map/Notes



Site Type Hand Auger

Date/Time Started 10/29/93, 1430

Site ID 5-PND-1 Dia. of Hole 3 in

Surface Elevation NA

Date/Time Completed 11/29/93, 1510

Completion Depth (ft.) 5 ft

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Hand Auger

Drilling Company Ebasco No. Samples 4

Driller Rich Borden

Size and Bit Type NA

Drilling Fluid NA

Sampler Type NA Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs) NA Drop (in.) NA

Geologist/Date RKB 10/29/93

Checked by/Date Paul White 11/2/93

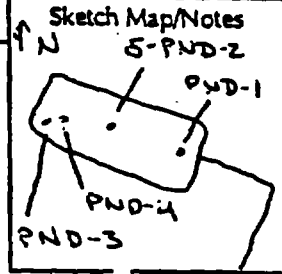
RKB → (Signature) RTC 11/4/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	273 10/29/93	Soil 1	0	ML	ML	0	Organic rich, med dark brown (10YR 4/3) loam, little moisture minor very fine qtz sandy, clayey silt, with much CaCO ₃
0.2							
0.5							
1			Soil 2				
2	273 10/29/93	Soil 3	2	ML	ML	0	By two feet is a light brown (2.5Y 7/3), medium stiff, very fine qtz sandy, clayey silt with minor biotite, abundant CaCO ₃
3							
4	273 11/27/93	Soil 4	4	ML	ML	0	By 4 ft the color has changed to (2.5Y 5/2)
5							
5.28	273 10/29/93						TD = 5 ft

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Hand Auger

Date/Time Started 10/29/93, 1520

Site ID 5-PND-2 Dia. of Hole 3in

Surface Elevation NA

Date/Time Completed 10/29/93, 1550

Completion Depth (ft.) 5 FT ^{4' 4" 10/27/93}

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method Hand Auger

Drilling Company Ebasco No. Samples 4

Driller Rich Borden

Size and Bit Type NA

Drilling Fluid NA

Sampler Type NA Length (ft.) NA

Diameter (in.) NA Driving Wt.(lbs.) NA Drop (in.) NA

Geologist/Date MZA 10/29/93
(Signature)

Checked by/Date Paul R White 11/2/93

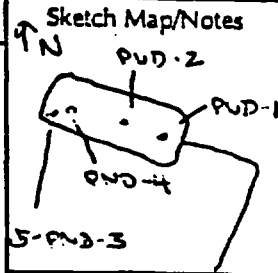
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)	
0		SCUS	0		ML	0	organic rich, dark brown (10YR 4/3), CaCO ₃ rich, loose, very fine sandy, clayey silt, little moisture	
			0.2			0		
			.5					
1		SCUS 6	1					By .5 ft is no longer organic rich light gray brown (10YR 5/3 with white CaCO ₃ cemented clasts; caliche)
2			2		ML	0	By 2 ft is a mottled light yellow brown (2.5Y 6/4) and med reddish brown (10YR 5/6), medium stiff, little moisture, CaCO ₃ rich with caliche clasts slightly very fine sandy, clayey silt	
3		SCUS 7	3					At 4 ft 2 in hit a silty gravel subround, subangular, grey limestone pebbles up to 1/2 inch in diameter well sorted
4			4			GM		
5		SCUS 8				0	Hit rock at bottom of hole 4 TD = 5 FT 4"	

Field Bore Log

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Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Hand Auger

Date/Time Started 10/29/93, 1630

Site ID 5-PUD-3 Dia. of Hole 3 in

Surface Elevation NA

Date/Time Completed 10/29/93, 1635

Completion Depth (ft.) 1 FT

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Hand Auger

Drilling Company Ebasco No. Samples 2

Driller Rich Borden

Size and Bit Type NA

Drilling Fluid NA

Sampler Type NA Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date MZA 10/29/93
(Signature)

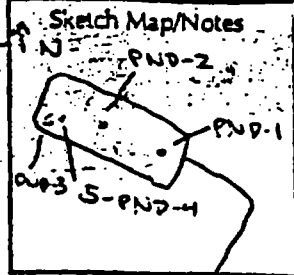
Checked by/Date Paul White 11/2/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		SU019	0		ML	0	Organic rich, med dark reddish brown (10YR 4/3) gravelly, very fine sandy ^{clay} silt, loose, 11% moisture, charcoal near surface and red, baked clinker; CaCO ₃ rich
0.2			0.2			0	
1		SU020	1				TD = 1 FT
1.25	2x5 10/29/93						
2.75	10/29/93						
3.75	10/29/93						
5.25	10/29/93						

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Auger Hole

Date/Time Started 10/27/93, 1620

Site ID S-PND-4 Dia. of Hole 3 in

Surface Elevation NA

Date/Time Completed 10/27/93, 1620

Completion Depth (ft.) 1 FT

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Hand Auger

Drilling Company Ebasco No. Samples 2

Driller Rich Borden

Size and Bit Type NA

Drilling Fluid NA

Sampler Type NA Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

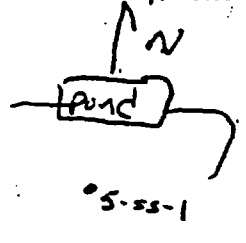
Geologist/Date MJM 10/27/93
(Signature)

Checked by/Date [Signature] 11/2/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S0021	0-0.2		ML	0	medium brown (10YR 4/3), loose, little moisture, CaCO ₃ rich, gravelly, very fine sandy, clayey silt, becoming less organic rich with depth and changes to 2.5Y 5/3 TD = 1 FT
1		S0022	0.2-1			0	
1.73	R73						10/27/93
2.73	R73						10/27/93
3.73	R73						10/27/93
4.73	R73						10/27/93
5.26	R73						10/27/93

Field Bore Log

- Sketch Map/Notes



Tooele Army Depot - South Area

Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Surface Sample

Date/Time Started 10-20-93 11:00

Surface Elevation NA

Completion Depth (ft.) 2''

Equipment and Drilling Method Trowel

Size and Bit Type NA

Sampler Type NA Length (ft.) NA

Geologist/Date Rich Wiengard

(Signature) 5/10/94

Site ID S-SS-1 Dia. of Hole 1/8

Date/Time Completed 10-20-93 11:10

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Drilling Company NA No. Samples 1

Driller NA

Drilling Fluid NA

Diameter (in.) NA Driving Wt.(lbs.) NA Drop (in.) NA

Checked by/Date Ray W... 5/10/94

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S0023	2110	0-2''	100%	GC	0	Silty Clayey Gravel - 25% silt, 30% clay + 15% gravel 107 R ³ / ₄ dk yellowish brown, unglastic, dense, unconsolidated, moist
5							
10							
15							
20							

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area

Ebasco Environmental
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Lakewood, Colorado 80228

N N

Task 3 Group 2 SWMUs

Site Type Surface Sample

Date/Time Started 10-20-93 11:15

Site ID 5-55-2 Dia. of Hole n/a

Surface Elevation NA

Date/Time Completed 10-20-93 11:16

Completion Depth (ft.) n/a

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method n/a

Drilling Company N/A No. Samples 1

Driller n/a

Size and Bit Type n/a

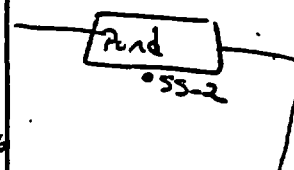
Drilling Fluid n/a

Sampler Type n/a Length (ft.) n/a

Diameter (in.) n/a Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date (Rick Weingarten) 5/10/94
(Signature)

Checked by/Date Alan G. [Signature] 5/10/94



Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S00261	2ANAL	0-2"	n/a	GC	0	Silty Clayey Gravel, 20% silt, 30% clay, 50% gravel, 10% 1/4 dk yellow brown, nonplastic, dense, unconsolidated moist
5							
10							
15							
20							

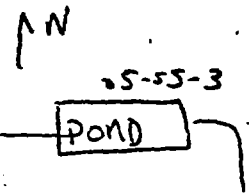
Field Bore Log

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Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type Surface Sample

Date/Time Started 10-20-93 1115

Site ID S-55-3 Dia. of Hole n/a

Surface Elevation _____

Date/Time Completed 10/20/93 1130

Completion Depth (ft.) n/a

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method n/a

Drilling Company n/a No. Samples 1

Driller n/a

Size and Bit Type n/a

Drilling Fluid n/a

Sampler Type n/a Length (ft.) _____

Diameter (in.) n/a Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date RW 10-20-93
(Signature)

Checked by/Date [Signature] 5/11/94

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	SOD 25	2B	0-2'	N/A	GC	D	Silty Clayey Gravel - 20% silt 30% clay 50% gravel 10% 1/4 DK yellow brown, low plastic, some, w/ coarse sand, moist
5							
10							
15							
20							

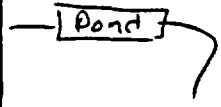
Field Bore Log

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Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes
N/A
SS-4



Site Type Surface Sample

Date/Time Started 10-20-93 1132

Site ID S-55-21 Dia. of Hole N/A

Surface Elevation _____

Date/Time Completed 10/20/93 1135

Completion Depth (ft.) N/A

Water Level Initial (ft.): N/A; After N/A Hours N/A (ft)

Equipment and Drilling Method N/A

Drilling Company N/A No. Samples 1

Driller N/A

Size and Bit Type N/A

Drilling Fluid N/A

Sampler Type N/A Length (ft.) N/A

Diameter (in.) N/A Driving Wt. (lbs) N/A Drop (in.) N/A

Geologist/Date [Signature] 10-20-93

Checked by/Date [Signature] 5/11/94

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S0026	2A	0-2"	N/A	GC	0	Silty Clayey Gravel - 25% silt, 25% clay 50% gravel 10 ft 1/2 dk yellow brown - nonplastic, base, unconsolidated, moist
5							
10							
15							
20							

Field Bore Log

5-UST-1

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Tooele Army Depot - South Area

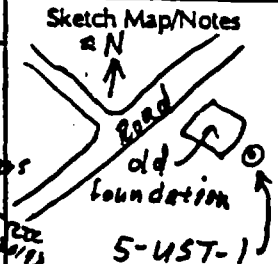
Task 3 Group 2 SWMUs

Ebasco Environmental

143 Union Blvd., Ste. 1010

Lakewood, Colorado 80228

4 1/4 inch Z.O. augers



Site Type Bore

Date/Time Started 10/20/93 1036

Site ID 5-UST-1 Dia. of Hole 3 inch

Surface Elevation _____

Date/Time Completed 10/20/93 1200

Completion Depth (ft.) 15.5 ft

Water Level Initial (ft.): DRY; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B-53

Drilling Company Boyles Brothers No. Samples 3

7/4 inch Tooth Size and Bit Type Split Spoon ^{RTC 10/20/93}

Driller Jay Hulise

Sampler Type Spoon Length (ft.) 2

Diameter (in.) 3 Driving Wt. (lbs.) push Drop (in.) NA

Geologist/Date R. T. Canon

Checked by/Date Paul White 10/25/93

(Signature) 10/20/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0					Fill		Fill: sand, gravel, and clay; moist; loose; 10YR 4/3 Brown 1.0
0-1.5				Auger	CL	10/20/93	clay (70%); some silt (20%); trace clay (10%); low-moderate plasticity; 10YR 8/2 very pale brown; medium stiff; NC; dry
1.5-4.5	50039 50040 50041		4-5	1.5 1.5	CL	10/20/93	
4.5-9.0	50042 50043 50044		9-10	1.5 1.5	CL	10/20/93	clay (60%); some silt (20%); some very fine grained sand (20%); moderate plasticity; 10YR 6/3 Pale Brown; stiff; NC; Low Moisture
9.0-14.0	50045 50046 50047		14-15	1.5 1.5			clay (50%); some silt (15%); some very fine grained sand (20%); some gravel (15%); increasing to gravelly bottom 0.2 ft; gravel and sand is graded, increasing w/depth; moderate plasticity; 10YR 5/4 Yellowish brown; stiff; NC; moist; gravel is dark grey limestone.
14.0-15.5							TD at 15.5 ft

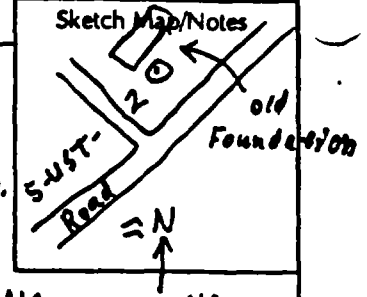
Field Bore Log

5-UST-2

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Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Bore

Date/Time Started 10/20/93 1210

Site ID 5-UST-2 Dia. of Hole 4 1/4 inch I.D. Auger

Surface Elevation _____

Date/Time Completed 10/20/93 1350

Completion Depth (ft.) 15.0

Water Level Initial (ft.): Dry; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B-53

Drilling Company Bayles Brothers No. Samples 3
Driller Jay Hulse

Size and Bit Type 7 1/2 inch O.D. Tooth

Drilling Fluid None

Sampler Type split spoon Length (ft.) 2

Diameter (in.) 3 Driving WL (lbs.) push Drop (in.) NA

Geologist/Date R.T. Canon
(Signature) 10/20/93

Checked by/Date [Signature] 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0							Fill: sand, gravel, and clay; loose; moist; 10YR 4/3 brown
0-1.0					CL	⊙	clay (65%); some silt (20%); some very fine grained sand (15%); low-moderate plasticity; 10YR 7/3 very pale brown; stiff; NC; dry; large dark grey limestone cobble at 4.8 ft; trace gravel (1.3%) @ 4.8-5.2 ft; the gravel may have been back fill from the UST. RTC 10/20/93
4.5-5.0	S0048 S0049 S0050		4-5	0.0 1.0		⊙	
5.0-10.0					CL	⊙	clay (60%); some silt (20%); some very fine grained sand (20%); low-moderate plasticity; 10YR 6/4 light yellowish brown; firm; NC; dry
9-10	S0051 S0052 S0053		9-10	1.5 1.5		⊙	
14-15	S0054 S0055 S0056		14-15	1.0 1.0		⊙	clay (50%); some silt (15%); some very fine grained sand (20%); some gravel (15%), increasing to gravelly bottom 0.1 ft; gravel and sand is graded; increasing with depth; low-moderate plasticity; 10YR 5/4 yellowish brown; stiff; NC; dry; dark bluish grey limestone gravel
15.0							TD at 15.0 ft.

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

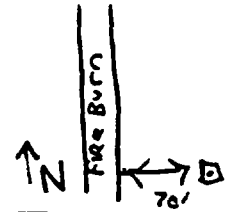
Site Type BORE/GRAB

Date/Time Started 10-25-93/1325

Site ID B-BK-1 Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-25-93/1433



Completion Depth (ft.) 3

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B53

Drilling Company Boyles Bros. No. Samples 2 Chemical
1 Geotech

Split Spoon Samplers - pushed

Driller J. Hulse

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split 2000 Length (ft.) 2

Diameter (in.) 2.5 Geotech 3.0 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date J. Hulse 10-25-93
(Signature)

Checked by/Date [Signature] 11/18/93

Blow Counts
pushed

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-0.2	NA	ML	O	0 - 1.0 ft clayey silt w/some fine sand (25% clay, 55% silt, 20% sand);
1		S*	1-3				104R 5/3 brown med. plasticity;
2	NA	S	2-3	1.5/2.0	ML	O	little moisture; soft; not cemented; minor roots
3							1.0 - 3.0 ft clayey silt w/some clay + some fine sand (20% clay, 60% silt, 20% fine sand), 104R 6/2 light brownish gray; low-med plasticity; dry; med. stiff - firm; not cemented; sample compacted
5							
10							
15							
20							

*Geotech sample collected at the 1-3 ft interval

Field Bore Log

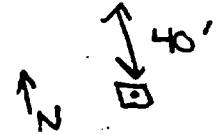
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Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Fire Break



Site Type GRAB/CORE

Date/Time Started 10-25-93 / 1515

Site ID 8-BK-2 Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-28-93 / 1000
10-26-93

Completion Depth (ft.) 3ft

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Mobile 8-53

Drilling Company Bayles Bros. No. Samples 1 Geotech
2 chemical

split spoon sampler - pushed

Driller J. Hulse

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2

Diameter (in.) 3.0 Driving Wt. (lbs.) 140 Drop (in.) 30
2.5 Geotech

Geologist/Date J. M. Bagn 10-25-93
(Signature)

Checked by/Date Paul White 11/2/93

Blow Counts

pushed

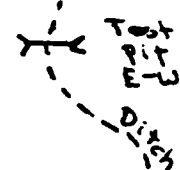
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-2	NA	ML	0	0-1 ft clayey silt w/ some fine sand (25% clay, 55% silt, 20% sand); 10 YR 5/3 brown; little moisture; soft; med. plasticity; roots; not cemented
1		S*	1-3				
2	NA	S	2-3	3/2	ML	0	1-3 ft clayey silt w/ some fine sand (24% clay, 60% silt, 15% sand); 10 YR 5/4 yellowish brown; dry; medium to medium stiff; med. plasticity; not cemented.
3							
5							
10							
15							
20							

* Geotech sample collected at the 1-3 ft interval

Field Bore Log

↑ N Page 1 of 1

Sketch Map/Notes



Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Test Pit

Date/Time Started 10/12/93, 1455

Site ID 8-DCH-1 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/12/93, 1545

Completion Depth (ft.) 3

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method 580

Drilling Company UXB No. Samples 2

Case backhoe

Driller Ren Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type GWS Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date WRS 10/12/93

Checked by/Date [Signature] 10/20/93

(Signature)

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0							med brown, (10YR 4/4), soft, little moisture, moderately organic rich, very fine grained, quartz sandy (10%) clayey (20%) silt (70%)
1	RWS 10/12/93	S0748 to S0751	0.5		0	ML	At 8 in deep on western end of test pit hit a .5 to 1 inch thick layer of black powder that smells of sulfur; The layer is exposed on both sides of the trench for about 1 1/2 feet.
2		S0752 to S0755	2		0		
3	RWS 10/12/93		3				TD = 3 ft
4	RWS 10/12/93						
5.28	RWS 10/12/93						

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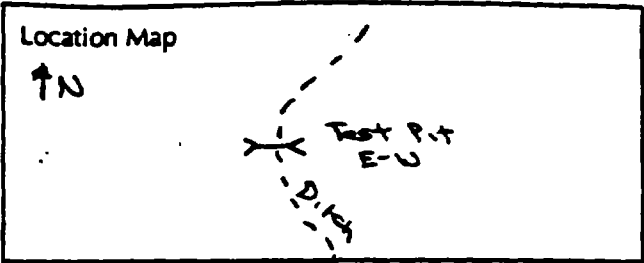
UXB
Contractor Name

Test Pit Record

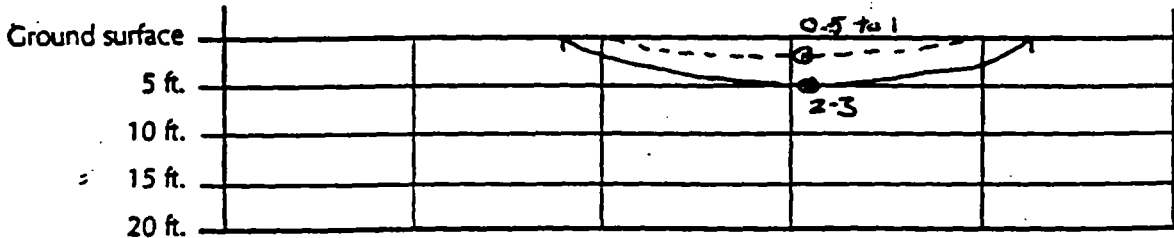
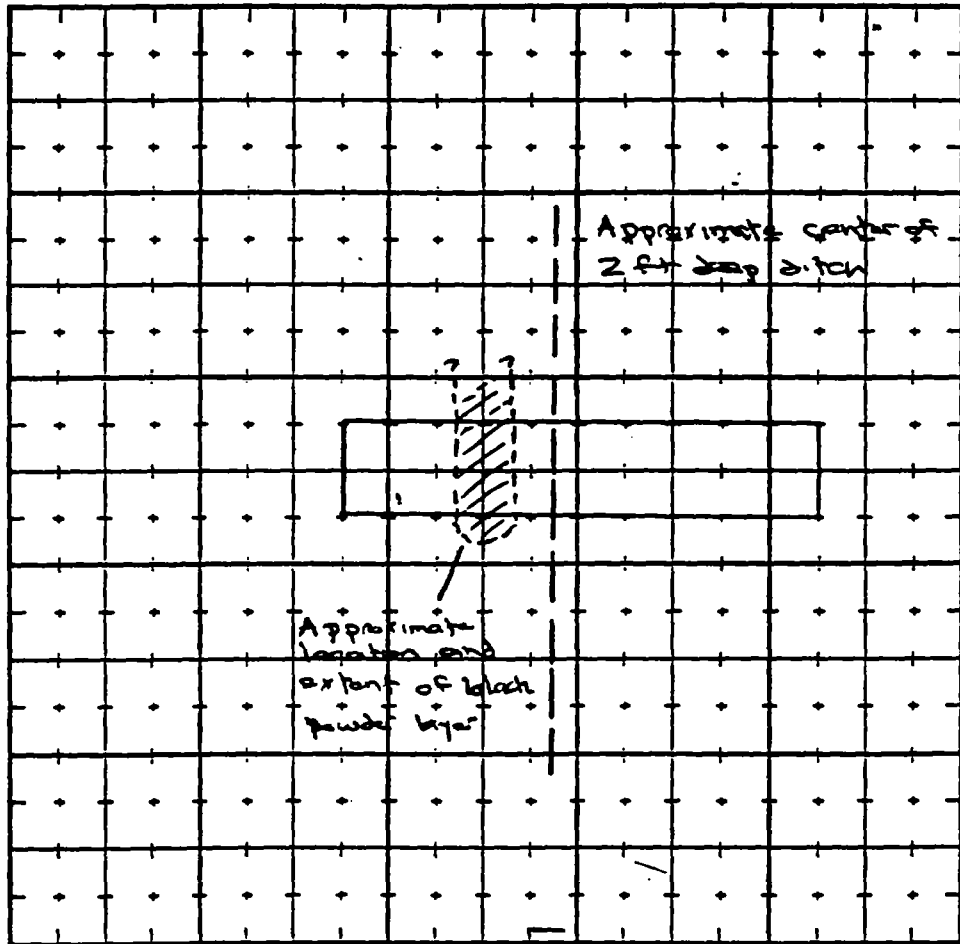
SWMU 8 Test Pit 8-DCH-1

Date/Time Started 10/12/93 1405 ~~1055~~ 949 ~~1012~~ ¹⁰¹² Coordinates NA

Date/Time Completed 10/12/93 1545 Geologist Rich Borden



Scale: 1 inch = 4 ft.

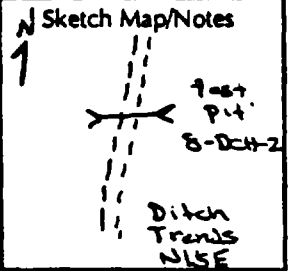


Notes Test pit is oriented E-U and is 10 ft long
Thin layer (<1 in) of black powder exposed for 18 in
on north and south sides of trench. Sampling interval
altered to incorporate this layer.

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/10/93, 1410

Site ID 8-DCH-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/10/93, 1450

Completion Depth (ft.) 3

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method SBO
Case Backhoe

Drilling Company UXB No. Samples 2

Driller Ron Wilson

Size and Bit Type 18in bucket

Drilling Fluid NA

Sampler Type G and S Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date M J M 10/10/93
(Signature)

Checked by/Date Fan White 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		50258 to 50259	0 to -2		ML	0	dark brown (10YR 4/2) organic rich, soft, med moist, very fine sandy (15%) clayey (20%) silt (65%)
1	R23 10/10/93						By 0.5 ft this changes to: light brown (10YR 5/4) dry, stiff to very stiff, silty (40%) very fine grained quartz sand (60%) well sorted with minor clay
2	R23 10/10/93	50260 to 50263	2		GM	0	Sharp contact at 1.5 ft with a dry, loose to med. dense, brown, (10YR 4/4) silty (10%), fine to med. grained, moderately sorted sandy gravel. gravel is subangular, subangular to subequant, clasts of limestone and sandstone up to 2 inches in dia
3							TD = 3 ft
4	R23 10/10/93						
5	R23 10/10/93						

UXB
Contractor Name

Test Pit Record

SWMU 8

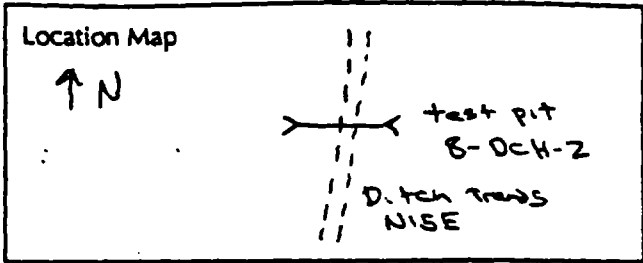
Test Pit 8-DCH-2

Date/Time Started 10/10/93, 1410

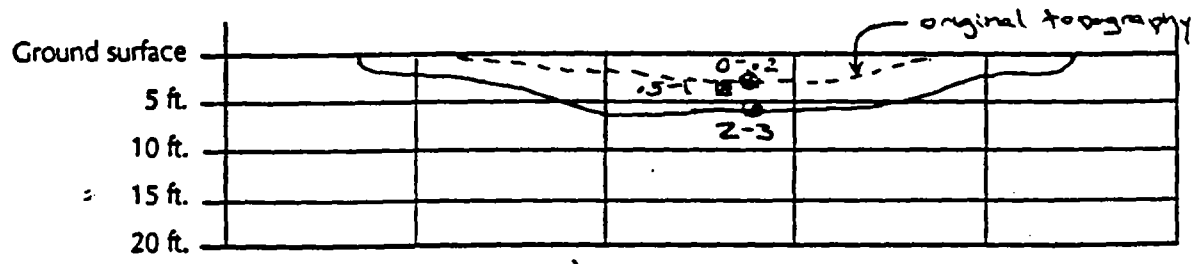
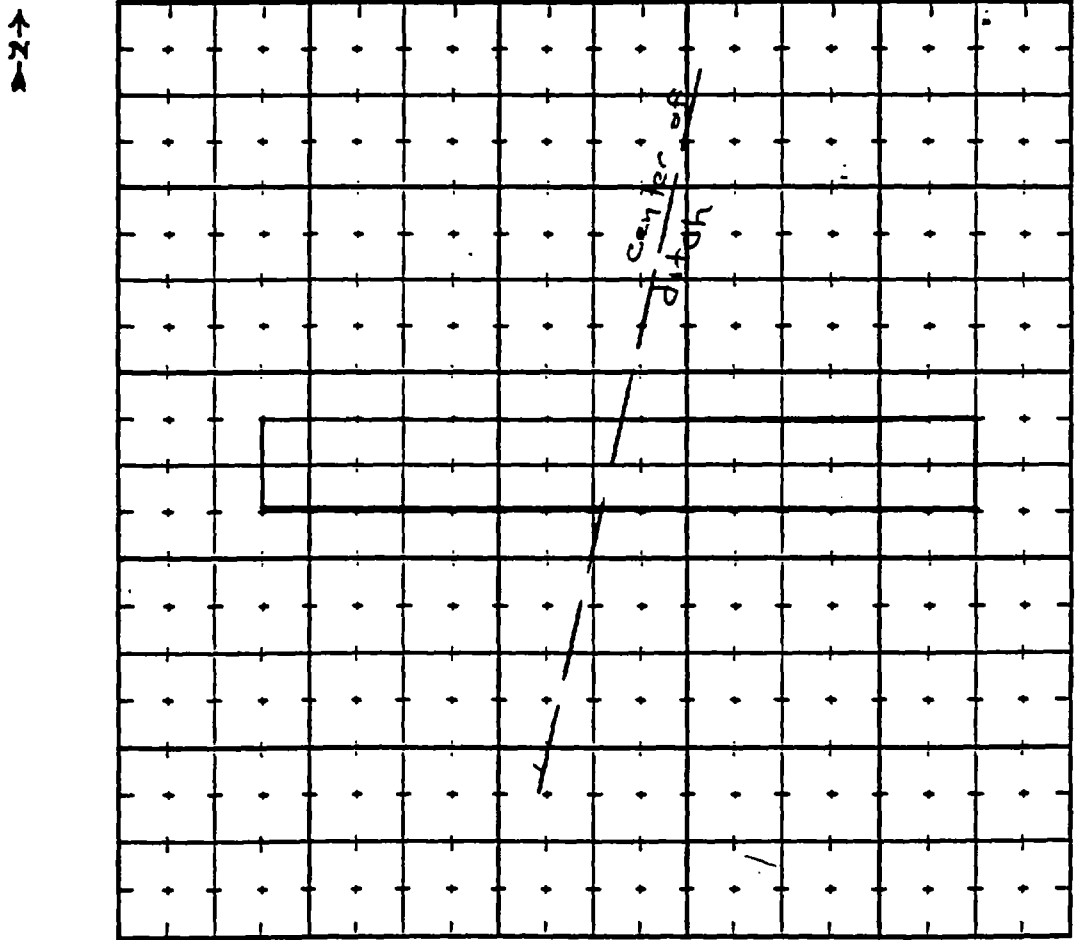
Coordinates NA

Date/Time Completed 10/10/93, 1450

Geologist Rich Pindan



Scale: 1 inch = 4 ft.



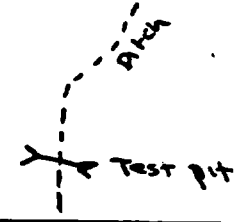
Notes Test pit is oriented E-W. Walls are vertical
Test pit was excavated across a 3 ft deep trench
and was three feet deep in the center of the trench.

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/12/93, 1600

Site ID 8-DCH-3 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/12/93, 1610

Completion Depth (ft.) 3

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method 580

Drilling Company UKB No. Samples 2

case backhoe

Driller Ron Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type GandS Length (ft.) NA

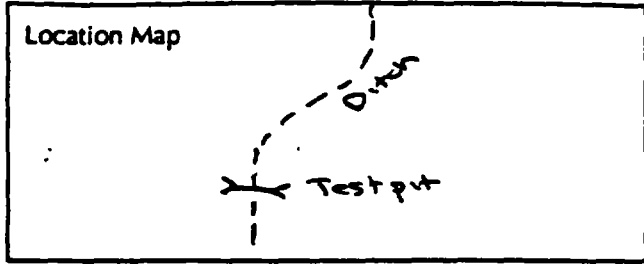
Diameter (in.) NA Driving Wt (lbs) NA Drop (in.) NA

Geologist/Date AKA 10/12/93
(Signature)

Checked by/Date [Signature] 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		50764 to 50767	0 to 2			0	dark brown (10YR 4/3) clayey (5%), very fine grained sandy (10%) silt (85%) with minor organics, dry, loose
1	283 10/12/93				ML		By .5 ft has no organics and is light brown (10YR 5/4)
2		50768 to 50771	2 to 3			0	
3	283 10/12/93						TD=3ft
4	283 10/12/93						
5	283 10/12/93						

EBASCO SERVICES INCORPORATED



Contractor Name UAB

Test Pit Record

SWMU 8

Test Pit B-DCH-3

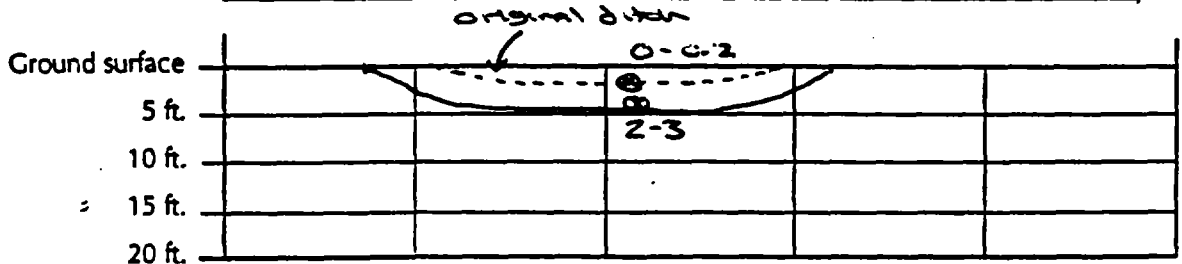
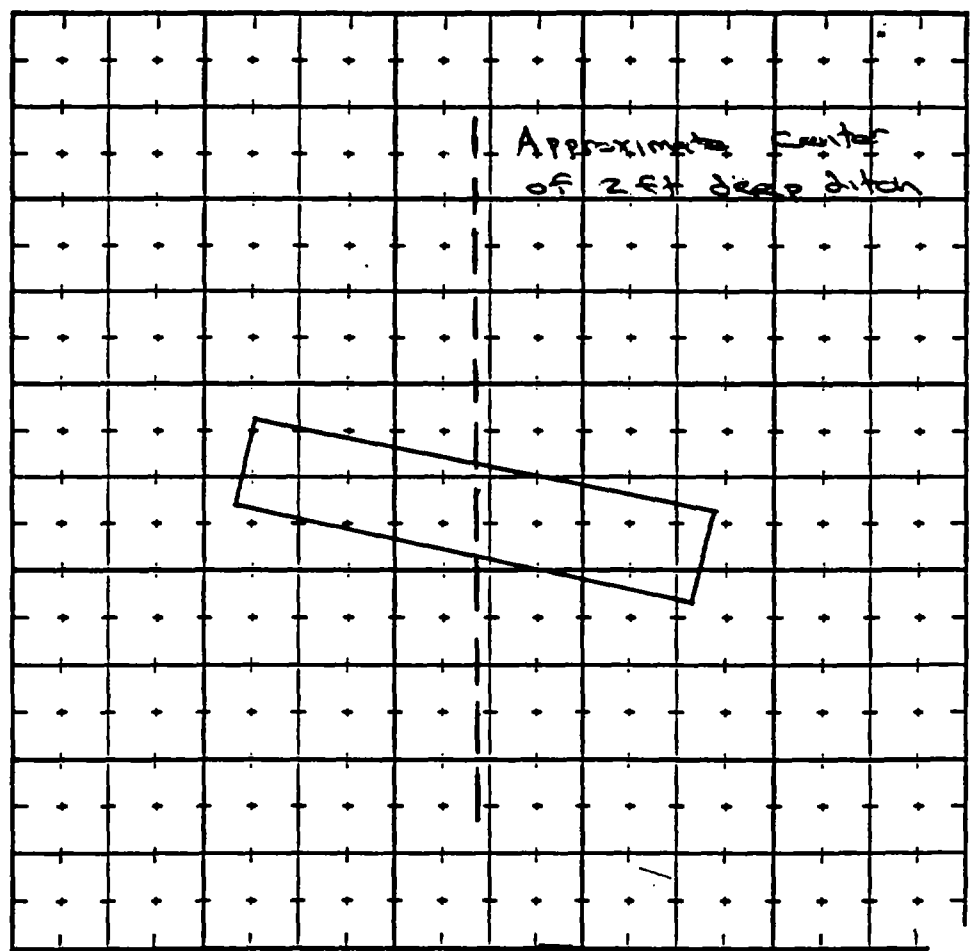
Date/Time Started 10/12/93, 1600

Coordinates NA

Date/Time Completed 10/12/93, 1610

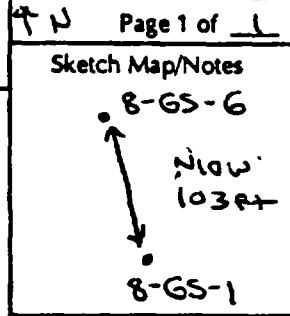
Geologist Rich Borden

Scale: 1 Inch = 4 ft.



Notes Trench is oriented N80W and is 6 ft long

Field Bore Log



Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Task 3 Group 2 SWMUs

Site Type Test Pit

Date/Time Started 10/10/93, 1145

Site ID 8-GS-1 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/10/93 1240

Completion Depth (ft.) 3

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method SBO

Drilling Company UXB No. Samples 3

Case backhoe

Driller Ron Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type Gows Length (ft.) NA

Diameter (in.) NA Driving WA (lbs) NA Drop (in.) NA

Geologist/Date MKA
(Signature)

Checked by/Date [Signature] 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		0	SO688 to SO691			0	med brown (10YR 5/3) organic rich, soft, little moisture, very fine qtz sandy (40%), silt (60%) with minor clay
0.5		1	SO692 to SO695		ML	0	Below 8 in no organics med, brown (10YR 5/4), little moisture, stiff, very fine qtz sandy (40%), silt (60%) with minor clay
1	R73 10/10/93	2	SO696 to SO699			0	
2	R73 10/10/93	3					
3	R73 10/10/93						TD = 3 FT
4	R73 10/10/93						
5.28	R73 10/10/93						

EBASCO SERVICES INCORPORATED

UXB
Contractor Name

Test Pit Record

SWMU 8

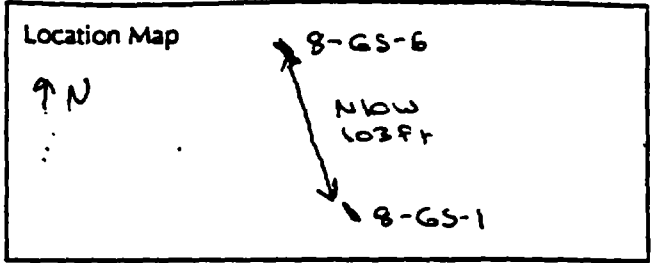
Test Pit 8-GS-1

Date/Time Started 10/10/93 1145

Coordinates NA

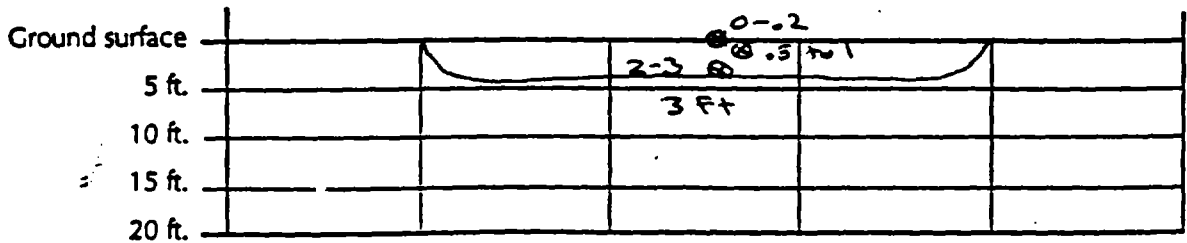
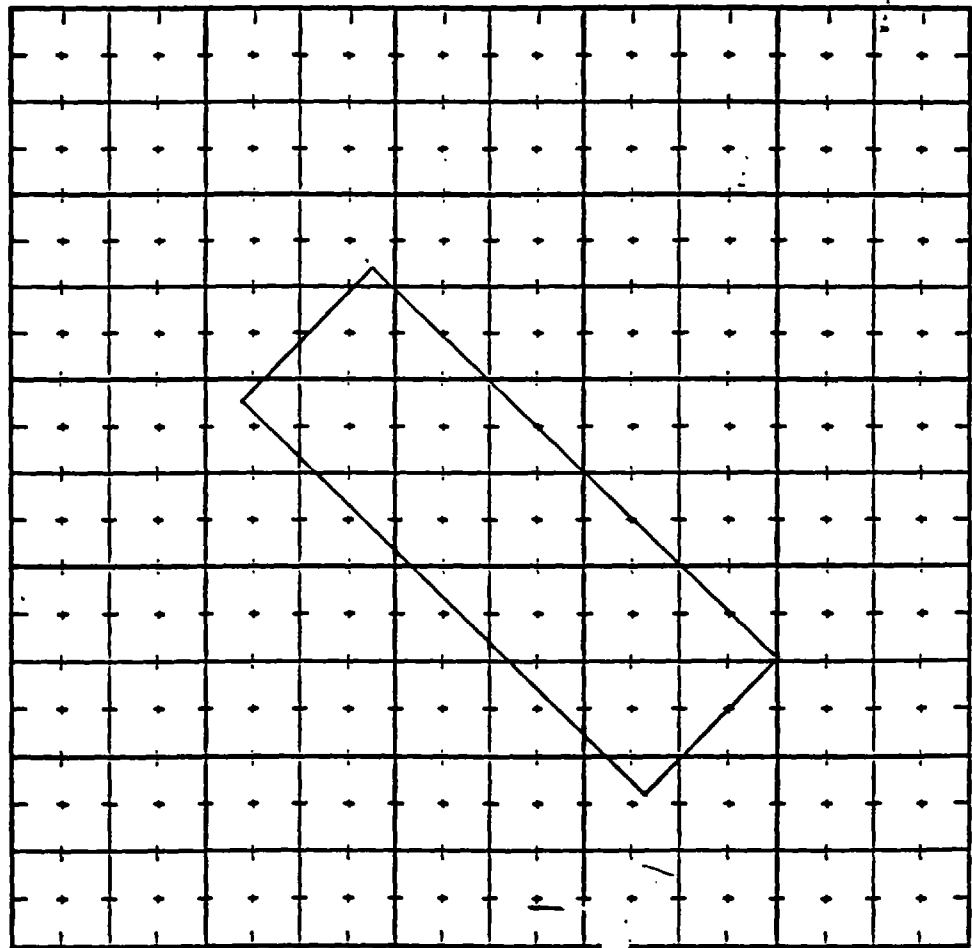
Date/Time Completed 10/10/93 1240

Geologist Rich Barden



Scale: 1 inch = 2 ft

↑ N



Notes Test pit is oriented N45W

Field Bore Log

Page 1 of 1
 Sketch Map/Notes
 8-GS-2 Concrete
 PDS
 15 ft
 RAS 10/19/93
 E-W

Tooele Army Depot - South Area

Ebasco Environmental
 143 Union Blvd., Ste. 1010
 Lakewood, Colorado 80228

Task 3 Group 2 SWMUs

Site Type Test Pit

Date/Time Started 10/19/93, 1550

Site ID 8-GS-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/19/93, 1620

Completion Depth (ft.) 3 ft

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method 580

Drilling Company UXB No. Samples 3

Case backhoe

Driller Ron Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type G90S Length (ft.) NA

Diameter (in.) NA Driving Wt (lbs.) NA Drop (in.) NA

Geologist/Date W R B 10/19/93
(Signature)

Checked by/Date [Signature] 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S070 to S073	0 to .2		GM	0	Fill gravel - angular to subangular, sub-elongate (50%) with a matrix of clayey, silty sand and organic debris the sand is light brown, (10YR 4/2) fine to medium grained mix of rock fragments and quartz grains Fill is .5 to 1 ft thick in test pit walls
		S074 to S077	.2 to .5			0	
1	RAS 10/19/93		1		ML		Light brown (10YR 6/4) fine sandy (15%), clayey (25%) silt (60%) dry, hard TD = 3 ft
2	RAS 10/19/93	S078 to S0711	2 to 3			0	
3			3				
4	10/19/93 RAS						
5	RAS 10/19/93						

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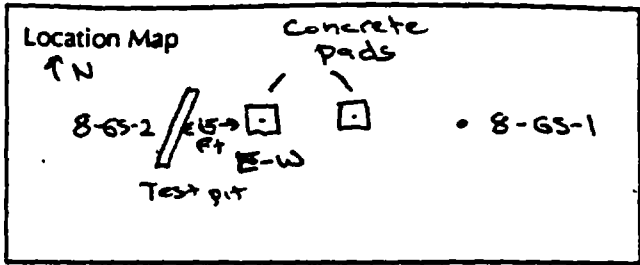
Contractor Name UXB

Test Pit Record

SWMU 8

Date/Time Started 10/9/93, 1550

Date/Time Completed 10/9/93 1620



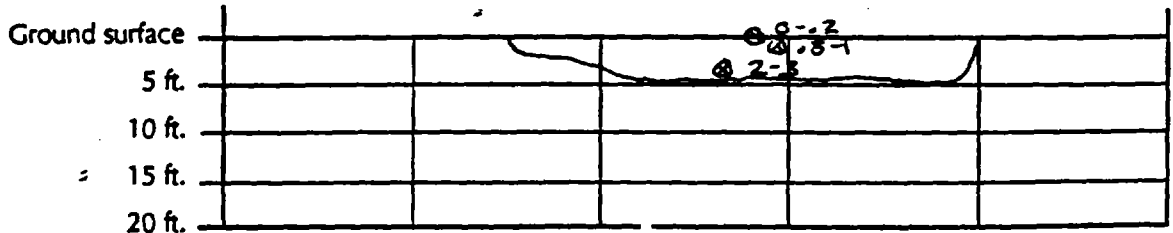
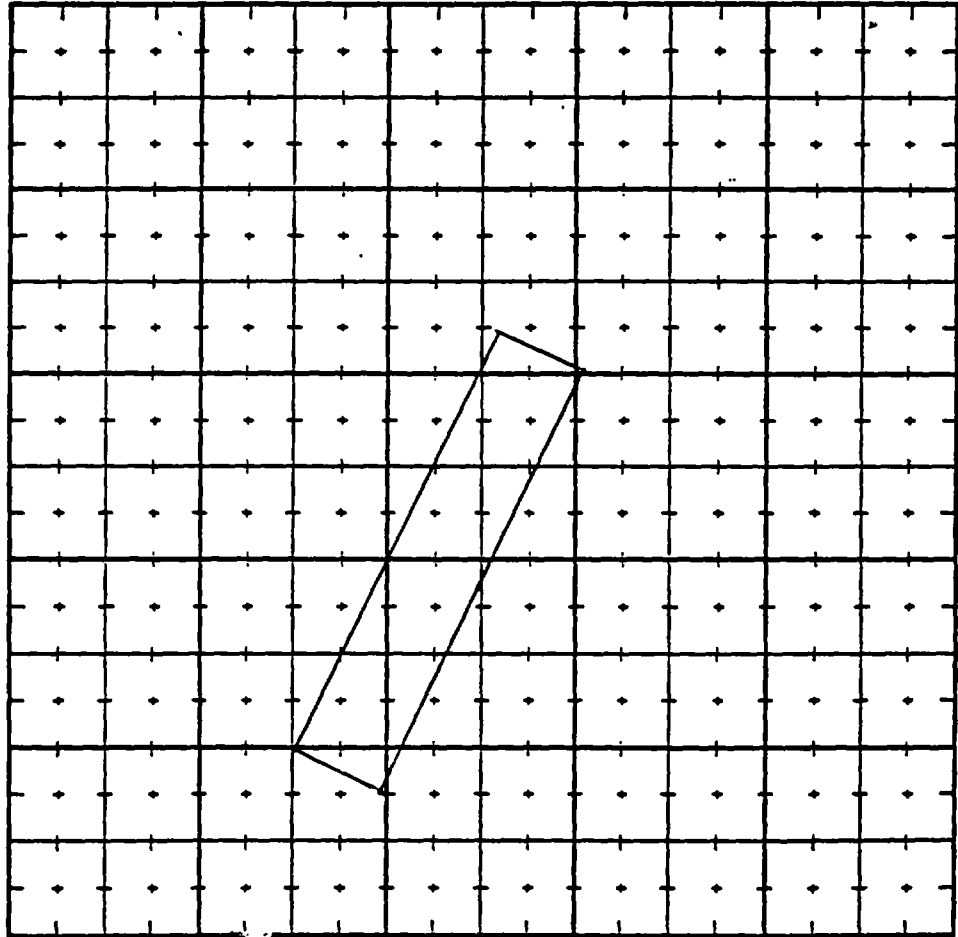
Test Pit 8-GS-2

Coordinates NA

Geologist Richard Burden

Scale: 1 inch = 4 ft.

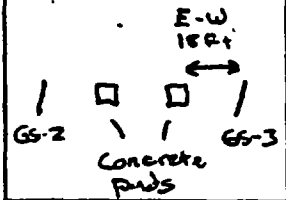
↑ N



Notes Test pit is oriented N20E, walls are vertical

Field Bore Log

Sketch Map/Notes



Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Task 3 Group 2 SWMUs

Site Type Test Pit

Date/Time Started 8/10/93, 0910

Site ID B-GS-3 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/10/93, 0945

Completion Depth (ft.) 3

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method SR0

Drilling Company UXB No. Samples 3

Cone Backhoe

Driller Ren Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type Gans Length (ft.) NA

Diameter (In.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date AKM
(Signature)

Checked by/Date [Signature] 10/2/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S0712 to S0715	0 to 2		GM	0	Dark brown (10YR 3/2) organic rich, silty (20%) sandy (30%) gravel (50%) Gravel is subangular, subsequent to subangular, up to 2 in in diameter, sand is fine to coarse and composed of rock fragments and quartz, loose, medium moist
0.5		S0716 to S0719	0.5 to 1			0	From 0.5 to 1 ft is disturbed, loose, dry friable soil (see description below)
1	AK3 10/10/93						
2		S0720 to S0723	2 to 3		ML	0	light brown, 10YR 5/4, dry, hard very fine sandy (10%), clayey (5%) silt (75%)
2.5	AK3 10/10/93						
3							
3.5	AK3 10/10/93						
4							
4.5	AK3 10/10/93						
5	AK3 10/10/93						
TD = 3 ft							

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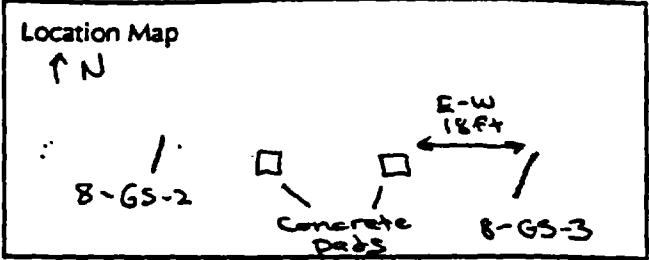
UXB
Contractor Name

Test Pit Record

SWMU 8

Date/Time Started 10/10/93 0910

Date/Time Completed 10/10/93 0945

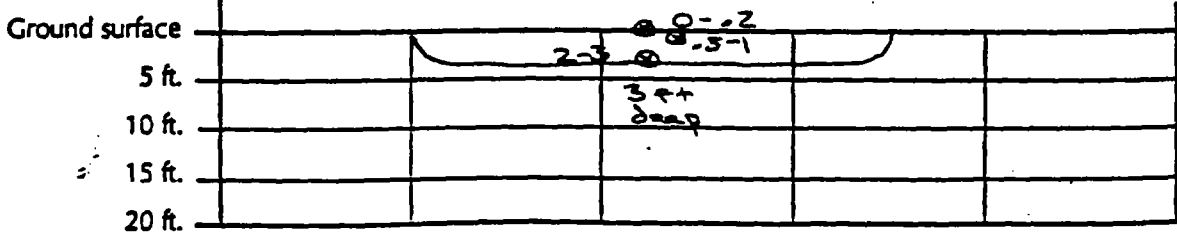
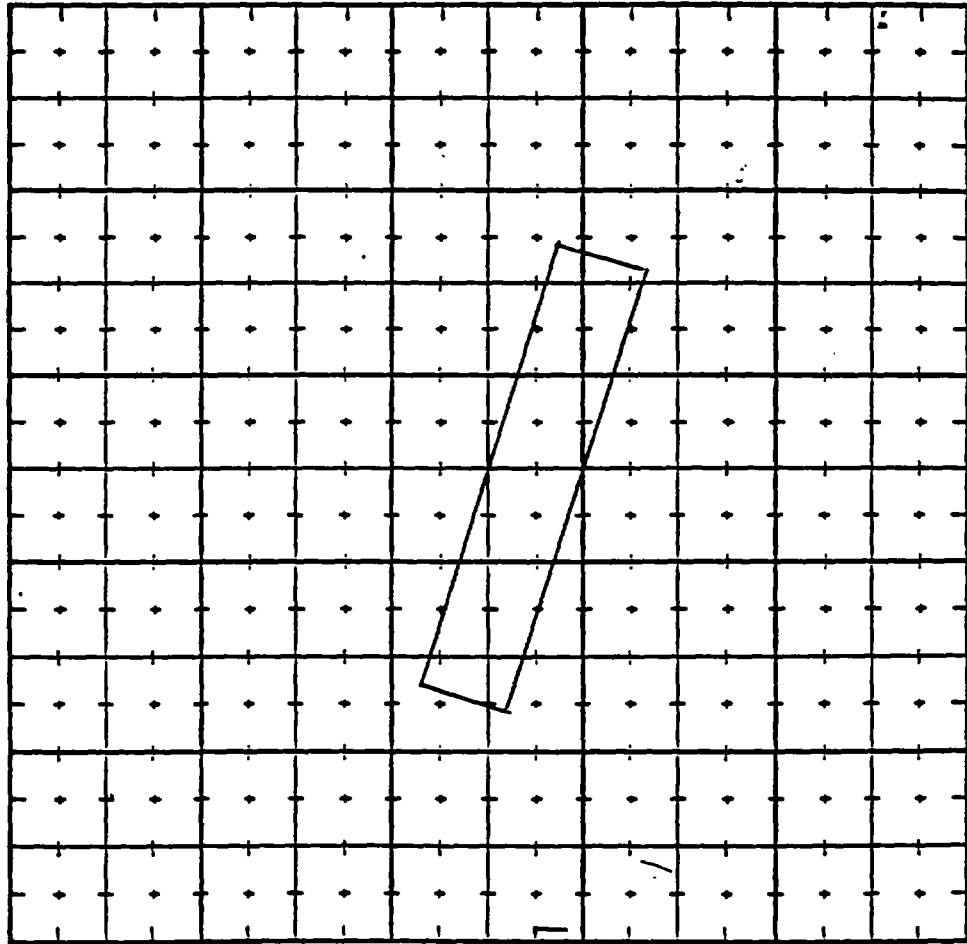


Test Pit 8-GS-3

Coordinates NA

Geologist Rich Borden

Scale: 1 inch = 4 ft



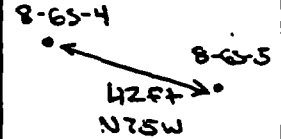
Notes Test pit is oriented NISE

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/10/93 1015

Site ID 8-65-4 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/10/93, 1100

Completion Depth (ft.) 3

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method 580 Case Backhoe

Drilling Company UXS No. Samples 3

Driller Ron Wilson

Size and Bit Type 18 in Bucket

Drilling Fluid NA

Sampler Type Gaws Length (ft.)

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date WR 10/10/93
(Signature)

Checked by/Date [Signature] 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		0 S0724 to S0727	0 to 0.5		ML	0	Medium brown (10YR 4/3) loose, moist, very fine grained quartz sandy (30%), clayey (10%) silt (55%) with rare subangular gravel (5%)
1	R93 10/10/93	1 S0728 to S0731	0.5 to 1		GM	0	By .3 feet has graded into a light brown (10YR 6/4) medium dense, dry clayey (5%), silty (10%) coarse to fine grained sandy (30%) gravel (55%); Gravel is subequal, subangular to subround mix of limestone, sandstone and silicified sediments
2	R93 10/10/93	2 S0732 to S0735	1 to 2			0	
3		3					- TO = 3 FT
4	R93 10/10/93						
5	R93 10/10/93						

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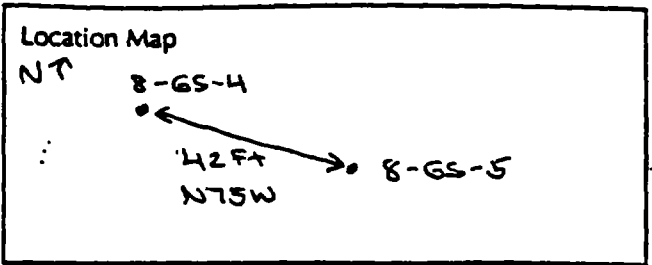
UXB
Contractor Name

Test Pit Record

SWMU 8

Date/Time Started 10/10/03 1015

Date/Time Completed 10/10/03 1100

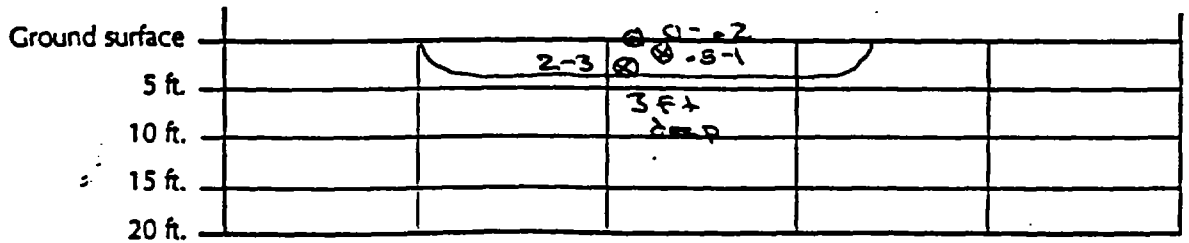
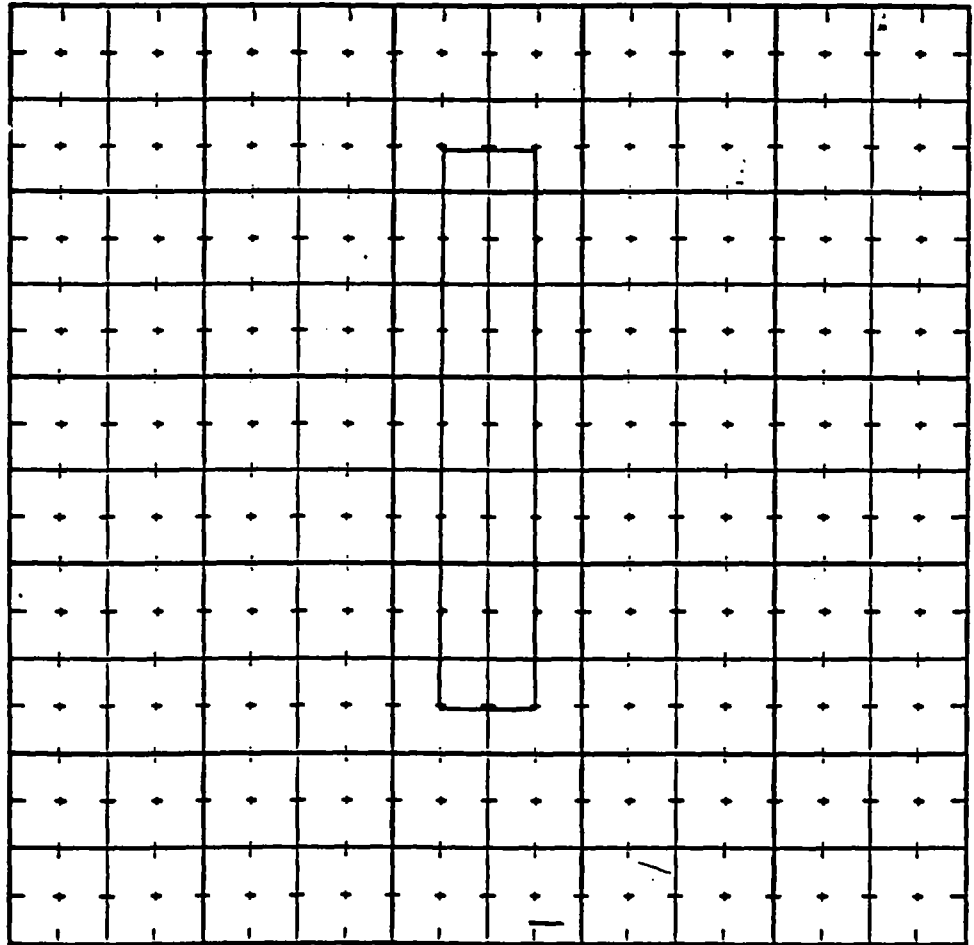


Test Pit 8-GS-4

Coordinates NA

Geologist Rich Borden

Scale: 1 inch = 4 ft



Notes Test pit is oriented N-S

Field Bore Log

8-GS-5

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Boxing

SWMU 8

Date/Time Started 1255 10/8/93

Site ID GS-5 Dia. of Hole

Surface Elevation NA

Date/Time Completed 1325 10/8/93

Completion Depth (ft.) 3'

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Backhoe

Drilling Company UXB No. Samples 3

Driller Bruce Lowe

Size and Bit Type NA

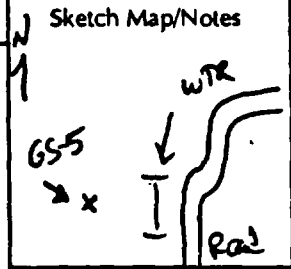
Drilling Fluid NA

Sampler Type NA Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date RJ Omerks 10/8/93
(Signature)

Checked by/Date [Signature] 10/21/93



Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D. ppm	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S	0.0-0.2		ML-SP	0	Grayish Brown HUE 2.5 Y 5/2 silt with 20% Angular Gravel (incl minor amounts of organic material in upper 1")
		S	0.5-1.0			0	
		S	2-3'		ML-CL	0	
2'							Grayish Brown HUE 2.5 Y 5/2 silt with 30-40% Light Gray & Rust Colored clay
3'							ML-CL

EBASCO SERVICES INCORPORATED

UXB
Contractor Name

Test Pit Record

SWMU 8

Date/Time Started 10/10/93 1145

Date/Time Completed 10/10/93 1240

Location Map

↑ N



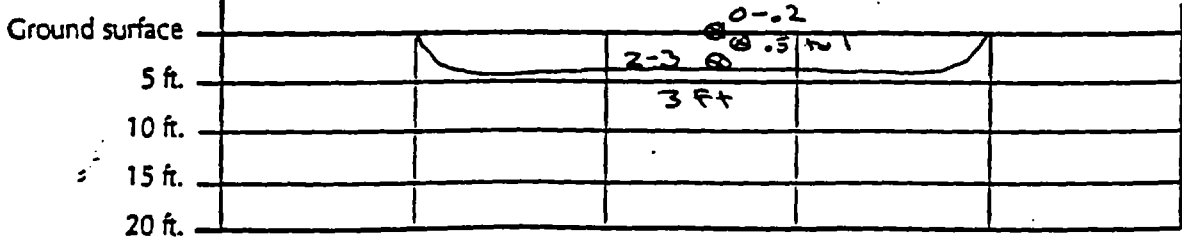
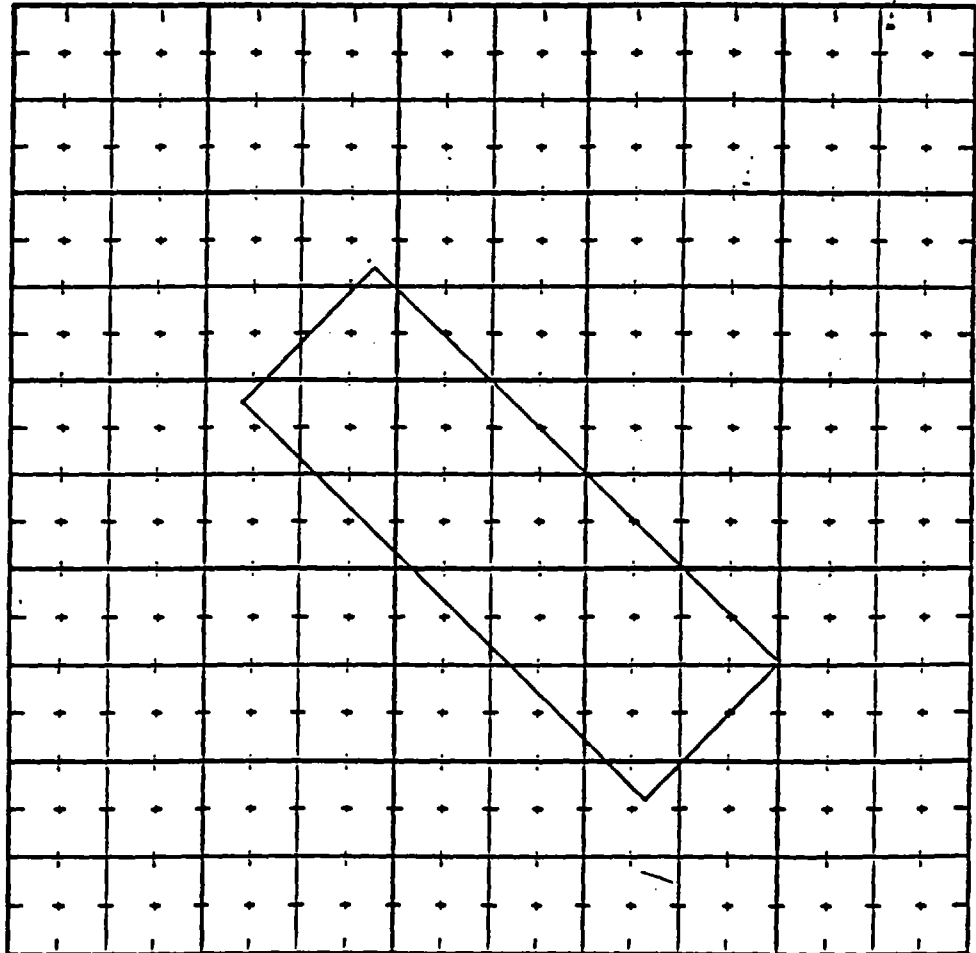
Test Pit 8-GS-1

Coordinates NA

Geologist Rich Borden

Scale: 1 Inch = 2 ft.

↑ N

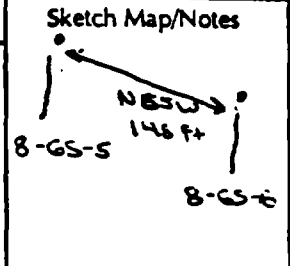


Notes Test pit is oriented N45W

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/10/93, 1305

Site ID 8-GS-6 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/10/93, 1345

Completion Depth (ft.) 3

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method S80
Case backhoe

Drilling Company UXB No. Samples 3
Driller Ben Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type GardS Length (ft.) NA

Diameter (in.) NA Driving Wt (lbs.) NA Drop (in.) NA

Geologist/Date MKM 10/10/93
(Signature)

Checked by/Date [Signature] 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S0736 to S0737	0 to 0.2		ML	0	light brown, (10YR 5/4), dry, soft, very fine quartz sandy (10%) clayey (15%) silt (75%) with minor organics By .5 ft becomes a clayey (30%) silt (70%) with minor fine sand, dry, stiff
0.5		S0740 to S0743	0.5 to 1			0	
1	293 10/10/93						
2		S0744 to S0747	2 to 3			0	
2.5	293 10/10/93						
3							
3.5	293 10/10/93						
4							
4.5	293 10/10/93						
5							
							TD = 3 ft

EBASCO SERVICES INCORPORATED

UXB
Contractor Name

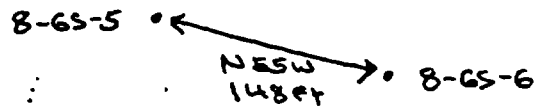
Test Pit Record

SWMU 8

Date/Time Started 10/10/93 1305

Date/Time Completed 10/10/93 1345

Location Map

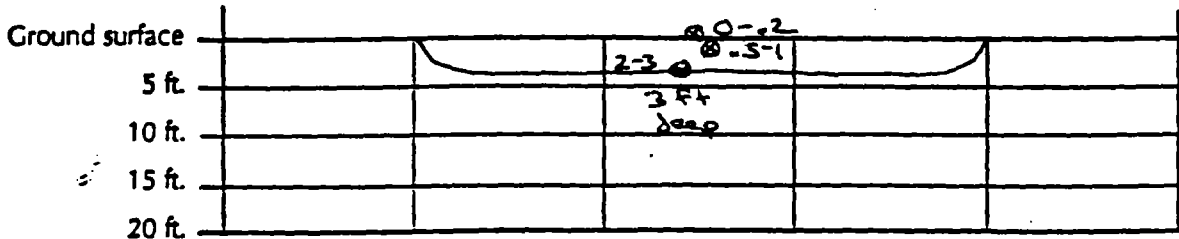
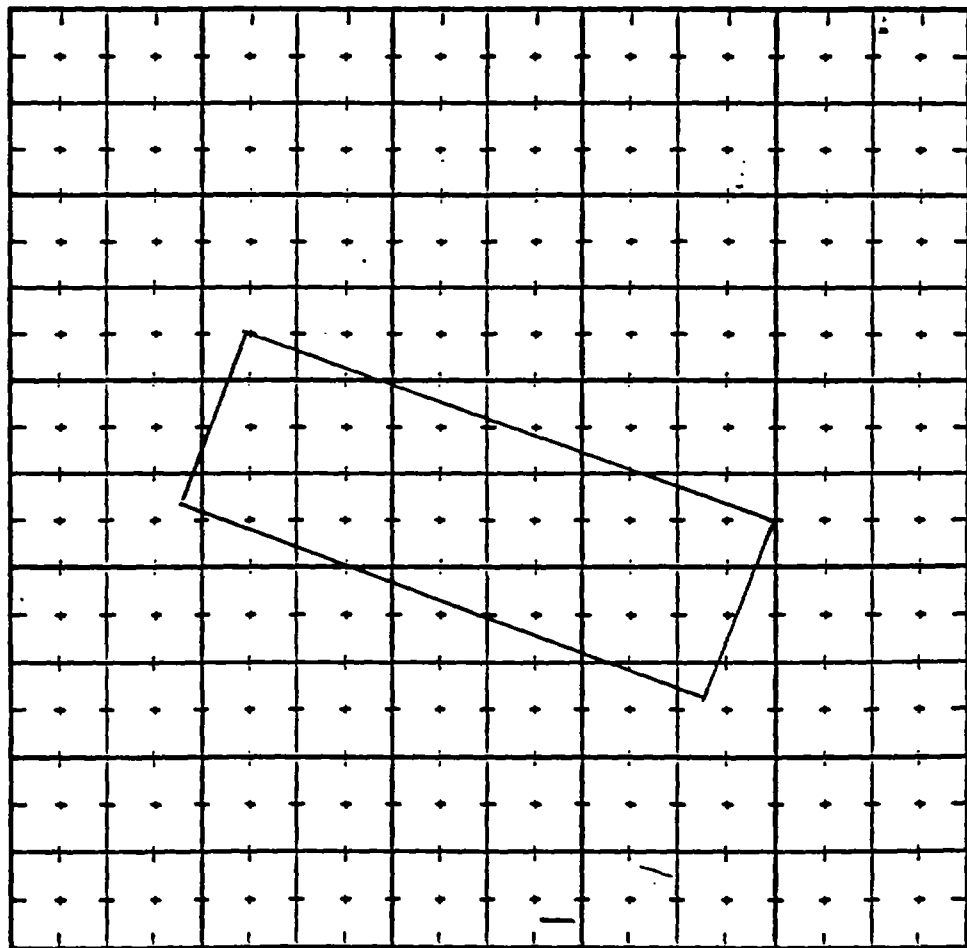


Test Pit 8-GS-6

Coordinates NA

Geologist Rich Borden

Scale: 1 inch = 2 ft



Notes Test pit is oriented N65W

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type GRAB/BORE

Date/Time Started 10-29-93/1250

Site ID 8-65-7 Dia. of Hole 3.5

Surface Elevation NA

Date/Time Completed 10-29-93/1304

Completion Depth (ft.) 3

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Mobile B53 rig; split open sampler

Drilling Company Boyles Bros. No. Samples 2

Size and Bit Type NA

Driller T. Giles Drilling Fluid NA

Sampler Type Split Length (ft.) 2

Diameter (in.) 3.0 Driving Wt.(lbs.) NA Drop (in.) NA

Geologist/Date J. J. B. 10-29-93
(Signature)

Checked by/Date Paul White 11/2/93

Handwritten notes:
1" in Drip
10-29-93

Blow Counts

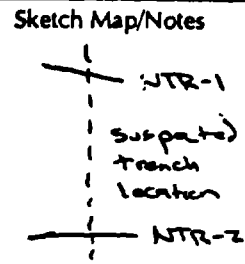
pushed

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-0.2	NA	ML	0	0 - 1.5 ft Fine to coarse sandy silt w/ some gravel and clay (20% clay, 35% silt, 30% sand, 15% gravel); 104R 5/3 brown; dry; loose/soft; low-med plasticity; not cemented; minor roots near surface; gravels are sub rounded-sub angular.
1	NA	S	2-3	1.8/2.0	ML	0	
2							1.5 - 3.0 ft Fine sandy silt w/ some clay and trace med. sand (20% clay, 45% silt, 30% fine sand, 5% med. sand); 104R 6/3 pale brown; firm-stiff; dry; not cemented; med. plasticity
3							
5							
10							
15							
20							

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/9/93, 0840

Site ID 2-NTR-1 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/9/93, 1045

Completion Depth (ft.) 5 FT

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method 588
Case Backhoe

Drilling Company UXB No. Samples 3

Driller Ram Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type GondS Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date M R A 10/9/93
(Signature)

Checked by/Date [Signature] 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S0658 to S0659	0 to 0.2		ML	0	Light Brown (10YR 4/4), soft, little moisture, clayey silt with rare fine to medium grained, angular sand (<27); subround to subangular gravel scattered on surface By .5 ft no gravel and only very rare (<1%) fine sand; clayey silt is dry and firm
0.5		S0660 to S0663	0.5 to 1			0	
1	RAS 10/9/93						By approximately two feet: soil is a mottled light brown and yellow brown (10YR 4/4 and 10YR 5/3) clayey (5%), silty (30%), fine to very fine, med sorted, quartz, angular sand with clasts of white (10YR 8/1) hard clay, little moisture, hard, weak argillic cement
2						0	
3	RAS 10/9/93						By 3 1/2 ft the sequence fines to a clayey (10%), fine angular quartz sandy (20%) silt (55%) with some white clay clasts; all else is the same as 2 to 3 1/2 ft. 10/9/93
4		S0668 to S0671	4 to 5		ML	0	
5	10/9/93 RAS						TO = 5 FT

EBASCO SERVICES INCORPORATED

Contractor Name UXB

Test Pit Record

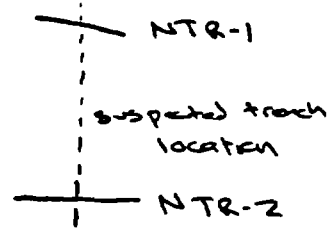
SWMU 8

Date/Time Started 10/9/93 0840

Date/Time Completed 10/9/93 1045

Location Map

↑ N



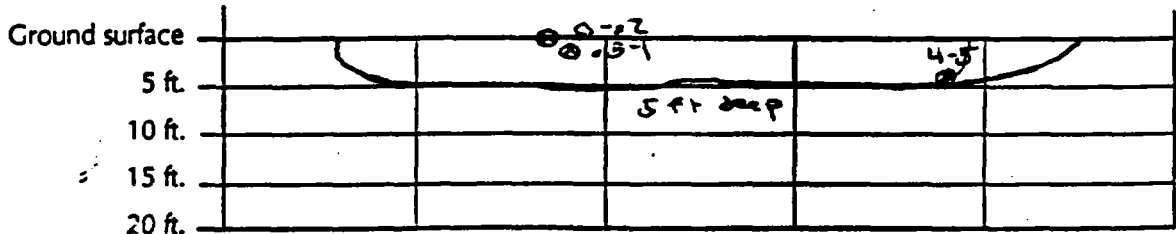
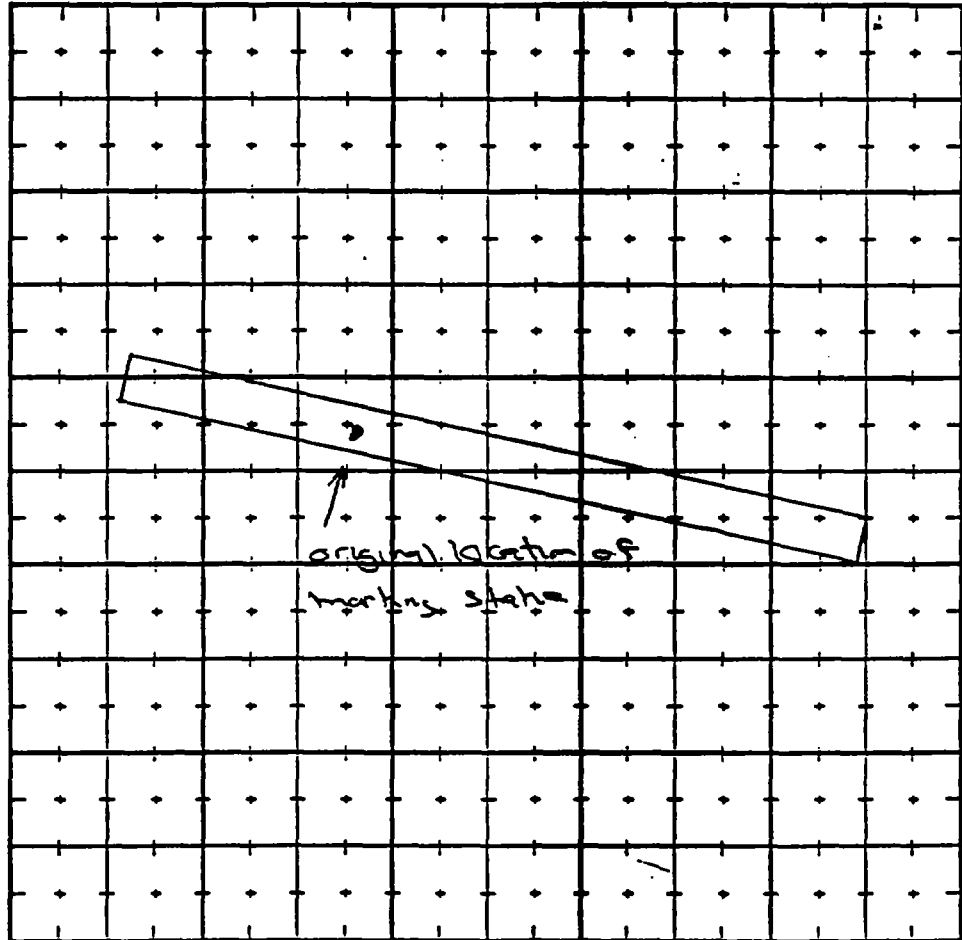
Test Pit 8-NTR-1

Coordinates NA

Geologist Rich Burden

Scale: 1 inch = 8 ft.

↑ N

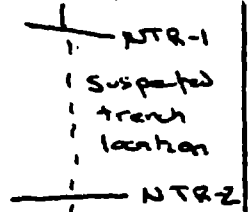


Notes Test pit is oriented N80W, this test pit only
encountered undisturbed soil, so three samples were
taken instead of the originally planned four, Test pit
was extended to the east

Field Bore Log

↑ N Page 1 of 1

Sketch Map/Notes



Tooele Army Depot - South Area

Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Test Pit

Date/Time Started 10/19/93, 1330

Site ID 8-NTR-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/19/93, 1515

Completion Depth (ft.) 5 ft

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method SBD
Case Backhoe

Drilling Company UXB No. Samples 3
Driller Ben Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type Gowis Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date M B G H 10/19/93
(Signature)

Checked by/Date Paul White 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S0672 to S0675	0 to 2		ML	0	light brown (10YR 6/4), very fine grained, quartz sandy (5%), clayey (3%), silt (65%); pebbles and cobbles surface on surface
1	R 235 10/19/93	S0676 to S0679	2 to 3			0	Clay content decreases and very fine sand content increases with depth, by three feet is a;
2							light brown (10YR 4/3), clayey (10%) sandy (25%) silt (65%) sand is very fine grained angular quartz, little moisture
3	R 215 10/19/93					0	
4	R 233 10/19/93		4		ML		A thin lense of fill gravel was found on west side of trench. The lense was about 3 in thick and buried 1 ft deep. It was exposed for about 10 ft along the trench wall. Its limits were defined on both the east and west sides by the test pit
5	R 233 10/19/93	S0684 to S0687	5			0	

TD = 5 ft

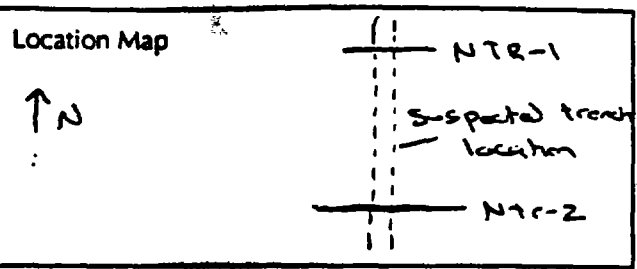
UXB
Contractor Name

Test Pit Record

SWMU 8

Date/Time Started 10/9/93, 1330

Date/Time Completed 10/9/93, 1515



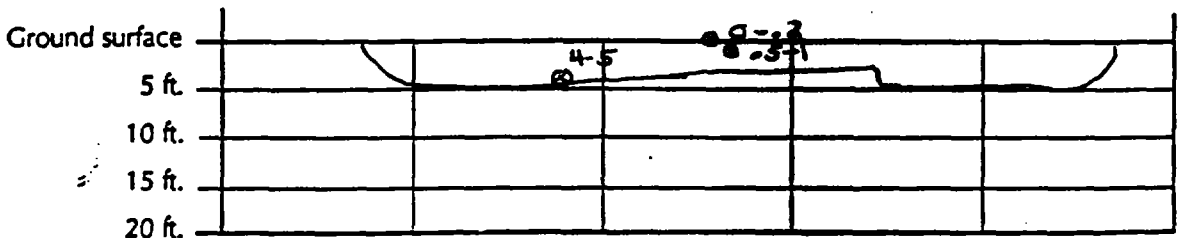
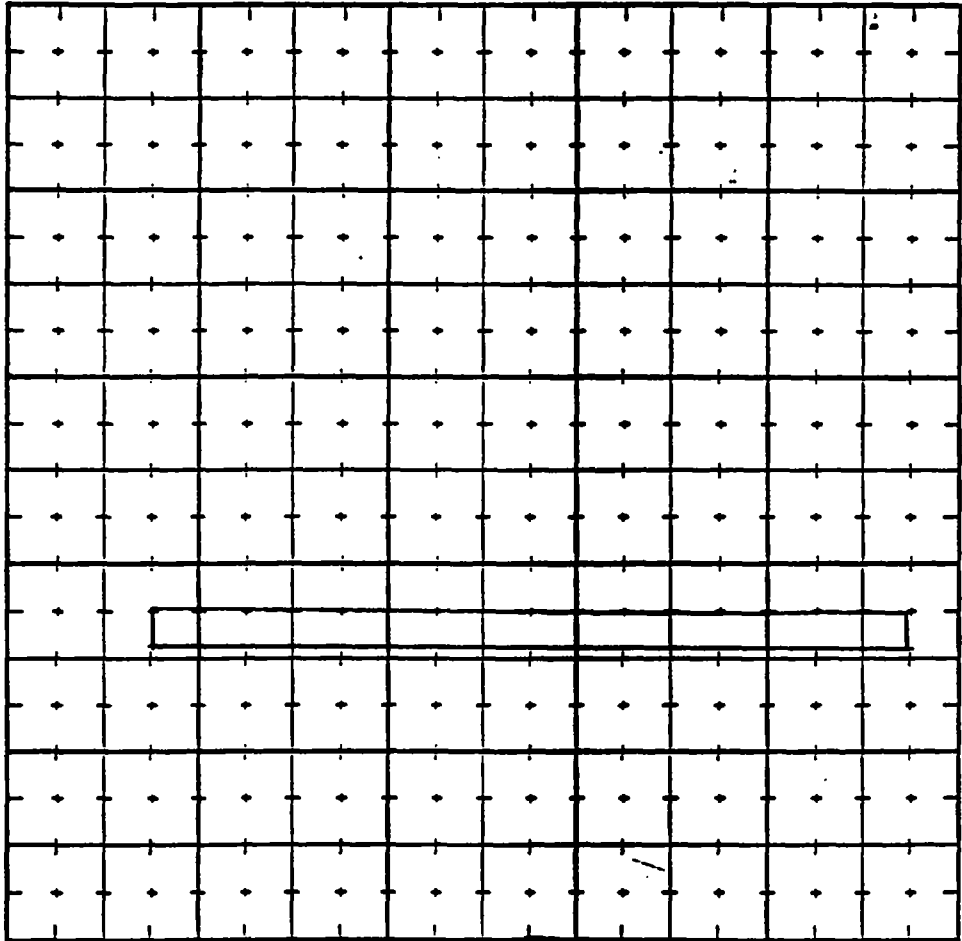
Test Pit 8-NTR-2

Coordinates NA

Geologist Rich Borden

Scale: 1 inch = 10 ft.

↑
N
↓



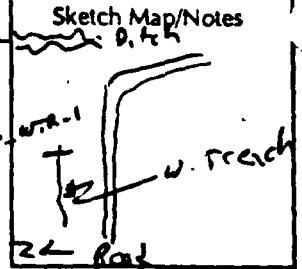
Notes Test pit is oriented E-W, wells are vertical, this pit encountered undisturbed soil, so only three samples were collected instead of four

Field Bore Log

8-WTR-1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Trench

8-WTR-1

Date/Time Started 10/16/93 9:10

Site ID _____ Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/16/93 1:00

Completion Depth (ft.) 10'

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Backhoe

Drilling Company UXB No. Samples 4

Driller B. Lowe

Size and Bit Type NA

Drilling Fluid NA

Sampler Type NA Length (ft.) _____

Diameter (in.) NA Driving Wt. (lbs) NA Drop (in.) NA

Geologist/Date Paul White 10/26/93
(signature)

Checked by/Date Paul White 10/26/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D. PPM	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S	0-1'		ML-GI	0	Grayish Brown Hue 2.5 Y5/2 SH with angular gravel < 1/4" diameter 80% silt 10% gravel - Dry
3		S	3-4'		ML	0	Same description @ 3-4' Except no gravel below 2' - Dry
7		S	7-8'		ML	0	Increasing clay content below 8'
9		S	9-10'		ML-CL	0	30% clay @ 9-10' MOIST
10	TO = 10'						

EBASCO SERVICES INCORPORATED

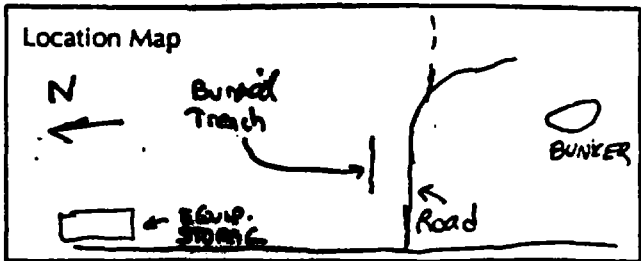
VXB
Contractor Name

Test Pit Record

SWMU 8

Date/Time Started 6/8/93 910

Date/Time Completed 10/8/93 1230



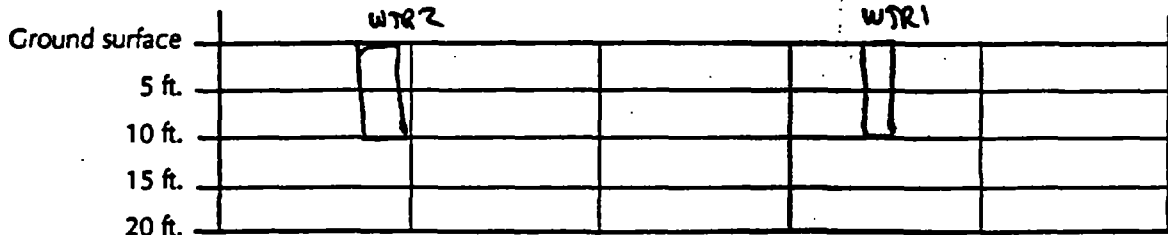
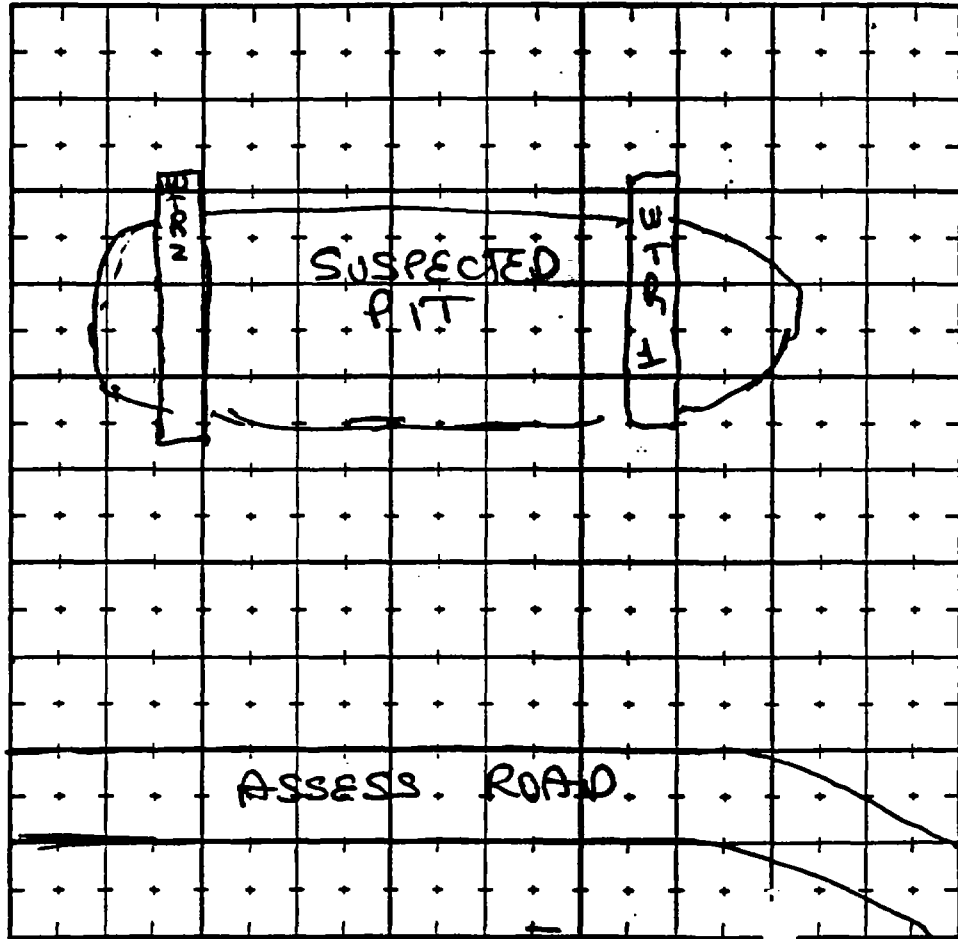
Test Pit WTR1 & WTR2

Coordinates _____

Geologist R. J. ONDERCJ

Scale: 1 inch = 10' ft.

↑
N
↑



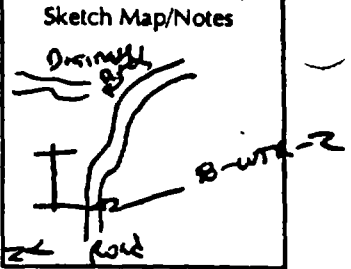
Notes NO DISTURBED SOIL IDENTIFIED
Samples WTR1 - 1-1, 3-4, 7-8, 9-10
WTR2 - 1-1, 3-4, 6-7, 9-10

Field Bore Log

8-WTR-2

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Trench

SWMU 8

Date/Time Started 10-2-93 1115

Site ID 8WTR-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/2/93 1230

Completion Depth (ft.) 10'

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method Backhoe

Drilling Comp. UXB No. Samples 4

Driller Bruce Lowe

Size and Bit Type —

Drilling Fluid CA

Sampler Type — Length (ft.) —

Diameter (in.) NA Drilling Wt. (lbs.) NA Drop (in.) NA

Geologist/Date RJONAS 10/2/93
(Signature)

Checked by/Date [Signature] 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S	0.5-1.0'	—	ML	0	Grayish Brown HUE 2.5Y 5/2 S ₁ + with angular gravel 80% S ₁ + 20% Gravel Dry
3		S	3-4'	—	ML	0	No Gravel below 1.5 feet - dry
6		S	6-7'	—	ML	0	minor amounts of red grains - dry
10		S	9-10'	—	ML	0	Grayish Brown HUE 2.5Y 5/2 S ₁ + with 30% light gray (GLEY #7) clay - DRY MOIST TD @ 10'
15							
20							

EBASCO SERVICES INCORPORATED

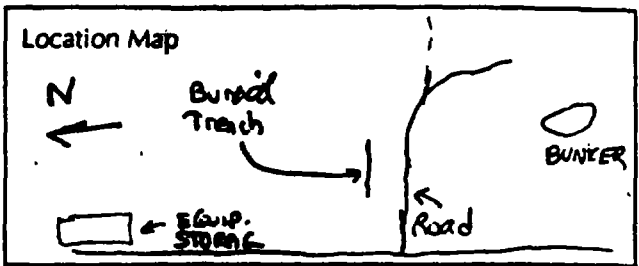
UXB
Contractor Name

Test Pit Record

SWMU 8

Date/Time Started 10/6/93 910

Date/Time Completed 10/19/93 1730



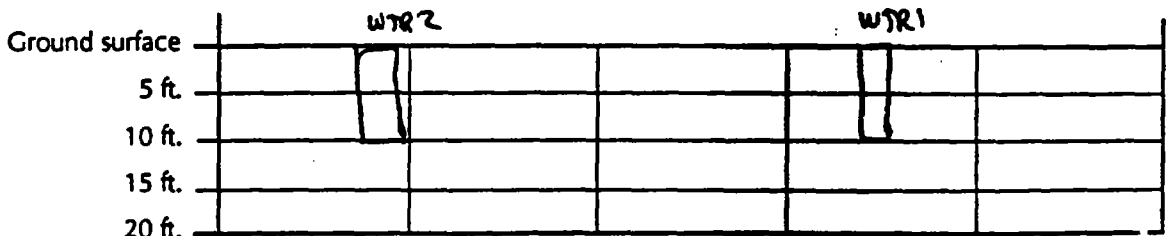
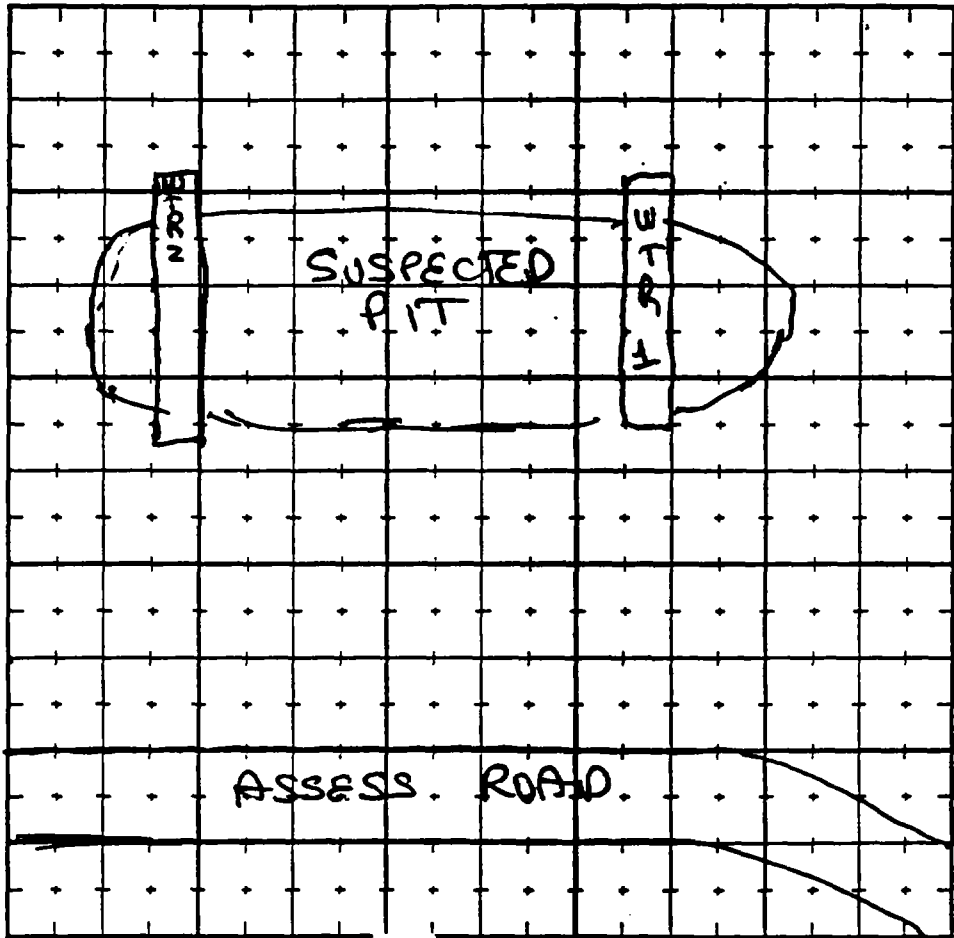
Test Pit WTR1 & WTR2

Coordinates _____

Geologist R. J. ONDERCJ

Scale: 1 inch = 10' ft.

↑
N
↑



Notes NO DISTURBED SOIL IDENTIFIED

Samples WTR1 - 1-1, 3-4, 7-8, 9-10

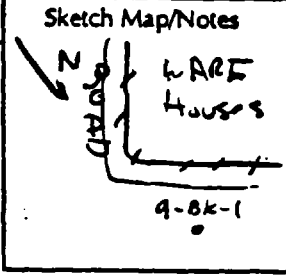
WTR2 - 1-1, 3-4, 6-7, 9-10

Field Bore Log

Page 1 of _____

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type BORE

Date/Time Started 10-20-93 1035

Site ID 9-BK-1 Dia. of Hole 3 1/2"

Surface Elevation _____

Date/Time Completed 10-21-93 0840

Completion Depth (ft.) 3'

Water Level Initial (ft.): ~1/2; After ~1/2 hours N/A (ft)

Equipment and Drilling Method HSA-
P-88

Drilling Company Bogles No. Samples 3
Driller J. Hulse

Size and Bit Type _____

Drilling Fluid N/A

Sampler Type ST Length (ft.) 2'

Diameter (in.) 3" Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date R. [Signature] 10-21-93
(Signature)

Checked by/Date [Signature] 11/18/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S0832	2A, 1 sieve	0-1.5' 0-2'	NA	CL	0	SAT, Clay - 40% silt, 60% clay - 100% yellow R. silt mod plastic, soft, unconsolidated, Lt med-s
1.5'							Silty Clayey Gravel 25% silt 35% clay 40% gravel - 100% yellow brown - nonplastic ^{very} dense, compact
2	S0833	2A, 2-3 sieve			Gm CL	0	TD 3'
3							see Tech/Chow tag # S0151 → S0153
5							
10							
15							
20							

Field Bore Log

Page 1 of 1

Sketch Map/Notes

Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010

Lakewood, Colorado 80228

Site Type BORE

Date/Time Started 10-20-93 1015

Site ID 9-BK-2 Dia. of Hole 3 1/2

Surface Elevation _____

Date/Time Completed 10-21-93 1015

Completion Depth (ft.) 3'

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method ASA

Drilling Company Bayels No. Samples 3

Hand Auger, B-

Driller S/Hulco

Size and Bit Type n/a

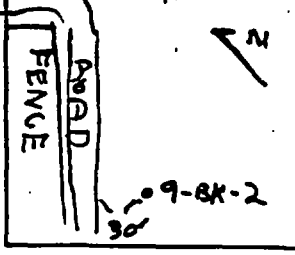
Drilling Fluid n/a

Sampler Type SZ Length (ft.) 2'

Diameter (in.) 3" Driving Wt (lbs.) n/a Drop (in.) n/a

Geologist/Date R. Weir 10-21-93
(Signature)

Checked by/Date [Signature] 11/18/93



Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S0334	2hrk	0-2	n/a	CL	0	Silty clay - 35% silt 65% clay - 10YR 4/1 yellow brown, homogeneous, soft, Lt moist, unconsolid
3	S0335	2hrk 8cm	2-3	0	GC	2'	clayey gravel - 40% clay 60% gravel, 10YR 4/1 yellow brown, nonplastic, very dense, very coarse
5							
10							
15							
20							

TCS #
S8152 → S8027, S8118 - see Tech/chem

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type GRAB/BORE

Date/Time Started 10-8-93/1050

Site ID 9-A2-1 Dia. of Hole 3 inch

Surface Elevation NA

Date/Time Completed 10-8-93/1420

Completion Depth (ft.) 5.5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

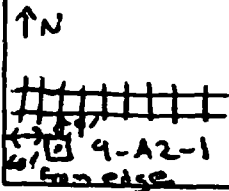
Equipment and Drilling Method CME75; Drilling Company PC Exploration No. Samples 4

Split spoon sampler driven Driller R. Smith

Size and Bit Type NA Drilling Fluid NA

Sampler Type Split spoon Length (ft.) 2 Diameter (in.) 2.5 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date A. D. ... Checked by/Date ... 10/21/93



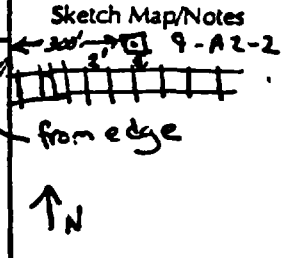
Blow Counts
Samples were pushed not driven

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G#	0-0.2	NA	ML	0	0-0.2 Ft f-c sandy silt w/some clay and some gravel (15% clay, 20% gravel, 15% sand, 40% silt). 10YR 5/3 brown, soft, minor roots, low plasticity, not cemented; gravel road base at top
1	NA	S#	0.2-0.5	1.5	ML	0	0.2-0.4 ft same as above
2	NA	S#	0.5-2.3	2.3	ML	0	0.5-7 ft fine sandy silt w/trace clay (10% clay; 30% sand; 60% silt) 10YR 5/4 yellowish brown; dry; soft; not cemented; low plasticity
3	NA	S#	2.3-4.5	2.2	ML	0	4.5-5.5 ft increase in clay content patches of caliche at 5.0-5.5 ft clayey silt w/some fine sand (40% clay, 45% silt, 15% fine sand) 10YR 5/4 yellow brown, dry, very stiff, hard, not cemented, med. plasticity
4	NA	S#	4.5-5.5	1.0	ML	0	* S9000, S9001, S9002, + S9003 * S9004, S9005, S9006 + S9007 Δ S9008, S9009, S9009 + S9010, S9011 ΔΔ S9011, S9012, S9013, + S9014

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type GRAB/BORE

Date/Time Started 10-8-93/1450

Site ID 9-A2-2 Dia. of Hole 3 inch

Surface Elevation NA

Date/Time Completed 10-8-93/1610

Completion Depth (ft.) 5.5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CME75

Drilling Company PC Exploration No. Samples 4

split spoon sampler driven

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2

Diameter (in.) 2.5 Driving Wt (lbs) 149 Drop (in.) 30

Geologist/Date J. M. Boyer
(Signature)

Checked by/Date Paul White 10/21/93

Samples were pushed driven

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D. ppm	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	SA	0-0.2	NA	ML	0	0-0.5ft f-c sandy silt w/some clay and gravel (15% clay, 20% gravel, 25% sand, 40% silt). 10YR 5/3 brown, soft, low plasticity, not cemented, gravels decrease w/ depth
1	NA	SA	0.5-1	1/2	ML	0	
2	NA	SA	1-2	2/2	ML	0	
3	NA	SA	2-3	3/2	ML	0	
4	NA	SA	4-5	1.5/1.5	ML	0	0.5-4.0 ⁵ fine sandy silt w/some clay (20% clay, 25% sand, 55% silt) 10YR 5/4 yellowish brown, medium, not cemented; low plasticity
5							
10							4.0-5.5 clayey silt w/some fine sand (40% clay, 45% silt, 15% fine sand) 10YR 5/4 yellow brown, dry, very stiff to hard, not cemented, med. plasticity
15							* 59016, 59017, 59018, 59019, 58007MS, 58010MS, 58011MS, 58012MS, 59032, 59033, 59034, 59035, 58005, 58006, 58013, 58014, 58007, 58014, 58008
20							** 59020, 59021, 59022, 59023 *** 59024, 59025, 59026, 59027

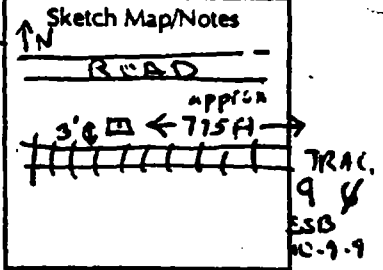
Δ 59028, 59029, 59030, 59031 Tooele Task 3 Grp. 2 9.93.jb

Field Bore Log

Page 1 of 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type GRAB/BORE

Date/Time Started 10-9-93/0808

Site ID 9-A2-3 Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-9-93/0929

Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CMETS; Drilling Company PC Exploration No. Samples 4
pushed split spoon samples Driller R. Smith

Size and Bit Type NA Drilling Fluid NA

Sampler Type split spoon Length (ft.) 1.5 Diameter (in.) 3 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date A. J. L. Bunn 10-9-93 (Signature) Checked by/Date [Signature] 10/21/93

check 10/10/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-0.2	NA	ML	0	0-0.2 ft F-c sandy silt w/some
1	NA	S	0.5-1	1/3	ML	0	clay and some gravels (15% clay, 40% silt, 30% sand, 15% gravel);
2	NA	S	2-3	1/3	ML	0	10 YR 5/3 brown; soft, dry;
3	NA	S	4-5	2/3	ML	0	low plasticity; not cemented;
4	NA	S			ML	0	several cobbles @ surface
5							0.2 - 0.5 ft gravels and sand decrease w/ depth
6.5							6.5 - 9.0 ft fine sandy silt w/trace clay (10% clay, 65% silt, 25% sand);
10							10 YR 5/4 yellowish brown; soft-medium; dry; low plasticity; not cemented; minor roots
15							4.0 - 5.0 ft silt w/some clay and fine sand (20% clay, 60% silt, 20% sand);
20							10 YR 5/4 yellowish brown; medium-stiff; dry; low plasticity; not cemented

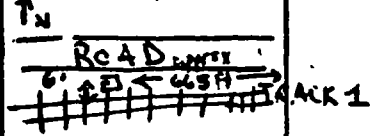
Field Bore Log

Tooele Army Depot - South Area

Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type BORE

Date/Time Started 10-9-93/1011

Site ID 9-A2-4 Dia. of Hole 3.0 in
3.5 in

Surface Elevation NA

Date/Time Completed 10-9-93/1119

Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CHETS

Drilling Company PC Exploration No. Samples 3

split spoon samplers pushed Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 1.5

Diameter (in.) 3.5 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date [Signature] 10-9-93

Checked by/Date [Signature] 10-9-93

Blow counts

11/13

shed

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA						0 - 0.5 ft f-c sandy silt w/some clay and some gravels (15% clay, 40% silt, 30% sand, 15% gravels); 10YR 5/3 brown; soft; dry; low plasticity; not cemented
1	NA	S	0.5 - 1	1.5 / 1.5	ML	0	
2	NA	S	2 - 3	1.5 / 1.5	ML	0	
3	NA	S	3 - 4	2.0 / 2.0	ML	0	
4	NA	S	4 - 5	2.0 / 2.0	ML	0	
5							0.5 - 4.5 ft fine sandy silt w/some clay (15% clay, 60% silt, 25% sand); 10YR 5/4 yellowish brown; soft - medium dry; low plasticity; not cemented
10							4.5 - 5 ft clayey silt w/some fine sand (15% clay, 15% sand, 30% silt); 10YR 5/2 grayish brown; med stiff; dry; med. plasticity; not cemented

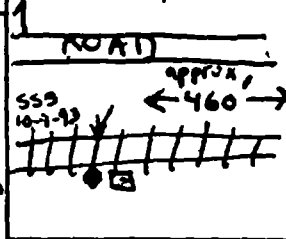
Note: Grab sample from 0-0.2 ft collected on 10-8-93
A.1-88

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

N Sketch Map/Notes



Site Type BORE

Date/Time Started 10-9-93/1203

Site ID SSS 10-9-93 09-K2-5 Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-9-93/1259

Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CME75; split spoon sampler pushed Drilling Company PC Exploration No. Samples 3
Driller R. Smith

Size and Bit Type NA Drilling Fluid NA

Sampler Type Split Spoon Length (ft.) 2.0 Diameter (in.) 3.0 Driving Wt (lbs) 140 Drop (in.) 30

Geologist/Date J. L. Bar 10-9-93 (Signature) Checked by/Date F. White 10/21/93

Samples pushed not driven therefore no blow counts (RET 10/10/93)

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval Ft	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	S	0.5-1	1.5	ML	0	0 - 0.3 ft f-c sandy silt w/ some clay and some gravels (15% clay, 40% silt, 30% sand, 15% gravel); 104R 5/3 brown; soft; dry; low plasticity; not cemented; roots
1				1.5		0	
2	NA	S	2-3	1.5	ML	0	
3				1.5			0.3 - 5 ft fine sandy silt w/ some clay (15% clay, 60% silt, 25% sand); 104R 5/4 yellowish brown; soft-medium; dry; low plasticity; not cemented
4	NA	S	4-5	2.0	ML	0	
5				2.0			
10							
15							
20							

NOTE: Grab sample from 0-0.2 ft collected on 10-8-93

Field Bore Log

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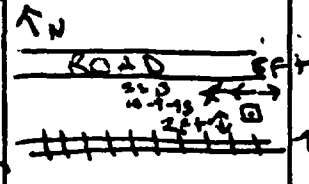
Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd, Ste. 1010
Lakewood, Colorado 80228

Site Type BORE



Date/Time Started 10-9-93/1344

Site ID 9-A2-6 Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-9-93/1441

Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CHESS; split spoon sampler pushed

Drilling Company PC Exploration No. Samples 3

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2.0

Diameter (in.) 3.0 Driving Wt (lbs) 140 Drop (in.) 30

Geologist/Date J.M. Brown 10-4-93
(Signature)

Checked by/Date Paul White 10/21/93

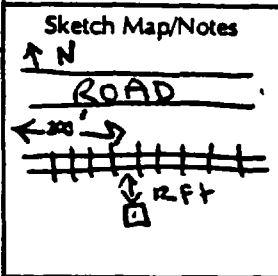
Blow Counts

5) 1
ive no
nts taken
shed
st 0.4ft
shed
10/5

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	S	0.5	1.5	ML	0	0 - 0.3 ft fine sandy silt w/ some clay and some gravels (15% clay, 40% silt, 30% sand, 15% gravel); 104R 5/3 brown; soft; dry; low plasticity; not cemented; roots
1	NA	S	2-3	1.5	ML	0	
2	NA	S	4-5	2.0	ML	0	
3	NA	S		2.0			0.3 - 5 ft fine sandy silt w/ some clay (15% clay, 60% silt, 25% sand), 104R 5/4 yellowish brown; soft-medium; dry; low plasticity; not cemented
4							
5							
10							
15							
20							

NOTE: Grab sample from 0-0.2 ft collected on 10-8-93 A.1-90

Field Bore Log



TRACK 2

Tooele Army Depot - South Area
 Task 3 Group 2 SWMUs

Site Type BORE

Date/Time Started 10-10-93/0845 Site ID 9-A2-7 Dia. of Hole 3.5 inch

Surface Elevation NA Date/Time Completed 10-10-93/1021

Completion Depth (ft.) 5 Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CMETS; split spoon driven/pushed Drilling Company PC Exploration No. Samples 3

Driller R. Smith

Size and Bit Type NA Drilling Fluid NA

Sampler Type Split spoon Length (ft.) 1.5 Diameter (in.) 3.0 Driving Wt. (lby.) 140 Drop (in.) 30

Geologist/Date B. M. Ryan 10-10-93 Checked by/Date Paul White 10/21/93

Blow Count
 13/26
 8/6
 shed

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval Ft	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	S	0.5-1	1.5 1.5	ML	0	0 - 0.3 ft f-c sandy silt w/some gravel and trace clay (10% clay, 45% silt, 30% sand, 15% gravel);
1							
2	NA	S	2-3	1.25 1.5	ML	0	10 YR 5/3 brown; dry; low plasticity; not cemented; soft
3							
4	NA	S	4-5	2.0 2.2	ML	0	0.3 - 5 ft fine sandy silt w/ some clay (15% clay, 60% silt, 25% sand); 10 YR 5/4 yellowish brown; dry; low plasticity; not cemented; medium to medium stiff; decreasing sand w/ depth
5							
10							
15							
20							

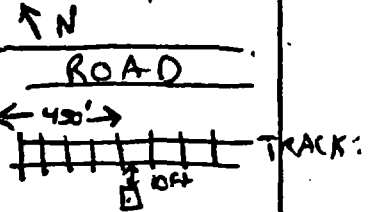
A.1-91

NOTE: The 0-0.2 ft sample was collected on 10-8-93

Field Bore Log

Page 1 of 1

Sketch Map/Notes



Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010

Lakewood, Colorado 80228

Site Type BORE

Date/Time Started 10-10-93/1050

Site ID 9-A2-8

Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation - NA

Date/Time Completed 10-10-93/1150

Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CMEIS; Drilling Company PC Exploration No. Samples 3

split spoon samplers

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2.0

Diameter (in.) 3.0

Driving Wt (lbs) 140 Drop (in.) 30

Geologist/Date A. M. Brown 10-10-93
(Signature)

Checked by/Date R. White 10/21/93

Blow Counts
0
1
2
3
4
5
10
15
20

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval Ft	Recovery (ft./ft.)	USCS Abbreviation	P.I.D. PPM	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	S	0.5-1	1.5 1.5	ML	0	0.0-0.3 ft f-c sandy silt w/ some gravel and trace clay (10% clay, 45% silt, 30% sand, 15% gravel); 10 yr 5/3 brown, dry; soft; low plasticity; not cemented
1							
2	NA	S	2-3	1.5 1.5	ML	0	0.3-5 ft fine sandy silt w/ some clay (15% clay, 60% silt, 25% sand); 10 yr 5/4 yellowish brown, dry; low plasticity; not cemented; medium to medium stiff, decreasing clay w/ depth.
3							
4	NA	S	4-5	2.0 2.0	ML	0	
5							
10							
15							
20							

A.1-92

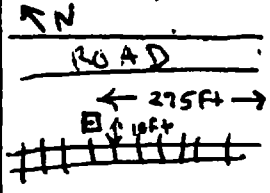
NOTE: The 0-0.2 ft sample was collected on 10-8-93

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



TRACK
7

Site Type BORE

Date/Time Started 10/10/93/1230

Site ID 9-A2-9 Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-10-93/1930

Completion Depth (ft.) 5

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method CMEIS
drive/push split spoon sampler

Drilling Company PC Exploration No. Samples 3
Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2.9
3-3

Diameter (in.) 2.5
3.0 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date J. Duhon Beyer 10-10-93
(Signature)

Checked by/Date [Signature] 10/21/93

Blow Counts
13/15
12/15
50.14
17/13

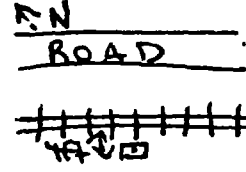
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	S	0.5 - 1	1.5/1.5	ML	0	0 - 0.2 ft f-c sandy silt w/ some gravel and trace clay (10% clay, 45% silt, 30% sand, 15% gravel); 10YR 5/3 brown; dry; soft; low plasticity; not cemented
1							
2	NA	S	2-3	1.5/1.5	ML	0	
3							
4	NA	S	4-5	2.0/2.0	ML	0	0.5 - 5 ft fine sandy silt w/ some clay and trace gravel (15% clay, 60% silt, 20% sand, 5% gravel); 10YR 5/4 yellowish brown; soft to medium; low plasticity; not cemented; dry
5							
10							
15							
20							

A.1-93

NOTE: The 0-0.2 ft sample was collected on 10-8-93

Field Bore Log

Sketch Map/Notes



Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type BORE

Date/Time Started 10-10-93/1420

Site ID 9-A2-10 Dia. of Hole 3.0 inch
2.5 inch

Surface Elevation NA

Date/Time Completed 10-10-93/1536

Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method SMEIS, Drilling Company PC Exploration No. Samples 3
drive/push split spoon sampler Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2.0
1.5

Diameter (in.) 3.0 Driving Wt (lbs.) 140 Drop (in.) 30

Geologist/Date J. B. [Signature] 10-10-93

Checked by/Date [Signature] 10/31/93

Blow counts
21
24/22/22

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	S	0-0.2	1.25 1.5	ML	0	0-0.2 ft fine sandy silt w/ some gravel and trace clay (14% clay, 20% gravel, 30% sand, 36% silt); 10YR 5/3 brown; dry; soft; low plasticity; not cemented
1	NA	S	2-3	1.0 1.5	ML SM	0	1-3.0 ft fine sandy silt w/ trace gravel and clay (10% clay, 45% silt, 35% sand, 10% gravel); 10YR 5/6 yellowish brown; dry; low plasticity; loose, not cemented; a cobble encountered @ 2 ft
2	NA	S	4-5	1.0 2.0	SM	0	3-5 ft silty fine to medium sand w/ some gravel and trace clay (10% clay, 95% silt, 40% sand, 15% gravels); 10YR 6/2 light brownish gray; dry; low plasticity; loose; not cemented; cobbles encountered between 3-5 ft interval

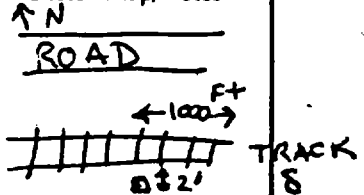
NOTE: The 0-0.2 ft sample was collected on 10-8-93

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type Bore

Date/Time Started 10-11-93/0838

Site ID 9-A2-11

Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-11-93/0948

Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CMGTS; Drilling Company PC Exploration No. Samples 3

pushed + driven split spoon sampler Driller R. Smith

Size and Bit Type NA Drilling Fluid NA

Sampler Type split spoon Length (ft.) 1.0 1.5 2.5 3.0 Diameter (in.) 2.5 3.0 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date D. J. B. 10-11-93 Checked by/Date Paul White 10/21/93

Blow counts

shed
= 16/9
5
10-11-93
14

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval Ft	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	S	0.5-1	1.5	ML	0	0 - 0.5 ft f-c sandy silt w/ some gravel and clay (15% clay, 40% silt, 30% sand, 15% gravel). 104R 5/4 yellowish brown; dry; soft; low plasticity; not cemented
1							
2	NA	S	2-3	1.1 1.5	ML-SM	0	
3							
4	NA	S	4-5	1.1 2.0	SM	0	0.5 - 3 ft fine sandy silt w/ trace clay and trace gravel (10% clay, 70% sand, 15% silt, 5% gravel); 104R 5/4 yellowish brown; dry; soft; low plasticity; not cemented
5							
10							
15							
20							

3-5 ft silty fine sand w/ trace clay and gravel (15% clay, 35% silt, 45% sand, 5% gravel). 104R 5/4 yellowish brown; dry; loose-med. dense; no-low plasticity; not cemented

color change at 5.0 ft to a light brownish gray 1072 6/2

NOTE: The 0-0.2 ft sample taken on 10-8-93
A.1-95

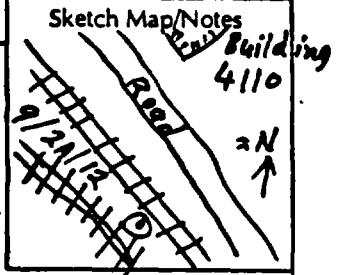
Field Bore Log

~~9/2A/12~~
9-A2-12

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Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Bore

9-A2-12

Date/Time Started 10/14/93 1200

Site ID 9/2A/12 Dia. of Hole 3 1/2" O.D.

Surface Elevation _____

Date/Time Completed 10/14/93 1555

Completion Depth (ft.) 4.5 ^{ATC} 10/14/93

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method B-61
Mobile Drill

Drilling Company PC Exploration No. Samples 4
Driller Randy Smith

Size and Bit Type NA (No augers)

Drilling Fluid None

Sampler Type split Spoon Length (ft.) 1 1/2

Diameter (in.) 3 1/2 Driving Wt. (lbs.) 140 Drop (in.) 140/36

Geologist/Date R. Weingart and
Sampler ↑ (Signature) R.T. Canon 10/14/93 ← Logger

Checked by/Date Randy Smith RTC 10/14/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	blows Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S0608, S0609, S0610	S0611	0-0.2	1.5 1.5	CL	⊙	Silty (25%) clay (75%); high plasticity; 10YR 6/4 light yellowish brown; medium; NC; dry
1	S0612, S0613, S0614, S0615	S0613, S0615	0.5-1.0	6, 12, 13 blows			
2	S0616, S0617, S0618, S0619		2-3	1.5 1.5	CL	⊙	As above expect low moisture and trace (1%) limestone, angular gravel
3				10, 11, 13			2.8 ft
4	S0620, S0621, S0622, S0623		4-5	1.5 2.0	CL	⊙	As above except color change: 10YR 7/3 Very pale brown
5			4.5	10, 40 77, 70			TD at 4.5 ft; hit rock or hard surface at that depth.

RTC 10/14/93

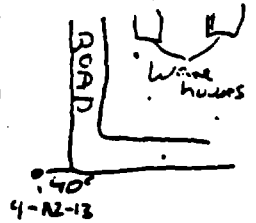
Field Bore Log

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Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type BORE

Date/Time Started 10-15-93 0815

Site ID 9-AZ-13 Dia. of Hole 4'

Surface Elevation _____

Date/Time Completed 10-15-93 0900

Completion Depth (ft.) 5'

Water Level Initial (ft.): N/A; After N/A Hours N/A (ft)

Equipment and Drilling Method HSA
B-61 mobile Drill (Push)

Drilling Company PC Exploration No. Samples 3

Driller R. Smith

Size and Bit Type N/A

Drilling Fluid N/A

Sampler Type ST Length (ft.) 1 1/2

Diameter (in.) 3 1/2 Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date RW 10-15-93
(Signature)

Checked by/Date [Signature] 5/11/94

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)	
0		2-100 3-100 3-100	0-2" 2-4" 4-6"	N/A 1-1 1-1	CL CL CL	0 0 0	Silty Clay - 30% silts 50% clay 20% fine Sand 25% blue yellow Placed from 1' to 5' clay 3-4" layers Trace of gravel - Limestone	
5		"	1-5" XX	1-0.5	CL	0		- Same as above - little moist
5								TD 5'

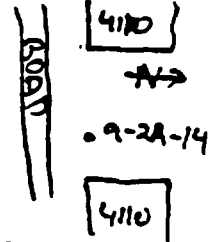
Field Bore Log

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Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type BORE

A2 CH 10/16/93

Date/Time Started 10-5-93 0930

Site ID 9-2A-14 Dia. of Hole 6"

Surface Elevation

Date/Time Completed 10-5-93 0945

Completion Depth (ft.) 5'

Water Level Initial (ft.): N/A ; After N/A Hours N/A (ft)

Equipment and Drilling Method ISA
B-61 mobile Drill

Drilling Company PC Exploration No. Samples 3

Driller R. Smith

Size and Bit Type N/A

Drilling Fluid N/A

Sampler Type ST Length (ft.) 1 1/2

Diameter (in.) 3 1/2 Driving Wt (lbs.) N/A Drop (in.) N/A

Geologist/Date R. White 10-5-93
(Signature)

Checked by/Date [Signature] 5/11/94

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		2100A	0-2"	N/A		0	0-2" collected prior to drilling by R. Bordon
		2100B	2-3		CL	0	Silty Clay trace fine sand - 15% sand 30% silt 55% clay 2.54% LT yellow brown low plastic, soft - Lt moist - uncemented. no change in soils.
		2100C	3-4			0	
		2100D	4-5			0	
5							
10							
15							
20							

Field Bore Log

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Sketch Map/Notes

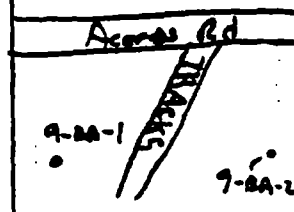
Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type BORE



Date/Time Started 10-17-93 1150

Site ID 9-BA-1 Dia. of Hole 3 1/2

Surface Elevation _____

Date/Time Completed 10-17-93 1230

Completion Depth (ft.) 3'

Water Level Initial (ft.): n/a; Aiter n/a Hours n/a (ft)

Equipment and Drilling Method HAND

Drilling Company n/a No. Samples 2

Auger

Driller n/a

Size and Bit Type n/a

Drilling Fluid n/a

Sampler Type Auger Length (ft.) 6"

Diameter (in.) 3/2 Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date R. W. [Signature] 10-17-93
(Signature)

Checked by/Date [Signature] 10/25/93

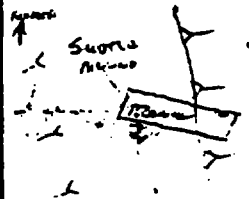
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	50252 50253 50254 50255 50252	200A SAND	0-2'	n/a	CL	0	Silty Clay - 40% Silt 60% Clay - 100% fine-grained, nonplastic soft, unconsolidated, moist. Full of debris and small stones
1	50257 50258 50259 50259	200A SAND	2-3'	n/a	CL	0	Silty Silty Clay - 25% silt 75% clay - 25% 1/3 pale yellow - soft, unconsolidated, nonplastic, dry - very sandy falls out end of hand auger.
2							
3							
10							
15							
20							

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type TEST PIT / BORE / TRENCH

Date/Time Started 10/17/93 1215

Site ID 9-BE-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/17/93 1304

Completion Depth (ft.) 3.0

Water Level Initial (ft.): —; After: — Hours — (ft)

Equipment and Drilling Method CASE 500 BORE HOLE

Drilling Company UXB No. Samples 2

Driller BRUCE MOE - OPERATOR

Size and Bit Type 1 1/2 - INCH BUCKET

Drilling Fluid NA

Sampler Type S Length (ft.) —

Diameter (in.) — Driving Wt. (lbs.) — Drop (in.) —

Geologist/Date [Signature]
(Signature) 10/17/93

Checked by/Date [Signature] 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S0268 S0269 S0270 S0271 (1216)	0-0.3				0 - 0.5 Silty Clay (10% Fines), PALE BROWN (10YR 6/3) MUD, STIFF, PLASTIC / COHESIVE. ROOTS / RESIDUAL
1							0.5 - 3.0 Silty Clay (10% Fines). VERY PALE BROWN (10YR 7/5), DRY STIFF PLASTIC / COHESIVE WHEN PLAST. SOIL IS CONSOLIDATED AND DOES NOT READILY CAVE OR SLURRY
2		S0272 S0273 S0274 S0275 (1225)	2				
3			3				
4							
5							

T.D. = 3.0'

EBASCO SERVICES INCORPORATED

UVR / EBASCO
Contractor Name

Test Pit Record

SWMU 9

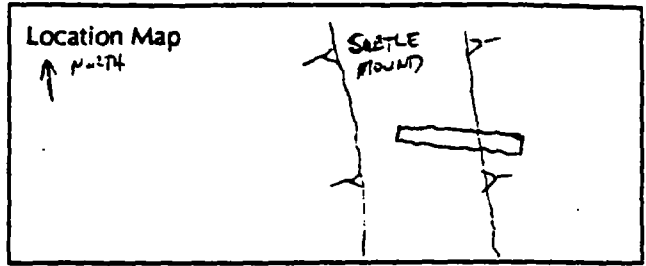
Test Pit 9-BK-2

Date/Time Started 10/7/93 1215

Coordinates NA

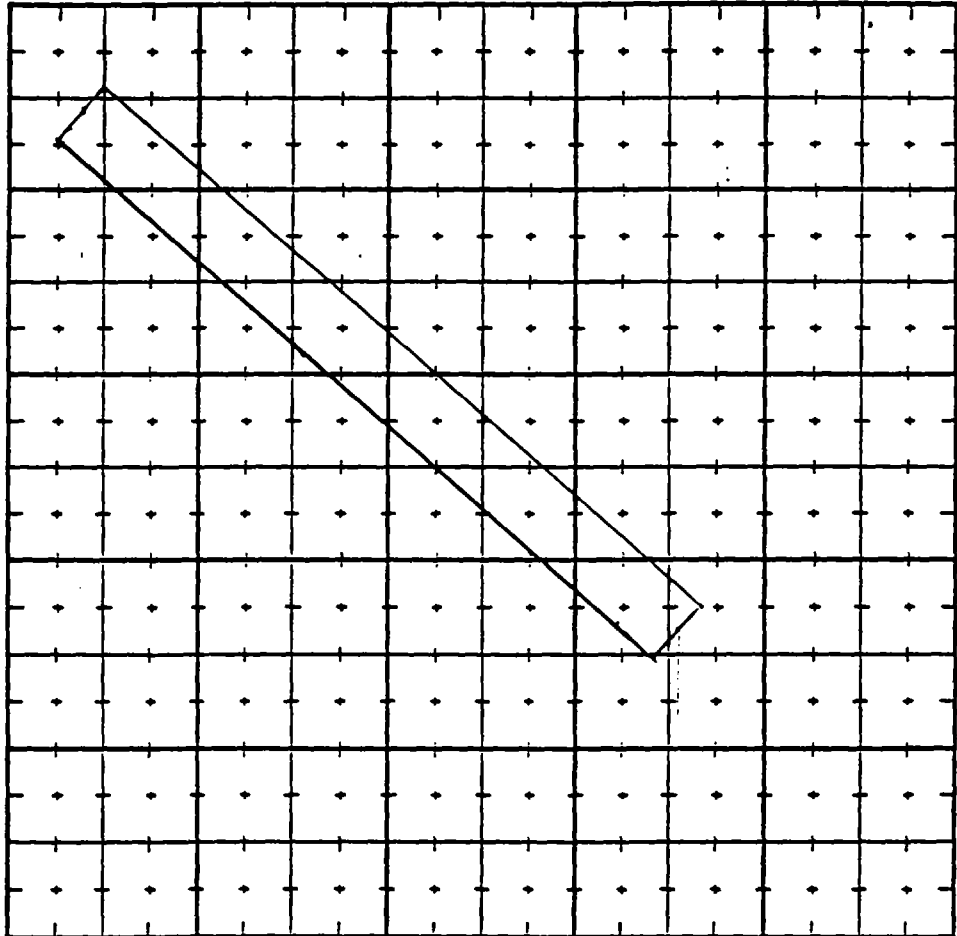
Date/Time Completed 10/7/93 1224

Geologist William C. Newman

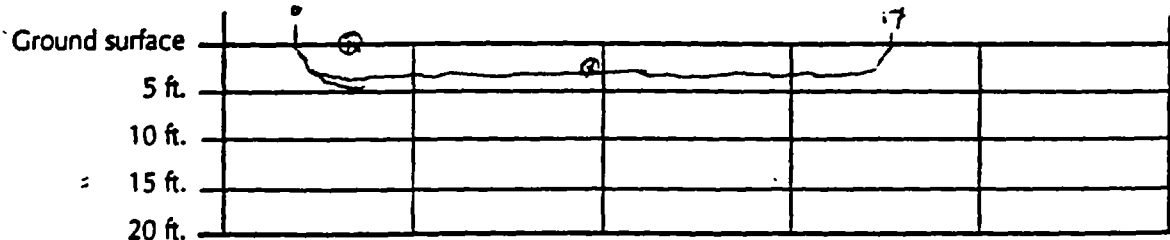


Scale: 1 inch = 1 ft

↑
N
↑



⊗ SAMPLE LOCATION

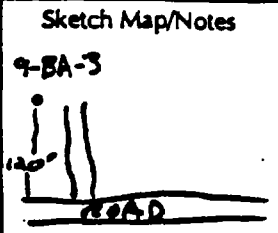


Notes BEARINGS OF TRENCH = 131° TRENCH MATERIAL CONSOLIDATED -
IE MATERIAL DOES NOT TEND TO SLURRY OR CAVE.

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Sta. 1010
Lakewood, Colorado 80228



Site Type BORE

Date/Time Started 10-17-93 1045

Site ID 9-BA-3 Dia. of Hole 3 1/4

Surface Elevation _____

Date/Time Completed 10-17-93 1130

Completion Depth (ft.) 3'

Water Level Initial (ft.): N/A; After N/A Hours N/A (ft)

Equipment and Drilling Method _____
HAND AUGER

Drilling Company _____ No. Samples 2
Driller _____

Size and Bit Type _____

Drilling Fluid _____

Sampler Type Hand Length (ft.) 6"

Diameter (In.) 3 1/2 Driving Wt. (lbs.) N/A Drop (in.) 7/8

Geologist/Date R. M. [Signature] 10/17/93
(Signature)

Checked by/Date [Signature] 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	50284 50285 50286 50287		0'-0'	7A	CL	0	Silty Clay - 40% silt 60% clay 10TR 1/4 yellow brown low plastic, soft, unconsolidated, lt moist -
1						0	
2	50288 50289 50290 50291		2'-3'	N/A	CL ML	0	1.75' Silt, Silty Clay - 20% silt 80% clay - 2.5F 5/2 pale yellow - no plastic, soft, unconsolidated, dry very powdery
3							TD 3'
10							
15							
20							

Field Bore Log

Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010

Lakewood, Colorado 80228

Site Type BORE / TRENCH

Date/Time Started 10/16/93 0955

Site ID 9-BA-4 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/16/93 1115

Completion Depth (ft.) 10'

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method _____

Drilling Company LUXP No. Samples 2

580 CASE BACKHOE

Driller RON WILSON - OPERATOR

Size and Bit Type 18-INCH FLUENT

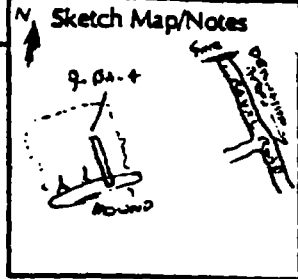
Drilling Fluid NA

Sampler Type G & S Length (ft.) _____

Diameter (in.) _____ Driving Wt.(lbs.) _____ Drop (in.) _____

Geologist/Date [Signature]
(Signature) 10/16/93

Checked by/Date [Signature] 5/11/94



Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	4	SC300 SC301 SC302 SC303 (0.75)	0 0.2		CH	BSHP	0-0.5 SILTY CLAY (100% FINES) PALE BROWN (10YR 6/3), MOIST, STIFF, PLASTIC / COHESIVE, ROOTS / VEGETATION. NOTE: MOISTURE DUE TO RECENT PRECIPITATION.
1					CH	BSHP	0.5-4.0 GRAVELLY SILTY CLAY WITH TR VF-C SAND: 4% VF-C SAND, 11% SUBANGULAR TO SUBROUND F-C GRAVEL FRAGMENTS, AND 85% SILT CLAY. VERY PALE BROWN (10YR 7/3), DRY, STIFF, PLASTIC / COHESIVE WHEN MOIST.
2	5	SC304 SC305 SC306 SC307 (1.03)	2 3				
3							
4						CH	BSHP
5							

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010

Lakewood, Colorado 80228

Site Type BERZ / TRENCH

Date/Time Started _____ Site ID 9-6A-4 Dia. of Hole _____

Surface Elevation _____ Date/Time Completed _____

Completion Depth (ft.) _____ Water Level Initial (ft.): _____ ; After _____ Hours _____ (ft)

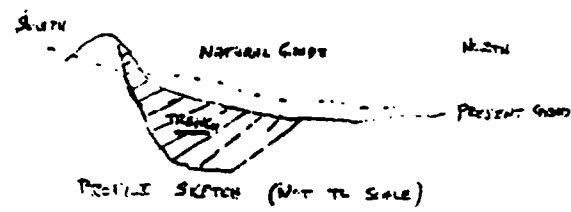
Equipment and Drilling Method _____ Drilling Company _____ No. Samples _____

_____ Driller _____

Size and Bit Type _____ Drilling Fluid _____

Sampler Type _____ Length (ft.) _____ Diameter (in.) _____ Driving WL (lbs.) _____ Drop (in.) _____

Geologist/Date _____ (Signature) _____ Checked by/Date _____

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
5					CH	BRKD	5.0 - 10.0 F-VF SANDY SILTY CLAY WITH 10% F-VF SAND AND 90% FINES. VARY PALE BROWN (10/2 7/8) DRY, STIFF, PLASTIC / COHESIVE WHEN MOIST
6							
7							NOTE: TRENCH LOCATION IS ON A SLOPED AREA WHICH HAS BEEN PREVIOUSLY SLOPED. ALL DEPTHS ARE WITH RESPECT TO NATURAL GRADE.
8							
9							
10							T.D. = 10.0'
10							

EBASCO SERVICES INCORPORATED

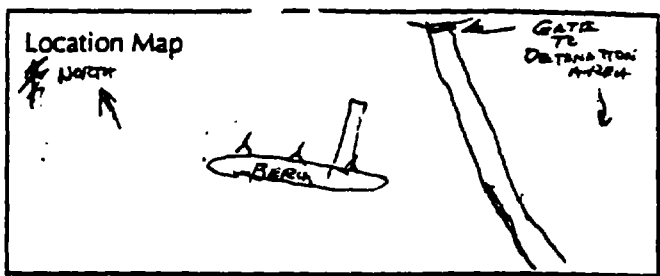
11VB & EBASCO
Contractor Name

Test Pit Record

SWMU 9

Date/Time Started 10/6/93 0955

Date/Time Completed 10/6/93 1115

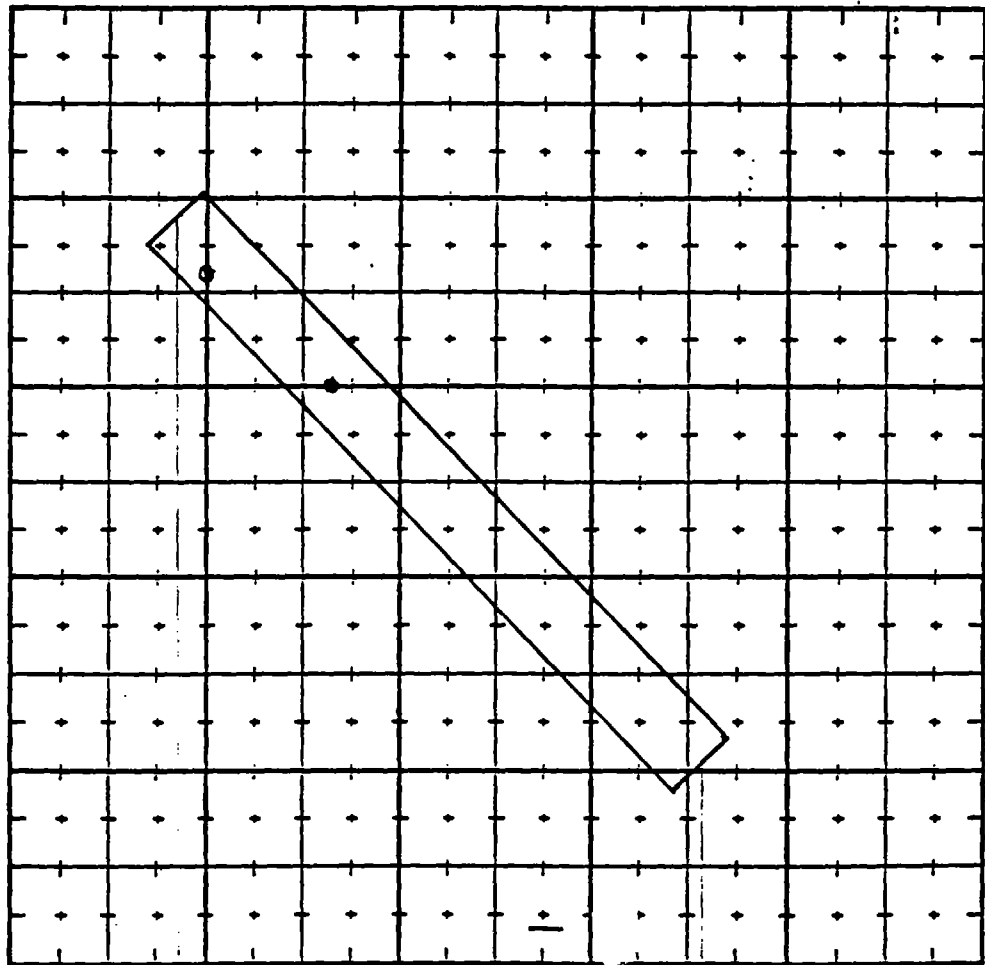


Test Pit 9-BA-4

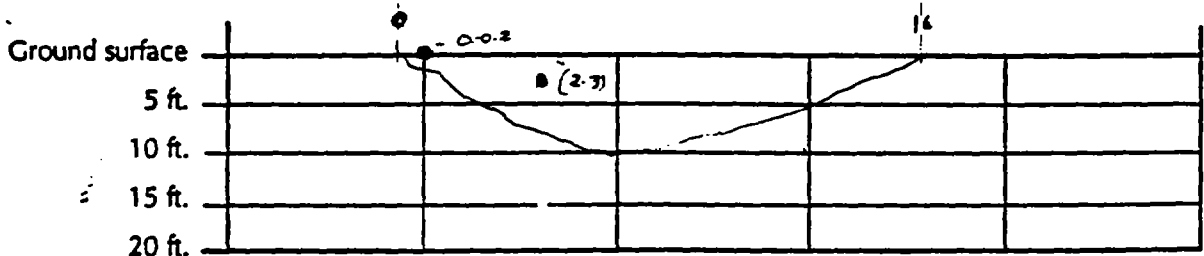
Coordinates MT

Geologist Robert C. Brown

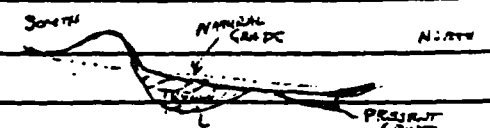
Scale: 1 inch = 4 ft.



● - SAMPLE COLLECTION PT



Notes DEPTHS ARE ✓ RESPECT TO NATURAL GRADE:



Field Bore Log

Tooele Army Depot - South Area

Ebasco Environmental
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Lakewood, Colorado 80228

Task 3 Group 2 SWMUs

Site Type BORE / TRENCH

Date/Time Started 10/16/93 / 1358

Site ID 9-BA-5 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/16/93 1513

Completion Depth (ft.) 10

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method _____

Drilling Company UVB No. Samples 2

RUSE 530 RUCKHOE

Driller RAN WILSON - OPERATOR

Size and Bit Type 18-INCH RUCKER

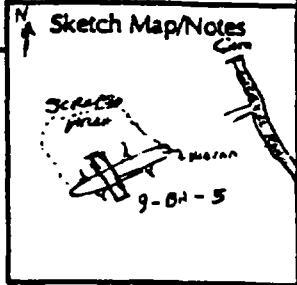
Drilling Fluid NA

Sampler Type G & S Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs) NA Drop (in.) NA

Geologist/Date [Signature]
(Signature) 10/16/93

Checked by/Date [Signature] 5/11/94



Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0					CH	BKD	3.5 - 4.0 (ABOVE NATURAL GRADE) SILTY CLAY WITH F-VF SAND: 79% SILT/CLAY, 17% F-VF SAND. PALE BROWN (10YR 4/3). LITTLE POST TO PLASTIC, SOFT, BIRTH/USFORMATION, TENDS TO SLURRY. PLASTIC/COHESIVE WHEN POST.
0 - 3.5					CH	BKD	(ABOVE NATURAL GRADE) SANDY GRAVELLY SILTY CLAY WITH 5% F-VF SAND. 10' SUBANGULAR TO SUBROUND F-C GRAVEL AND 65% FINE. VERY PALE BROWN (10YR 7/2), DRY, SOFT, ROOTLETS. MATERIAL SLIGHTLY PLASTIC/COHESIVE WHEN POST.
0 - 5.0					CH	BKD	(BELOW NATURAL GRADE) SILTY CLAY WITH TRACE F-VF SAND: 97% FINE, 3% SAND. VERY PALE BROWN (10YR 7/3), DRY, STIFF, PLASTIC/COHESIVE WHEN POST. DOES NOT TEND TO SLURRY.
4		50321 50322 50323 50324 (1430)					

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type BORE / TRENCH

Date/Time Started _____ Site ID 2-B1-5 Dia. of Hole _____

Surface Elevation _____ Date/Time Completed _____

Completion Depth (') _____ Water Level Initial (ft.): _____ ; After _____ Hours _____ (ft)

Equipment and Drilling Method _____ Drilling Company _____ No. Samples _____
Driller _____

Size and Bit Type _____ Drilling Fluid _____

Sampler Type _____ Length (ft.) _____ Diameter (In.) _____ Driving Wt.(lbs.) _____ Drop (In.) _____

Geologist/Date William C. Brown Checked by/Date _____
(Signature) 10/03

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
5					CH	BND	5.0 - 10.0 (Below Natural Gravel) SILT CLAY w/ TR FINE SAND: 37% FINES, 3% SAND. VERY PALE BROWN (10YR 7/3), DRY, STIFF, PLASTIC/ COHESIVE WHEN MOIST. DOES NOT TEND TO SLOUGH.
6							
7							
8							
9		S0226 S0227 S0330 S0331 (1515)	?				
10			10				T.D. = 10' Below Natural Gravel

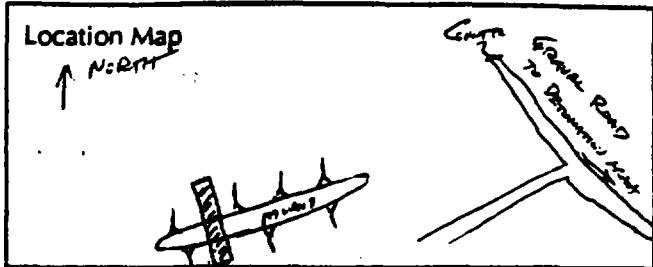
UXB - EBASCO
Contractor Name

Test Pit Record

SWMU 9

Date/Time Started 10/6/93 1339

Date/Time Completed 10/6/93 1513

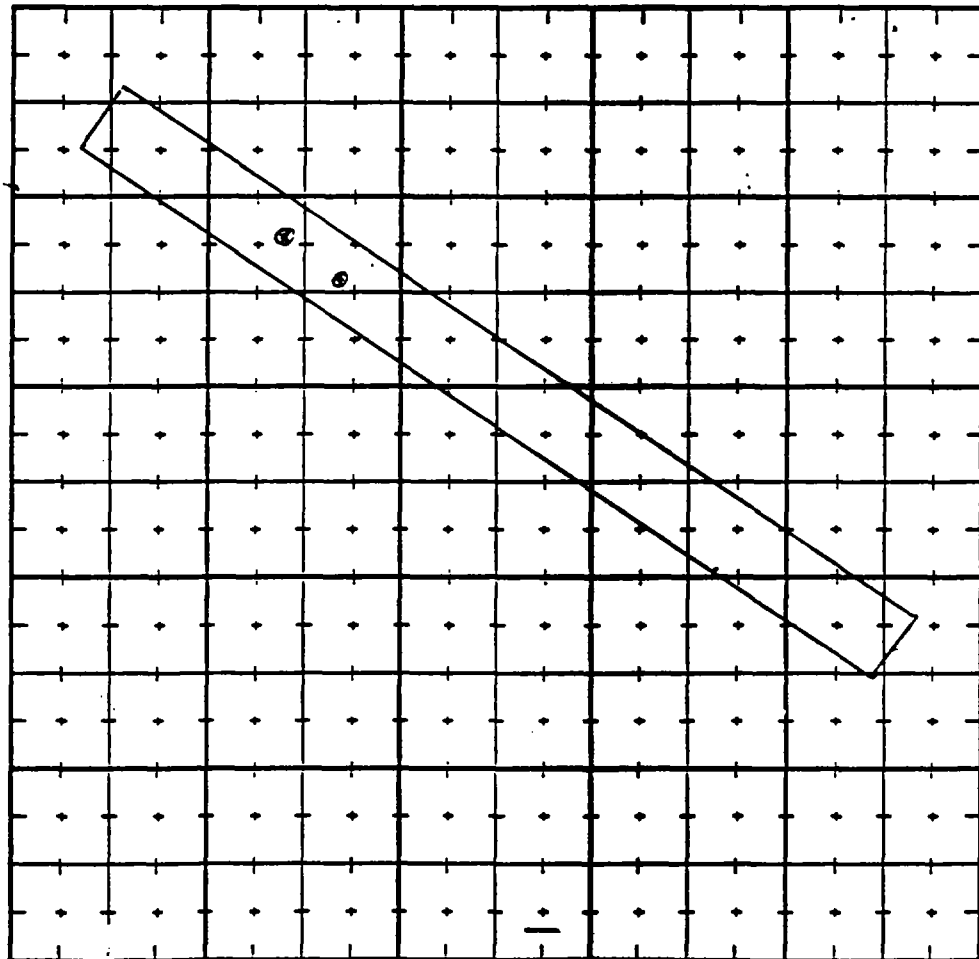


Test Pit 9-BA-5

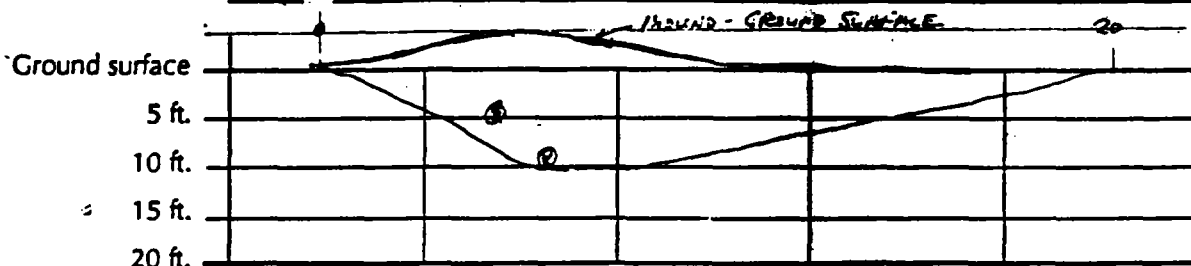
Coordinates NA

Geologist Robert C. Brown

Scale: 1 inch = 4 ft.



⊙ Sample Location



Notes TRENCH ORIENTATION = 123° ALL SAMPLE DEPTHS RECORDED
WITH RESPECT TO APPROXIMATE UNDISTURBED GROUND SURFACE.

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type BORE

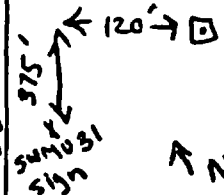
Date/Time Started 10-11-93/1100

Site ID 9-CA2-1

Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-11-93/1200



Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CHETS;
pushed split spoon sampler

Drilling Company PC Exploration No. Samples 4

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2.0

Diameter (in.) 3.0 Drilling Wt (lbs.) 140 Drop (in.) 30

Geologist/Date A. J. Bryan
(Signature)

Checked by/Date [Signature] 10/21/93

Blow Counts

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-0.5	NA	SM	0	0-0.5 ft silty f-c sand w/some gravel and trace clay (5% clay, 20% gravel, 45% sand, 30% silt); 10YR 4/3 brown; soft loose; not cemented;
1	NA	S	0.5-1	1.5	ML	0	
2	NA	S	2-3	1.25	HL	0	
3	NA	S	4-5	1.0	ML	0	no plasticity; roots; slight moisture; wet rain
4							
5							0.5-1.5 fine sandy silt w/some clay (10% clay, 35% sand, 55% silt); 10YR 5/6 yellow brown. soft-medium; not cemented, no-low plasticity; dry
10							1.5-5 ft fine sandy silt w/some clay (15% clay, 30% sand, 55% silt); 10YR 6/3 pale brown; medium; not cemented; low-med. plasticity; dry
15							
20							

ushed

Field Bore Log

Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Task 3 Group 2 SWMUs

Site Type BORE

Date/Time Started 10-11-93/1250

Site ID 9-DA2-2 Dia. of Hole 3.0 inch
2.5 inch

Surface Elevation NA

Date/Time Completed 10-11-93/1446

Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method SM-15;
driven split spoon sampler

Drilling Company PC Exploration No. Samples 4

Driller R. Smith

Size and Bit Type NA

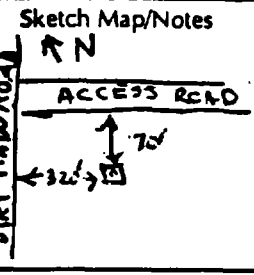
Drilling Fluid NA

Sampler Type split spoon Length (ft.) 1.5

Diameter (in.) 2.5 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date [Signature] 10-11-93

Checked by/Date [Signature] 10/21/93



Blow counts

15
15/16
17/6/10

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0.0-0.2	NA	ML	0	0 - 0.5 ft fine sandy silt w/ ^{trace} clay (19% clay, 35% sand, 50% silt);
1	NA	S	0.5 - 1	1.25 / 1.50	ML	0	5/3 10 YR 5/3 brown; dry; low to med. plasticity; medium consistency; no roots; not cemented
2	NA	S	2-3	1.25 / 1.5	SM	0	0.5 - 1.5 ft fine sandy silt w/ some clay (15% clay, 35% sand, 50% silt); 10 YR 6/3 pale brown; dry; medium plasticity; not cemented; soft to medium
3	NA	S	4-5	2.0 / 2.0	ML	0	1.5 - 4.0 ft silty fine sand w/ trace clay (10% clay, 40% silt, 50% sand) 10 YR 6/3 pale brown; dry; low plasticity; not cemented; soft to medium; <u>limonite staining</u>
4	NA	S					4.0 - 5.0 ft fine sandy silt w/ some clay (15% clay, 35% sand, 50% silt); 10 YR 6/3 pale brown; dry; medium plasticity, med. consistency; not cemented

Field Bore Log

Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Task 3 Group 2 SWMUs

Site Type BORE

Date/Time Started 10-11-93/1520

Site ID 9-0A2-3 Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-11-93/1625

Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CMEETS;

Drilling Company PC Exploration No. Samples 4

pushed split spoon sampler

Driller R. Smith

Size and Bit Type 1 1/2

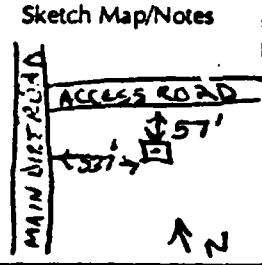
Drilling Fluid NA

Sampler Type split spoon Length (ft.) 3.5

Diameter (in.) 3.0 Driving Wt (lbs) 140 Drop (in.) 30

Geologist/Date A. J. B. B. 10-11-93
(Signature)

Checked by/Date Paul White 10/21/93



Blow Counts
pushed

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	SG	0-0.2	NA	ML	G	0 - 0.5ft fine sandy silt w/ trace clay (10% clay, 35% sand, 55% silt); 10YR 5/3 brown; dry; low plasticity; medium stiff; no roots; not cemented.
1	NA	SG	0.5-1	1.30 / 1.5	ML	G	
2	NA	S	2-3	1.25 / 1.5	SM	O	
3	NA	S	4-5	1.75 / 2.0	ML	O	0.5 - 1.5 ft silt w/ some clay and some fine sand (20% clay, 60% silt, 20% sand); 10YR 7/2 light gray; dry; medium plasticity; medium stiff to firm; not cemented
4	NA	S	4-5	1.75 / 2.0	ML	O	1.5 - 4.0 ft silty sand (95% silt, 5% sand) sand is fine to medium grained; 10YR 5/3 brown; no plasticity; loose; not cemented; limonite staining/veining; dry
5	NA	S	4-5	1.75 / 2.0	ML	O	5.0 - 5.0 ft clayey silt w/ some fine sand (25% clay, 15% sand, 60% silt); 10YR 5/3 brown; medium stiff; not cemented; medium plasticity; white evaporite crystals or caliche; slight moisture

Field Bore Log

Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type GRAB/BORE

Date/Time Started 10-12-93/0835

Site ID 9-0A2-4 Dia. of Hole 2.5 inch

Surface Elevation NA

Date/Time Completed 10-12-93/0955

Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CHETS

Drilling Company PC Exploration No. Samples 4

~~pushed~~
~~driven split spoon sampler~~

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

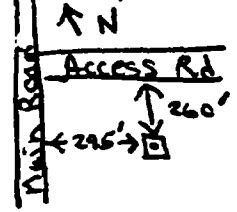
Sampler Type split spoon Length (ft.) 2.0

Diameter (in.) 2.5 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date [Signature] 10-12-93

Checked by/Date Paul White 10/21/93

Sketch Map/Notes



Blow Counts

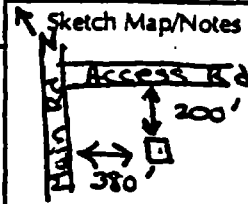
29/22
19/16

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval Ft	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-0.2	NA	ML	0	0 - 2.0 ft fine sandy silt w/some clay (10% clay, 30% sand, 60% silt); 10% R s/s brown; low plasticity; dry; soft; not cemented, minor roots
1	NA	S	0.3-1	1.25 1.5	M	0	
2	NA	S	2-3	1.3 1.5	ML	0	
3	NA	S	4-5	2.0 2.0	ML	0	2.0 - 5.0 fine sandy silt w/some clay (15% clay, 20% sand, 65% silt); 10% R s/s light brown gray; medium plasticity; dry; medium to medium stiff; not cemented.
4	NA	S					w/depth fine sand and clay slightly increases and color changes to 10% L/3 pale brown
5							
10							
15							
20							

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type GRAB CORE

Date/Time Started 10-12-93/1025

Site ID 9-0A2-5 Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-12-93/1135
Completion Depth (ft.) 5 Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CHEYS driven split spoon sampler; Drilling Company PC Exploration No. Samples 4
Driller R. Smith

Size and Bit Type NA Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2.0 3-5 Diameter (in.) 2.5 3.0 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date [Signature] 10-12-93 Checked by/Date [Signature] 10/21/93

Blow Counts

0.5
1.5
4/15
0.5/1.5

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval Ft	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-0.2	NA	ML	0	0 - 0.5ft fine sandy silt w/trace
1	NA	U	0.5-1	1.3	ML	0	clay (10% clay, 30% sand, 60% silt); 10YR 5/3 brown; low plasticity; dry; little moisture at surface; soft; not cemented, roots
2	NA	S	2-3	1.3	ML	0	
3	NA	S	4-5	1.75	ML	0	0.5 - 3ft fine sandy silt w/ some clay (15% clay, 25% sand, 60% silt); 10YR 6/4 light yellow brown; low to med plasticity; dry; medium stiff to consistency; not cemented
4	NA	S	4-5	2.0	ML	0	3-5ft fine sandy silt w/trace clay (10% clay, 25% sand, 65% silt); 10YR 6/3 pale brown; low plasticity; dry; medium to medium stiff; not cemented
5							
10							
15							
20							

553
10-12-93

553 10-12-93

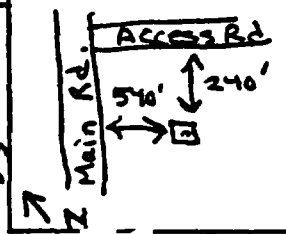
553 10-12-93

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type GRAB CORE

Date/Time Started 10-12-93/1208

Site ID 9-012-6 Dia. of Hole 2.0 inch

Surface Elevation NA

Date/Time Completed 10-12-93/1320

Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CME15;
driven split spoon samples

Drilling Company PC Exploration No. Samples 4

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2.0

Diameter (in.) 2.5 Driving Weight (lb.) 4 Drop (in.) 30

Geologist/Date A. M. B. 10-12-93
(Signature)

Checked by/Date [Signature] 10/21/93

Blows Counts

7/14
10/12
18/15

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-2	NA	ML	0	0 - 0.5 ft fine sandy silt w/ trace
1	NA	S	0.5-1	1.5	ML	0	clay (10% clay, 60% silt, 30% sand);
2	NA	S	2-3	1.5	ML	0	10YR 5/3 brown; low plasticity; little
3	NA	S	2-3	1.5	ML	0	moisture @ surface; soft to medium
4	NA	S	4-5	2.0	ML	0	stiff; not cemented; Gravels at surface w/
5	NA	S	4-5	2.0	ML	0	roots
6-10							0.5-3 ft fine sandy silt w/ trace
10-15							clay (10% clay, 65% silt, 25% sand);
15-20							10YR 6/3 pale brown; low plasticity;
							dry; medium stiff to stiff; not
							cemented; limonite staining/veining--
							clay increasing w/ depth
							3-5 ft silt w/ some fine sand +
							some clay (15% clay, 20% fine sand)
							65% silt); 10YR 5/4 yellow brown;
							low to med. plasticity; medium to
							firm; dry; not cemented; limonite
							staining/veining.

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type GRAB BORE

Date/Time Started 10-12-93/1400

Site ID 9-0A2-7 Dia. of Hole 3.0 inch
2.5 inch

Surface Elevation NA

Date/Time Completed 10-12-93/1504

Completion Depth (ft.) 5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CHEYS driven split spoon sampler

Drilling Company Pc Exploration No. Samples 4

Driller R. Smith

Size and Bit Type NA

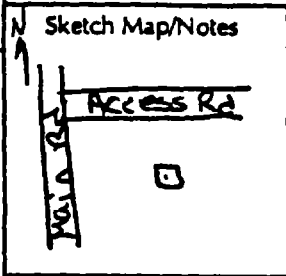
Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2.0

Diameter (in.) 3.0 Driving Wt (lbs.) 140 Drop (in.) 30

Geologist/Date D. M. B. 10-12-93
(Signature)

Checked by/Date [Signature] 10/21/93



Blow Counts

6/11
15/13
18/7

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0.0-2	2.0	ML	0	0 - 1.5 ft fine sandy silt w/ some clay (15% clay, 25% sand, 60% silt); 104R 6/3 pale brown; dry; medium to medium stiff; low plasticity; not cemented.
1	NA	S	0.5-1	1.5	ML	0	1.5 - 3 ft fine sandy silt w/ some clay (15% clay, 25% sand, 60% silt); 104R 42 light brownish gray; dry; medium stiff; low to med. plasticity; not cemented; limonite staining/veining.
2	NA	S	2-3	1.3	ML	0	3 - 5 ft silt w/ some clay and some fine sand (20% clay, 20% sand, 60% silt); 104R 6/3 pale brown; little moisture; medium to medium stiff; medium plasticity; not cemented.
3	NA	S	3-4	1.5	ML	0	
4	NA	S	4-5	2.0	ML	0	
5	NA	S	4-5	2.0	ML	0	

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type GRAB/BORE

Date/Time Started 10-12-93/1545 Site ID 9-0A2-5 Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA Date/Time Completed 10-12-93/1644

Completion Depth (ft.) 5 Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method CME 15j Drilling Company PC Exploration No. Samples 4

push/driven split spoon sampler Driller R. Smith

Size and Bit Type NA Drilling Fluid NA

Sampler Type Split Spoon Length (ft.) 2.0 3-5 Diameter (in.) 2.5 3.0 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date D. M. B. 10-12-93 Checked by/Date [Signature] 10/21/93



Blow counts

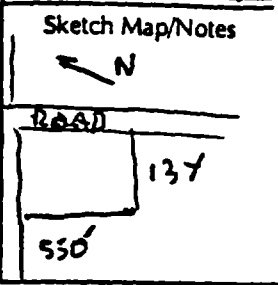
13/9
13/12
1/14/12

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-1.2	NA	ML	0	0 - 0.2 ft silt w/trace clay (5% clay, 45% silt, 50% fine sand); 104R 2/2 very dark brown; dry; no plasticity; soft; not cemented; charred wood at surface (rail ties)!
1	NA	S	0.5-1	1.5	ML	0	0.2 - 3.0 ft fine sandy silt w/ some clay (15% clay, 25% sand, 60% silt); 104R 6/3 pale brown; low to med. plasticity; medium to firm; not cemented; dry
2	NA	S	2-3	1.5	ML	0	3-5 ft silt w/ some clay and some fine sand (20% clay, 20% sand, 60% silt); 104R 6/3 pale brown; little moisture; medium stiff; medium plasticity; not cemented
3	NA	S	2-3	1.5	ML	0	
4	NA	S	4-5	2.0	ML	0	
5	NA	S	4-5	2.0	ML	0	
10							
15							
20							

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type BORH

Date/Time Started 10-13-93-0920

Site ID 9-0A2-9 Dia. of Hole 4"
As per test log 5/10/94

Surface Elevation N/A

Date/Time Completed (10-13-93 11:50)

Completion Depth (ft.) 5'

Water Level Initial (ft.): N/A; After N/A Hours N/A (ft)

Equipment and Drilling Method ISA
B-61

Drilling Company P.C. Exploration No. Samples 4
Driller B. Smith

Size and Bit Type N/A

Drilling Fluid N/A

Sampler Type ST Length (ft.) 1 1/2

Diameter (in.) 3 Driving Wt.(lbs.) N/A Drop (in.) N/A

Geologist/Date (Rick Weingart)
(Signature) 5/10/94

Checked by/Date Allyne Warren 5/10/94

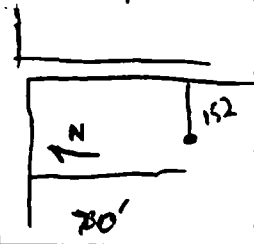
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	SC808 SC809 SC810 SC811 + SC823	250A 250B 250C 250D		N/A	CL	0	Silty clay trace of fine sand - 10% sand - 50% silt 40% clay 2-ST 43 Lt yellowish Brown low plast., soft, poorly cemented Dry to lt moist - - Drier red hard - red cemented TD. 5' no change.
				3		0	
				1-1		0	
5				1-1		0	
10							
15							
20							

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type BORE

Date/Time Started 10-13-93 1230

Site ID 9-252-10 Dia. of Hole 4"

Surface Elevation n/a

Date/Time Completed 1305 10-13-93

Completion Depth (ft.) 5'

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method HSA
-Push-

Drilling Company PC Excavation No. Samples 3

Driller Smith

Size and Bit Type n/a

Drilling Fluid n/a

Sampler Type ST Length (ft.) 1 1/2

Diameter (in.) 3 1/2 Driving Wt (lbs.) n/a Drop (in.) n/a

Geologist/Date R. White 10-13-93
(Signature)

Checked by/Date R. White 5/11/94

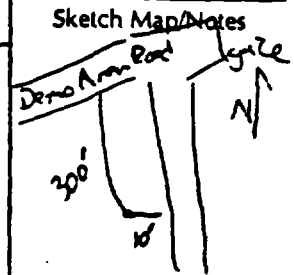
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	SO824 ↓ SO839	200A 300B	0-1/2	6-1/2	CL	0	Silt clay - 2.5% clay, 67% yellow brown - 40% clay, 60% clay nonplastic, soft, poorly cemented Dry
1/2			1/2-1	11-1/2	SM	0	Silty Sand 45% fine sand 30% silt 25% clay 2.5% clay LT golden, nonplastic, soft, uncemented, Dry
3'			1-1 1/2	17-	CL	0	Silty clay / fine sand, 40% silt, 50% clay, 10% fine sand. nonplastic, Firm, not cemented, Dry, 2.5% clay LT yellow brown
5'							TD 5'
10							
15							
20							

Field Bore Log

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Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
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Lakewood, Colorado 80228



Site Type Bore

Date/Time Started 1420 10-13-93

Site ID 9-0A2-1 Dia. of Hole 4

Surface Elevation n/a

Date/Time Completed 10-13-93 1440

Completion Depth (ft.) 5'

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method NSA Push.

Drilling Company PC Exploration No. Samples 3
Driller R. Smith

Size and Bit Type n/a

Drilling Fluid n/a

Sampler Type ST Length (ft.) 1 1/2

Diameter (in.) 3 1/2 Driving Wt. (lbs) n/a Drop (in.) n/a

Geologist/Date R. White 10-13-93
(Signature)

Checked by/Date R. White 5/11/94

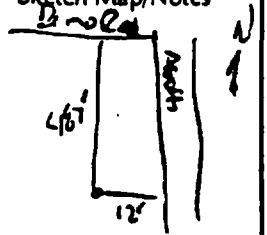
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	SOBBZ	300A	11-25-93	11-25-93	CL	0.0	Clayey silt - 35% clay, 65% silt - 2.5% 1/3 LT gill with brown nonplastic, soft, poorly cemented, dry
		300B	21-24-93	21-24-93	CL		
		300C	18-25	24-17			
5	SOB47						Silty clay - 35% silt, 65% clay - 2.5% 1/4 LT gill, brown nonplastic, firm, poorly cemented, dry
							TD 5'
10							
15							
20							

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type BORE

Date/Time Started 1525 10-13-93

Site ID 9-002-12 Dia. of Hole 4"

Surface Elevation N/A

Date/Time Completed 1600 10-13-93

Completion Depth (ft.) 5'

Water Level Initial (ft.): N/A; After N/A Hours N/A (ft)

Equipment and Drilling Method HSA
B-61 Push

Drilling Company P.C. Excavation No. Samples 3
Driller R. Smith

Size and Bit Type N/A

Drilling Fluid N/A

Sampler Type ST Length (ft.) 1 1/2

Diameter (in.) 5 1/2 Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date [Signature] 10-13-93
(Signature)

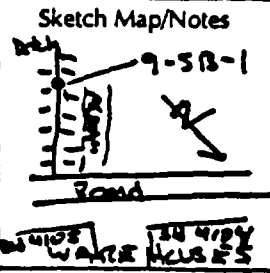
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Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	50989	3100 3101 3102	1-1 1-1 1-1	7-10 44	CL	ORW	Silty Clay - 40% clay 60% clay - 25% fine yellow kaolinitic, soft, unconsolidated to poorly consolidated Dry.
5	50913	3103 3104	1-1 1-1	20-44 45-32			- Same as previous - Lt moist
10							
15							
20							TD 5'

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type BORE

Date/Time Started 10-17-93 812

Site ID 9-58-1 Dia. of Hole 4'

Surface Elevation _____

Date/Time Completed 10-17-93 830

Completion Depth (ft.) 3

Water Level Initial (ft.): N/A ; After N/A Hours N/A (ft)

Equipment and Drilling Method Hand Auger

Drilling Company PL Exploration No. Samples 21

Driller N/A

Size and Bit Type N/A

Drilling Fluid N/A

Sampler Type Hand Auger

Diameter (in.) 3 1/2 Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date Paul White 10-17-93
(Signature)

Checked by/Date Paul White 10/25/93

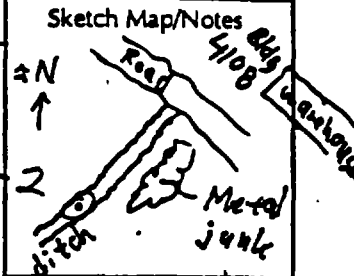
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				100%	CL	0	Silty Clay - 35% silt 65% clay - 10% RSL, yellowish brown, homogeneous, soft. unconsolidated - 41% moist.
1						0	- 1 1/2" - 2" gravel layer -
2	50950 50951 50952 50953	300A 300B	2'-3'	75%		0	Same as above no changes.
3							TO 3'
10							
15							
20							

Field Bore Log

9-SB-2

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Bore

Date/Time Started 10/15/93 1018

Site ID 9-SB-2 Dia. of Hole 2 inch

Surface Elevation _____

Date/Time Completed 10/15/93 1159

Completion Depth (ft.) 3.0 ft

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method B-G1
Mobile Drill Rig

Drilling Company PC Exploration No. Samples 2
Driller Randy Smith

Size and Bit Type 2 inch spoon

Drilling Fluid None

Sampler Type split spoon Length (ft.) 2

Diameter (in.) 2 Driving Wt. (lbs.) 140 Drop (in.) 36

Geologist/Date R.T. Canon
(Signature) 10/15/93

Checked by/Date [Signature] 5/11/94

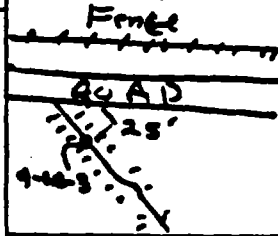
10/15/93
RTC

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
* 0	50954, 50955, 50956, 50957		0-0.2	1.4 1.5	CL	⊕	Silty (25%) clay (60%); some very fine grained sand (15%); low-moderate plasticity; very pale brown 10YR 7/4; soft; NC; dry; one piece of subangular limestone pebble at 0.8 ft.
1							
2	50958, 50959, 50960, 50961		2-3 ft	1.5 1.5	CL	⊕	
3							TD at 3.0 ft
16							* Note: The 0-0.2 ft sample was not collected due to rain soaking the top surface part of the ground. Sample will be collected at a later date.
36							

Field Bore Log

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Sketch Map/Notes



Tooele Army Depo - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Task 3 Group 2 SWMUs

Site Type BORE

Date/Time Started 10-17-93 0900

Site D-58-3 Dia. of Hole 3 1/2

Surface Elevation _____

Date/Time Completed 10-17-93 0900

Completion Depth (ft.) 3'

Water Level Initial (ft.): n/a; After n/a Hours n/a (SU)

Equipment and Drilling Method Hand

Drilling Company _____ No. Samples 1

Auger

Driller _____

Size and Bit Type n/a

Drilling Fluid _____

Sampler Type Auger Length (ft.) 6"

Diameter (in.) 3 1/2 Driving Wt (lbs.) n/a Drop (in.) n/a

Geologist/Date R. W. [Signature] 10-17-93
(Signature)

Checked by/Date Paul [Signature] 10/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				n/a	CL	0	Silty clay - 45% silt + 55% clay - 10TR 6/4 yellow brown, low plastic, soft, uncemented, lt. moist.
1						0	
2	50966 50967 50968 50969	300A Number	2'-3'	n/a		0	- no change to 3'
3							
10							TB 3'
15							
20							

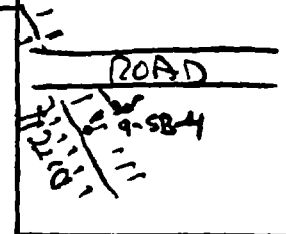
Field Bore Log

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Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type BORE

Date/Time Started 10-16-93 1543

Site ID 9-58-4 Dia. of Hole 3 1/2

Surface Elevation _____

Date/Time Complete 10-16-93 1555

Completion Depth (ft.) 3'

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method Hand

Drilling Company _____ No. Samples 1

Auger

Driller _____

Size and Bit Type n/a

Drilling Fluid n/a

Sampler Type HAND AUGER Length (ft.) 6"

Diameter (in.) 3 1/2" Driving (lb) n/a Drop (in.) n/a

Geologist/Date R. W. [Signature] 10-16-93
(Signature)

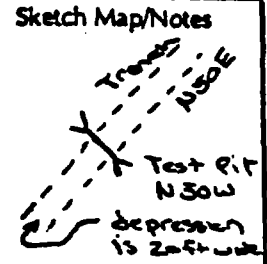
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Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0				n/a	CL	0	Silty Clay - 40% silt 60% clay / 10TR% brownish yellow, soft, lumpy, lit moist in center
1							
2	SOA74	300A	2-3'	n/a		0	- no change of depth.
2	SOA75	400A					
2	SOA76						
3	SOA77						
10							
15							
20							TD 3'

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/11/93, 0930

Site ID 9-TP-1 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/11/93, 1545

Completion Depth (ft.) 10

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method 580
CASE Backhoe

Drilling Company UXB No. Samples 3
Driller Ron Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type Gowis Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date MBA 10/11/93
(Signature)

Checked by/Date [Signature] 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S9908 to S9057	0 to 2		ML	0	light brown (10YR 5/3) soft, little moisture, uncemented, very fine grained quartz sandy (10%), clayey (20%) silt (70%) with very minor organic component
1	2910 10/11/93						Becomes less clayey with depth and by 2 1/2 ft is a:
2		S9102 to S9103	2 to 3			0	light brown (10YR 6/3), firm, little moisture very fine grained, quartz sandy (25%) silt (70%) with minor clay (5%)
3	2913 10/11/93		3		ML		
4		S9104 to S9107	4 to 8			0	By 4 1/2 feet becomes: very hard, weak argillic cemented very fine grained sandy (25%) silt (70%) with minor clay (5%)
5	2918 10/11/93						

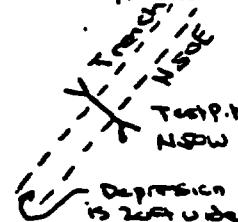
Field Bore Log

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Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type Test Pit

Date/Time Started 10/11/93, 0730

Site ID 9-TP-1 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/11/93, 1545

Completion Depth (ft.) 10

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method ESP
Case Backhoe

Drilling Company UAB No. Samples 3
Driller Ron Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type Gowis Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date MZM 10/11/93
(Signature)

Checked by/Date _____

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
5	R27B 10/11/93						<p>From 5 to 10 feet the soil remains the same as described on previous page except:</p> <ol style="list-style-type: none"> From 8 1/2 to 10 feet the soil is stiff instead of very hard Lower two feet contains roots and some partially carbonized organic debris <p>TD = 10 ft</p>
6							
7	R27B 10/11/93				ML	0	
8	R27B 10/11/93						
9	R27B 10/11/93						
10	R27B 10/11/93						

EBASCO SERVICES INCORPORATED

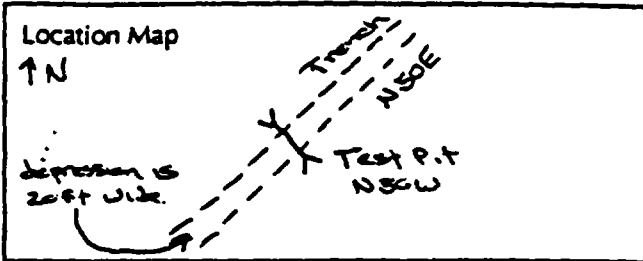
Contractor Name UXB

Test Pit Record

SWMU 9

Date/Time Started 10/1/93, 0930

Date/Time Completed 10/1/93, 1545

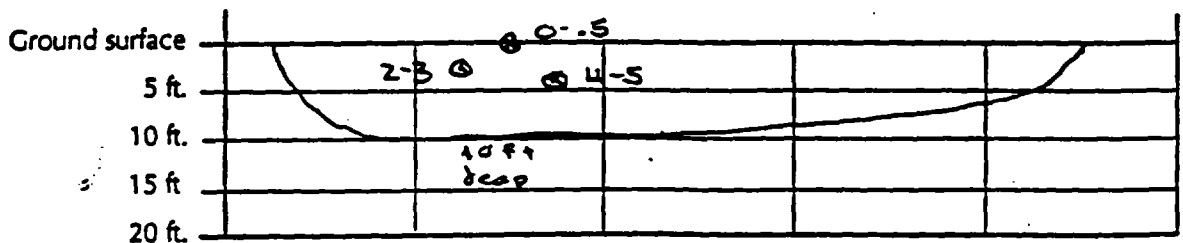
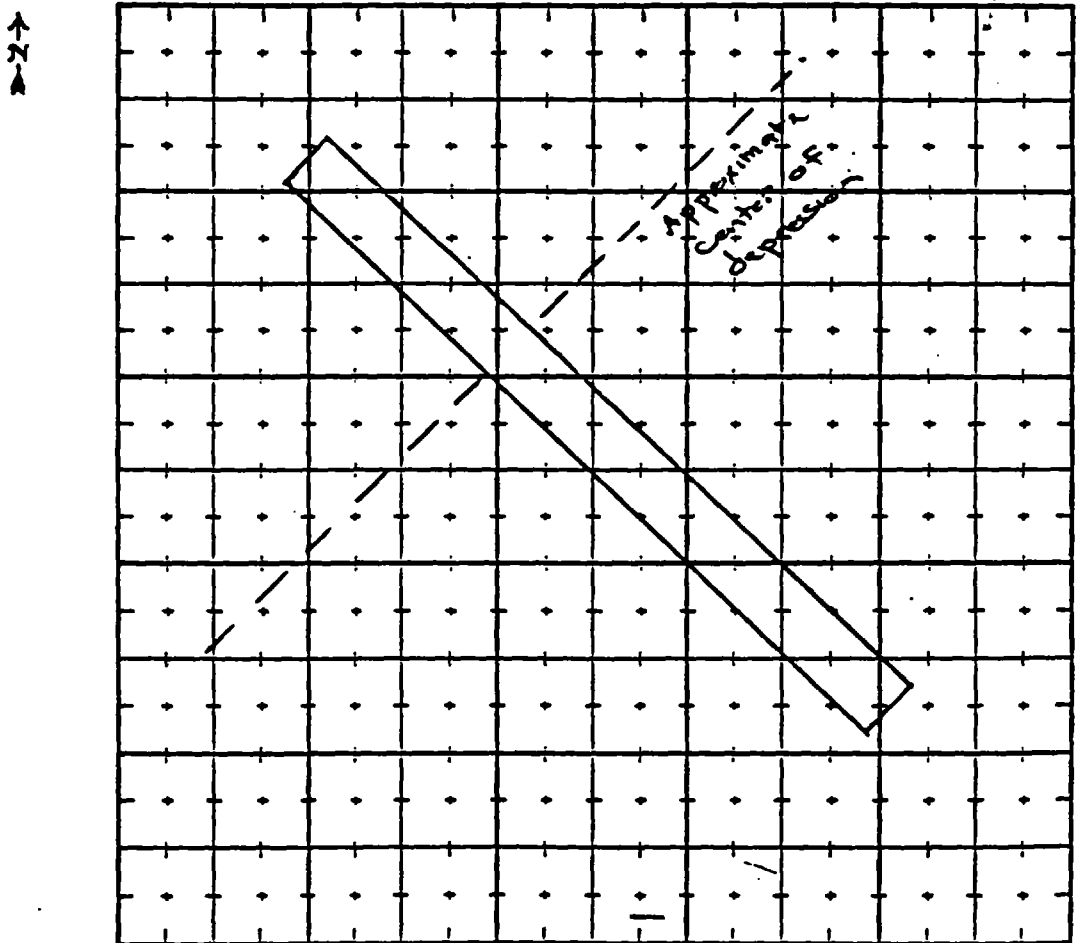


Test Pit 9-TP-1

Coordinates NA

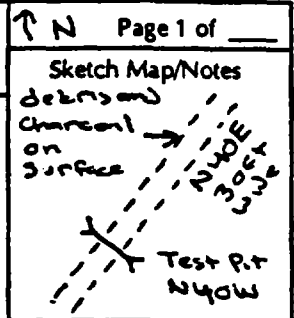
Geologist Rich Borden

Scale: 1 inch = 6 ft.



Notes Trench is oriented N50W, walls are vertical;
Only undisturbed soil encountered in this test pit
so only three samples collected instead of four

Field Bore Log



Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebaecg Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Test Pit

Date/Time Started 10/12/93, 0845

Site ID 97R-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/12/93, 1330

Completion Depth (ft.) 10 FT

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method 580 Case Backhoe

Drilling Company EXB No. Samples 3
Driller Ron Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type Grab Length (ft.) NA

Diameter (in.) NA Driving Wt.(lbs.) NA Drop (in.) NA

Geologist/Date M R M 10/12/93
(Signature)

Checked by/Date _____

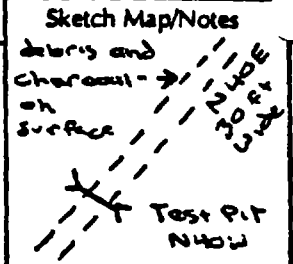
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S913 to S916	0 to 1			0	light brown (10YR 5/4) soft, not cemented, little moisture, slightly clayey (5%), very fine grained, well sorted, angular quartz sandy (30%) silt (65%) rounded limestone and sandstone, pebbles scattered on surface
1	27B 10/12/93				ML		the silt becomes stiff and dry with depth
2		S917 to S920	2			0	At 2 1/2 feet - sharp contact
3			3		SM and GM		light brown (10YR 5/3), medium dense, dry, silty (20%), subangular, moderately sorted, fine to coarse grained, quartz and rock fragments sandy (30%) gravel (50%) with rare clay; the gravel is subround to round, subangular to subequant, limestone and sandstone, clasts up to 2 in in diameter
4	22B 10/12/93		4		SM and SM	27B 10/12/93	lenses of this gravel are interbedded with:
5	22B 10/12/93						

Field Bore Log

↑ N Page 1 of 2

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/12/93, 0845

Site ID 9-TP-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/12/93, 1330

Completion Depth (ft.) 10ft

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method SBO
Case Bucher

Drilling Company UXB No. Samples 3
Driller Ron Wilson

Size and Bit Type 18in bucket

Drilling Fluid NA

Sampler Type Gows Length (ft.) NA

Diameter (in.) NA Driving Wt.(lbs.) NA Drop (in.) NA

Geologist/Date MZA 10/12/93
(Signature)

Checked by/Date _____

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
5	R45 1012193				SM		(10YR 6/3) very light brown, silty (35%) subangular, very fine grained to fine grained, well sorted, quartz and rock fragments sand (65%)
6							
7	R45 1012193						At 3 3/4 ft a sharp contact with: light brown (10YR 6/3), well sorted, very fine grained, angular, quartz silty (35%) sand (65%) reddish brown (10YR 5/8) Fe oxide stained around rootlets and other organic matter, dry and hard, minor clay (5%) weak argillic cement
8	R45 1012193						
9	R45 1012193				SM		
10	R45 1012193						TD = 10ft

Samples
discarded

New test pit made
in another trench
to west and
labelled as
9-TP-2A

EBASCO SERVICES INCORPORATED

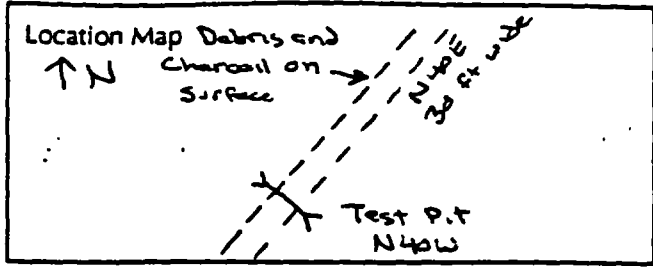
Contractor Name UXB

Test Pit Record

SWMU 9

Date/Time Started 10/12/93, 0845

Date/Time Completed 10/12/93,

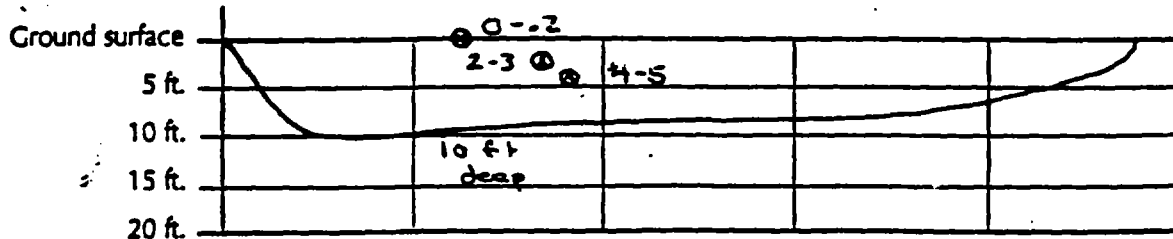
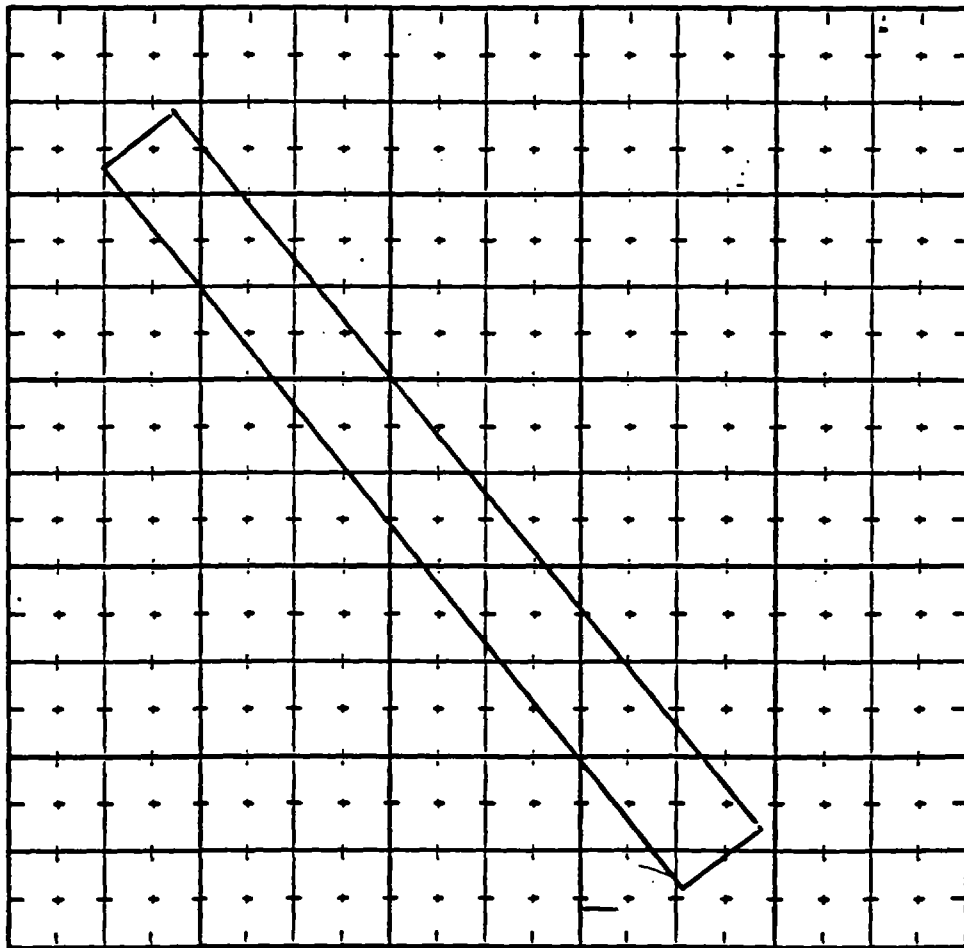


Test Pit 9-TR-2

Coordinates NA

Geologist Rich Borden

Scale: 1 inch = 4 ft



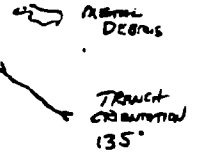
Notes Test pit is oriented N40°W. Walls are vertical.
This test pit only encountered undisturbed soil so only
three samples were collected

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type TEST Pt

Date/Time Started 10/13/93/1415

Site ID 9-TP-2A Dia. of Hole 4 1/2"

Surface Elevation n/a

Date/Time Completed 10/13/93/1635

Completion Depth (ft.) 10.0'

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method 580 CASE BACKHOE

Drilling Company UKR No. Samples 2

Driller BOB WILSON - OPERATOR

Size and Bit Type 1 1/2" - INCH BUCKET

Drilling Fluid n/a

Sampler Type C & S Length (ft.) n/a

Diameter (in.) n/a Driving Wt. (lb) n/a Drop (in.) n/a

Geologist/Date William C. Pizarro
(Signature) 10/13/93

Checked by/Date Paul White 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	0.2 S Soil Dust TR. P. Rim	589665			CH	BRD	0-5.0 SILTY CLAY (100% Fines) LIGHT YELLOWISH BROWN (10%R 6/4). STIFF, DRY, PLASTIC/COHESIVE WITHIN 1/2" ROOT/VEGETATION FROM 0-0.25.
0.2		589670					
0.4		589675					
0.6		589680					
0.8		589685					
1.0		589690					
1.2		589695					
1.4		589700					
1.6		589705					
1.8		589710					
2.0	2-3	589715					
2.2		589720					
2.4		589725					
2.6		589730					
2.8		589735					
3.0							
4.0							
10.0							

WELLS
10/13/93

WELLS
10/13/93

WELLS
10/13/93

WELLS
10/13/93

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type TEST PIT

Date/Time Started 10/3/23/1415

Site ID 9-TP-2A Dia. of Hole n/a

Surface Elevation n/a

Date/Time Completed 10/3/23/1635

Completion Depth (ft.) 10.0'

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method SB²
CASE BACKHOE

Drilling Company UKB No. Samples 2
Driller AND WILSON - OPERATOR

Size and Bit Type 18-INCH BUCKET

Drilling Fluid n/a

Sampler Type ESP Length (ft.) n/a

Diameter (in.) n/a Driving Wt.(lbs.) n/a Drop (in.) n/a

Geologist/Data W.C. P...
(Signature) 10/3/23

Checked by/Date _____

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
5.0					CH	WCB SA	5.0 - 7.5 SILTY CLAY (100% FINE) LIGHT YELLOWISH BROWN (10YR 5/4), STIFF, DRY, PLASTIC/COHESIVE WHEN MOIST.
7.5					GH	WCB	7.5 - 10.0 GRAVELLY F-VF SAND/CLAYEY SILT with 15% ANGRULAR TO SUBANGULAR BRANDED GRANUL FRAGMENTS, 10% F-VF SAND; AND 75% CLAY/SILT. LIGHT YELLOWISH BROWN (2.5Y 6/4), STIFF, V. LITTLE MOIST, F STAINING, ROOT-CHANNELS, PLASTIC/COHESIVE WHEN MOIST
10.0							7.0' = 10.0'

WCB 10/3/23

WCB 10/3/23

WCB 10/3/23

WCB 10/3/23

WCB 10/3/23

EBASCO SERVICES INCORPORATED

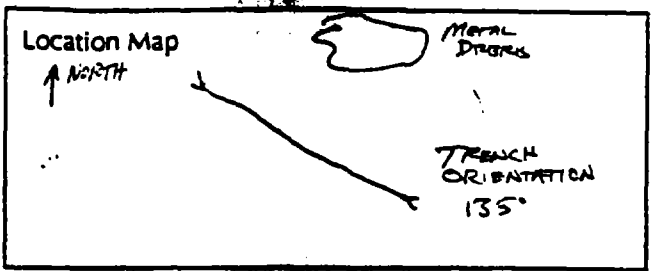
UXB
Contractor Name

Test Pit Record

SWMU 9

Date/Time Started 10/29/14 15

Date/Time Completed 10/29/14 35



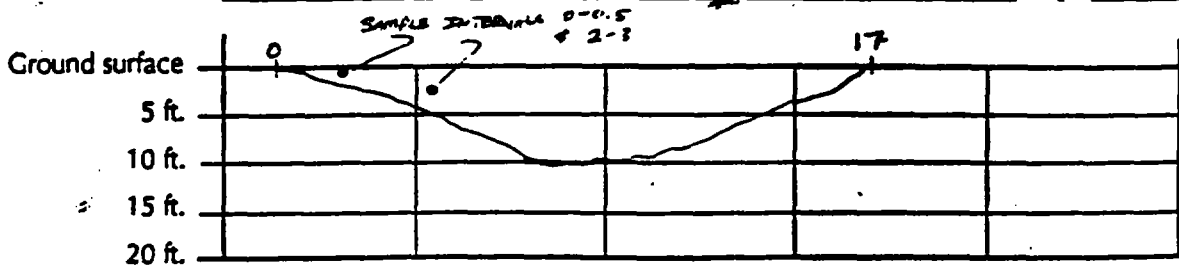
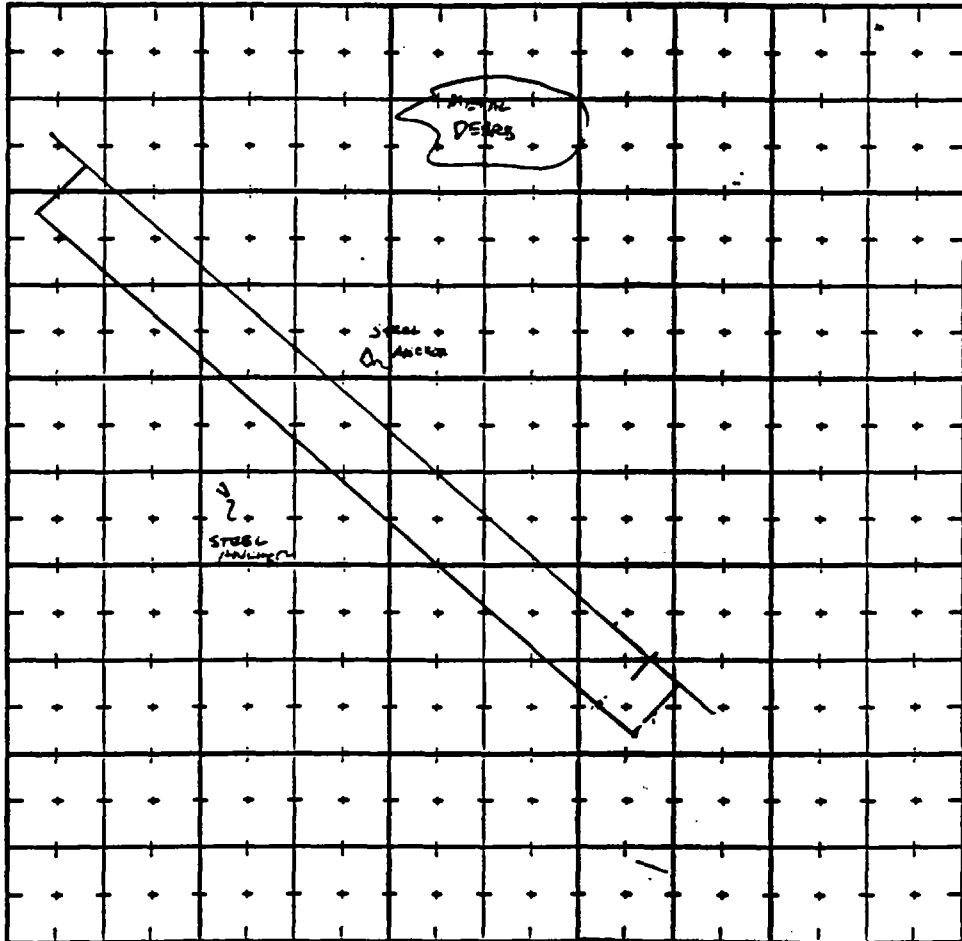
Test Pit 9 - TP-2A

Coordinates N/A

Geologist John C. [Signature]

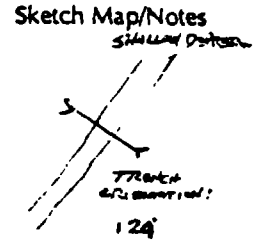
Scale: 1 inch = 4 ft.

↑
N
↑



Notes TEST PIT IS ORIENTED NW-SE AND IS 17' LONG. TRENCH WALLS DID NOT COME ON SLOTTED CORRUGATED METAL NEAR TRENCH.

Field Bore Log



Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type TEST PIT

Date/Time Started 10/13/93 / 10:35

Site ID 3-TP-3 Dia. of Hole 4/4

Surface Elevation N/A

Date/Time Completed 10/13/93 / 12:23

Completion Depth (ft.) 10.0'

Water Level Initial (ft.): NA; Aft. NA Hours NA (ft)

Equipment and Drilling Method SSC

Drilling Company UXB No. Samples 3

LAST RACE HOLE

Driller RON WILSON OPERATOR

Size and Bit Type 1 1/2 INCH FUSINET

Drilling Fluid N/A

Sampler Type G AND S Length (ft.) 4/4

Diameter (in.) 4/4 Driving Wt.(lbs.) 4/4 Drop (in.) 4/4

Geologist/Date [Signature]
(Signature) 10/13/93

Checked by/Date [Signature] 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		59108 59109 59110 59111 (103)			cl	B4D	0-2.0 Silty clay (10:1 fines) Pale Brown (10YR5/3), Firm, Dry, Plastic/cohesive when moist.
2		59112 59130 59131 59132 (110)	2.0		cl	B4D	2.0-5.0 Silty clay (10:1 fines), Light yellowish Brown (10YR6/4), DENSE, Dry, Plastic/cohesive when moist.
4		59133 59134 59135 59136 59144 (114)				B4D	

WCB
10/13/93

WCB
10/13/93

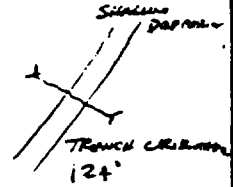
WCB
10/13/93

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type TEST PIT

Date/Time Started 10/13/93 / 10:25

Site ID 2-72-3 Dia. of Hole n/a

Surface Elevation n/a

Date/Time Completed 10/13/93 / 12:23

Completion Depth (ft.) 10.0'

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method SRU
(Air-Backhoe)

Drilling Company UFR No. Samples 3

Driller RON WILSON - OPERATOR

Size and Bit Type 18" BUCKET

Drilling Fluid n/a

Sampler Type G.P.S. Length (ft.) 4'

Diameter (in.) n/a Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date [Signature]
(Signature) 10/13/93

Checked by/Date _____

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
5					CH	4-013	5.0 - 7.0 SILTY CLAY (10% Fines) LIGHT YELLOWISH BROWN (10YR5/3), STIFF, DRY. PLASTIC / CONSISTENT WHEN MOIST
7					CL	4-013	7.0 - 10.0 F-VF SANDY SILTY CLAY w/ 5% F-VF SAND AND 45% SILT/CLAY. LIGHT YELLOWISH BROWN (2.5Y4), STIFF, v. LITTLE MOIST, RAT CHANNELS, Fe STAINING, PLASTIC / CONSISTENT WHEN MOIST
10							T.D. = 10.0'

UFR 10/13/93

UFR 10/13/93

UFR 10/13/93

UFR 10/13/93

UFR 10/13/93

EBASCO SERVICES INCORPORATED

HYB
Contractor Name

Test Pit Record

SWMU 9

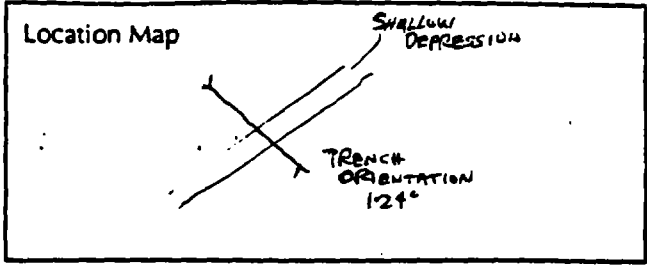
Test Pit 9-TP-3

Date/Time Started 10/3/93/1035

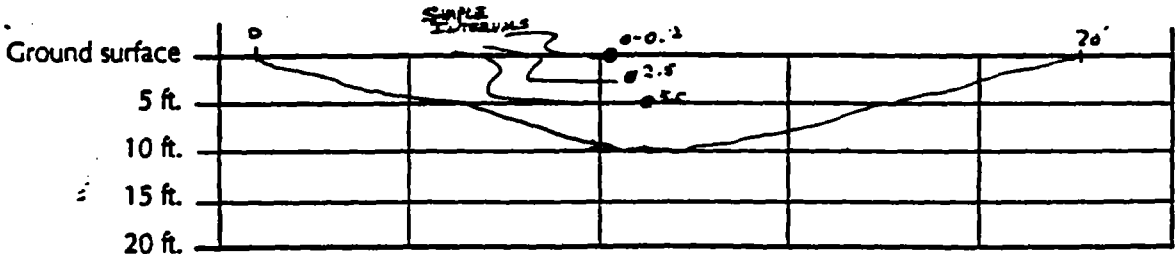
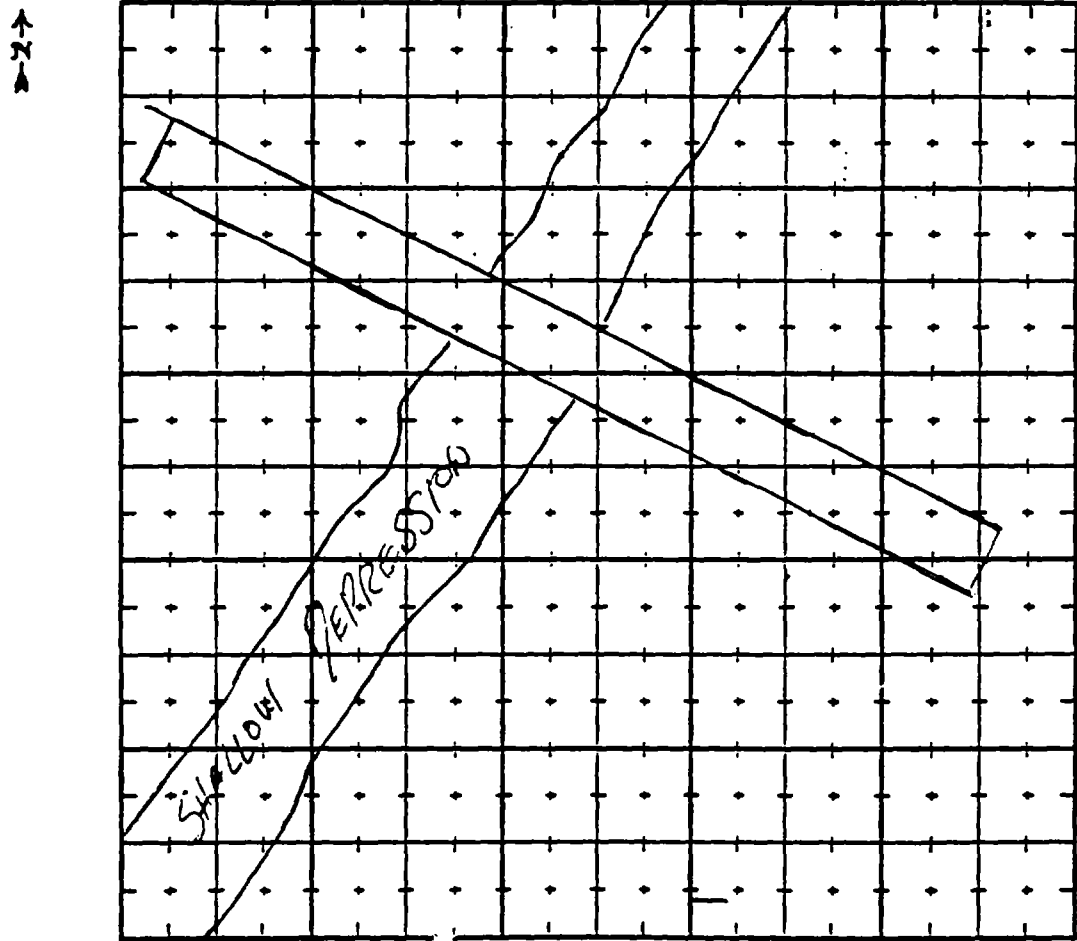
Coordinates N/A

Date/Time Completed 10/3/93/1233

Geologist William C. Brown



Scale: 1 inch = 4 ft.



Notes TEST PIT IS ORIENTED NW-SE AND IS 20' LONG. TRENCH WALLS DID NOT CURVE OR SLOUGH

A.1-137

Field Bore Log

Tooele Army Depot - South Area

Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type TEST PIT

Date/Time Started 10/7/93 0915

Site ID 9-TR-04 Dia. of Hole NA

Surface Elevation _____

Date/Time Completed 10/7/93 1027

Completion Depth (ft.) 10

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method _____

Drilling Company UYB No. Samples 2

580 CASE BACKHOE

Driller BRUCE MEE OPERATOR

Size and Bit Type 18-INCH BUCKET

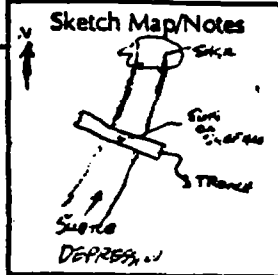
Drilling Fluid NA

Sampler Type GFS Length (ft.) NA

Diameter (in.) NA Drilling Wt. (lbs.) NA Drop (in.) NA

Geologist/Date _____
(Signature)

Checked by/Date P. M. M. 10/25/93



Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		59164 59165 59166 59167 59172 (0910)	0 0.2		CL	CLAY	0-0.25 SILTY CLAY (100% FINE) PINK BROWN (10YR 4/3), MUST. STIFF, PLASTIC / COHESIVE. RHYTHMIC.
1							
2		59168 59169 59170 59171 (0930)	2				0.25 - 8.0 SILTY CLAY (100% FINE), VERY PINK BROWN (10YR 4/3) DRY, FLAKY / COHESIVE WHEN MOIST.
3							
4							
5							

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Task 3 Group 2 SWMUs

Site Type TEST PIT

Date/Time Started _____ Site ID 9-TP-04 Dia. of Hole _____

Surface Elevation _____ Date/Time Completed _____

Completion Depth (ft.) _____ Water Level Initial (ft.): _____ ; After _____ Hours _____ (ft)

Equipment and Drilling Method _____ Drilling Company _____ No. Samples _____

Driller _____

Size and Bit Type _____ Drilling Fluid _____

Sampler Type _____ Length (ft.) _____ Diameter (in.) _____ Driving Wt.(lbs.) _____ Drop (in.) _____

Geologist/Date [Signature] _____ Checked by/Date _____
(Signature) 1/17/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
5							
6							
7							
8					CL	BLD	8.0-10.0 Sandy Silty Clay with 10% F-VF Sand and 1% silt/clay. Brownish yellow (10YR 4/6). Little moist, plastic/cohesive when moist. Fe staining, root channels. Soil is consolidated & does not tend to crumb or slough (from 0-10')
9							
10							TD = 10.0'

EBASCO SERVICES INCORPORATED

UXB
Contractor Name

Test Pit Record

SWMU 9

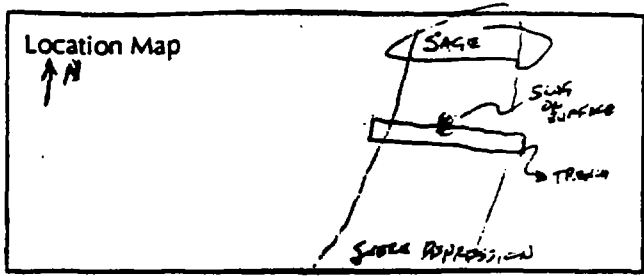
Test Pit 9-TP-04

Date/Time Started 10/2/93 0915

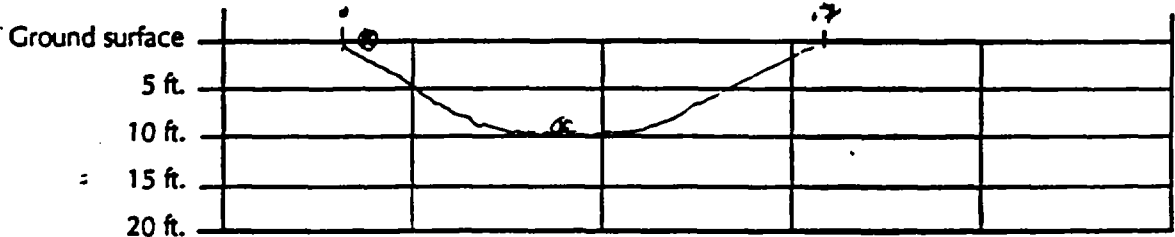
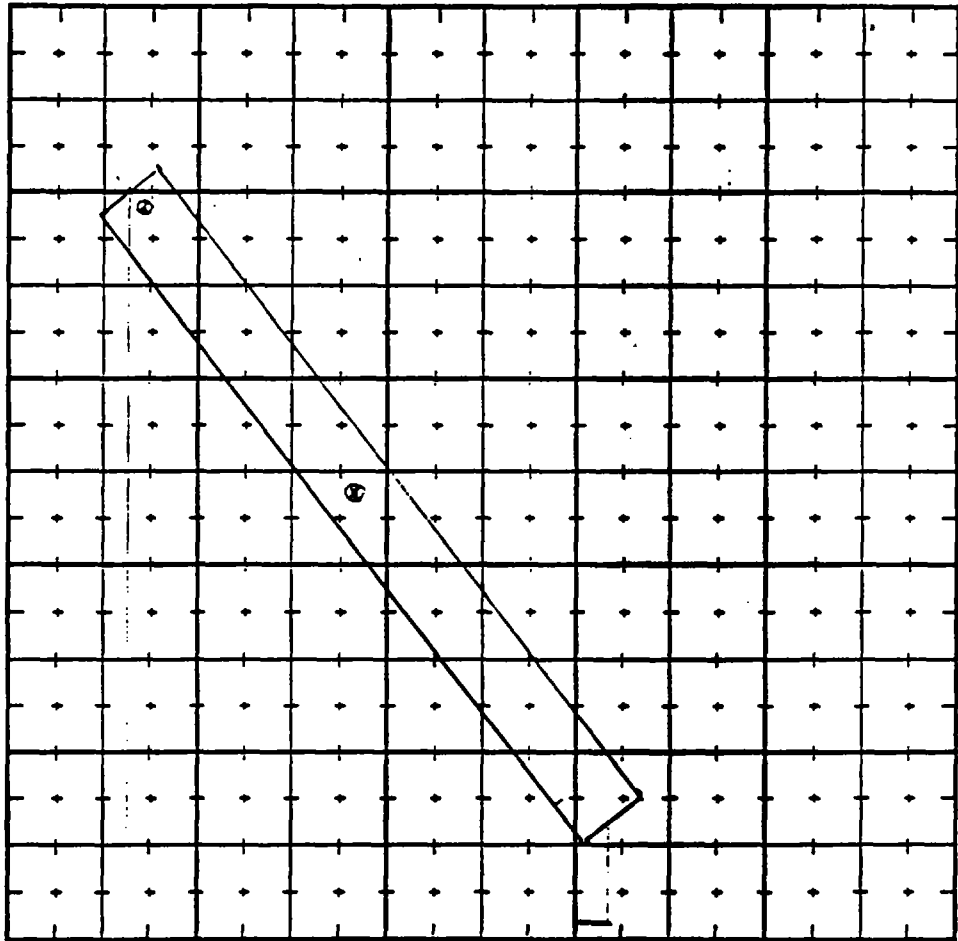
Coordinates _____

Date/Time Completed 10/2/93 1027

Geologist Mark C. [Signature]



Scale: 1 inch = 4 ft.



Notes PERIMETER OF TRENCH = 137' TRENCH INTERNAL CONSOLIDATED
DO NOT TRY TO SEARCH OR CURE

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type BORE

Date/Time Started 10-27-93/1205

Site ID 30-05A-1 Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-27-93/1235

Completion Depth (ft.) 3

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Mobile

Drilling Company Boyles Bros. No. Samples 1 geotech
1 chemical

B53; split spoon sampler pushed

Driller T. Giles

Size and Bit Type NA

Drilling Fluid NA

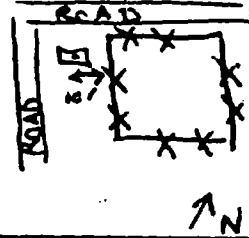
Sampler Type split spoon Length (ft.) 2

Diameter (in.) 3.5 geotech
3.0 Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date J. J. Bay

Checked by/Date Paul White 11/2/93

Sketch Map/Notes



Blow Counts

pushed

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA				GC	ppm	
1					GC	0.25 523 10-27-93	
2		S#					
3		S#	2-3	1.5 / 2.0	CL		
5							
10							
15							
20							

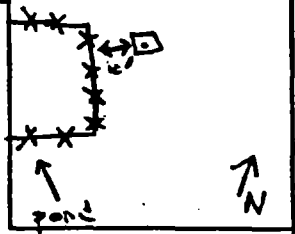
Handwritten notes in description column:
 0 - 1.75 ft clayey gravel w/ some fine to coarse sand and silt (25% clay, 20% silt, 20% f-c sand, 35% gravel + cobbles). Road base at surface, 104R 5/4 yellowish brown, dry, dense, med. plasticity, not cemented, minor roots, subrounded gravel + cobbles.
 0.25 - 1.75 ft Silty clay w/ some gravel and f-c sand (25% silt, 40% clay, 15% gravel, 20% f-c sand); 104R 5/4 yellowish brown, med. moisture, hard; not cemented; med plasticity.
 1.75 - 3.0 ft Silty clay w/ some fine sand + trace med. sand (50% clay, 30% silt, 15% fine sand, 5% med. sand); 104R 5/4 yellowish brown, med. moisture, med. plasticity; not cemented; hard; soil compacted in tube.
 * Geotech sample collected from the 1.5-2.0 ft interval

NOTE: The 0.0.2 ft sample was collected on 10-26-93

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type BORE

Date/Time Started 10/27/93 0920

Site ID 30-05A-2 Dia. of Hole 3.0 inch
2.5 inch

Surface Elevation NA

Date/Time Completed 10/27/93 1040

Completion Depth (ft.) 3

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Mobile BS3

Drilling Company Boyles Bros.

No. Samples 1 geotech
12 chem
1 chemical

Bit - split spoon samplers

Driller T. Giles

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2

Diameter (in.) 3.0 Drilling Wt. (lbs.) 140

Drop (in.) 30

Geologist/Date D. Mc-Bo 10-27-93
(Signature)

Checked by/Date [Signature] 11/2/93

Blow Counts

23/25/31/27

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval Ft	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)				
0	NA	S*	1-3	1.5	CL	O	0 - 0.5 ft silty clay w/some fine sand and trace med - coarse sand and trace gravels (45% clay, 30% silt, 15% fine sand, m-c sand 8%, gravel 2%); 10 YR 5/4 yellowish brown; dry, med. plasticity; not cemented, minor roots; soft - medium				
1							2-3	1.5	CL	0	w/ depth decreasing coarse-grained material and increasing moisture
2							2-3	1.5	CL	0	0.5 - 3.0 ft silty clay w/ trace fine sand (10% sand, 30% silt, 60% clay); 10 YR 5/4 yellowish brown; medium moisture; med. plasticity; not cemented; hard; soil is compacting in split spoon
3											
5											
10											
15											
20											

A.I-142

* Geotech sample collected from the 2-3 ft interval 10-27-93

NOTE: The 0-0.2 ft sample was collected on 10-26-93

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type BORE

Date/Time Started 10-27-93/1110

Site ID 30-01A-3 Dia. of Hole 3.5 inch

Surface Elevation NA

Date/Time Completed 10-27-93/1115

Completion Depth (ft.) 3

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Mobile

Drilling Company Boyles Bros. No. Samples 1

B53; splitspoon sampler pushed

Driller T. Gies

Size and Bit Type NA

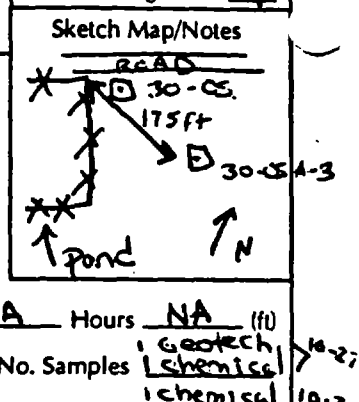
Drilling Fluid NA

Sampler Type splitspoon Length (ft.) 2

Diameter (in.) 3.0 Driving Wt (lbs.) NA Drop (in.) NA

Geologist/Date A. D. [Signature] 10-27-93
(Signature)

Checked by/Date [Signature] 11/2/93



Flow Counts

pushed

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA				CL	ppm	0-0.25 ft silty clay w/ some fine sand and trace med-coarse sand and trace gravel (45% clay, 30% silt, 15% fine sand, m-c sand 8%, gravel 2%); 10YR 5/4 yellowish brown; dry; med. plasticity; not cemented; minor roots; soft-medium.
1		S*	2-3				
2		S	2-3	1.7/2.0	CL	O	w/depth decreasing coarse-grained material + moisture increases
3							0.25-3 ft silty clay w/ some finesand and trace med.sand (50% clay, 30% silt, 15% finesand, 5% med.sand); 10YR 5/4 yellowish brown; med. moisture; med. plasticity; not cemented; hard; soil is compacted in tube.
5							
10							
15							
20							* Geotech sample collected from the 2-3 ft interval

NOTE: The 0-0.2 ft sample was collected on 10-26-93 A.1-143

* This is 1st trench at 30-TP-1.
 No samples collected. (RKT 10/8/93)

Field Bore Log		9N Page 1 of 1
Tooele Army Depot - South Area Task 3 Group 2 SWMUs		Ebasco Environmental 143 Union Blvd., Ste. 1010 Lakewood, Colorado 80228
Site Type <u>Test Pit</u>		
Date/Time Started <u>10/7/93, 0955</u>		
Surface Elevation <u>NA</u>	Date/Time Completed <u>10/7/93 1040</u>	
Completion Depth (ft.) <u>5 ft</u>	Water Level Initial (ft.): <u>NA</u> ; After <u>NA</u> Hours <u>NA</u> (ft)	
Equipment and Drilling Method <u>580 Case Backhoe</u>	Drilling Company <u>UXB</u>	No. Samples <u>0</u>
	Driller <u>Bruce MOE</u>	
Size and Bit Type <u>18 in bucket</u>	Drilling Fluid <u>NA</u>	
Sampler Type <u>MS</u> Length (ft.) <u>NA</u>	Diameter (in.) <u>NA</u> Driving Wt. (lbs) <u>NA</u>	Drop (in.) <u>NA</u>
Geologist/Date <u>MKB/10/7/93</u> (Signature)	Checked by/Date <u>[Signature] 10/21/93</u>	

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0							Light brown (10YR 5/3) silty clay and clayey silt; stiff, medium moist, not cemented
1					ML		
1.5		R23 10/7/93					Becomes more clay rich with depth, soil is ~ silty clay by 2 ft, (10YR 4/2)
2							
2.5		R26 10/7/93					
3							
3.5		R28 10/7/93					
4					ML		Only clean fill and undisturbed soil encountered so no chemical samples were taken. A second trench is begun at 1055 about 50 ft to the east.
4.5							A third trench is begun at 1140 about 22 feet to west when clean fill and undisturbed soil encountered in second trench = 5 ft
5							

EBASCO SERVICES INCORPORATED

Contractor Name UXB

Test Pit Record

SWMU 30

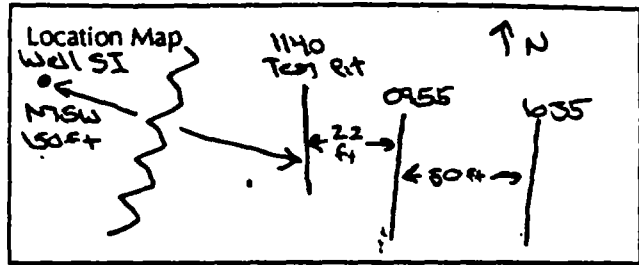
Test Pit 30-TP-1 (1st pit)

Date/Time Started 10/7/93 0955

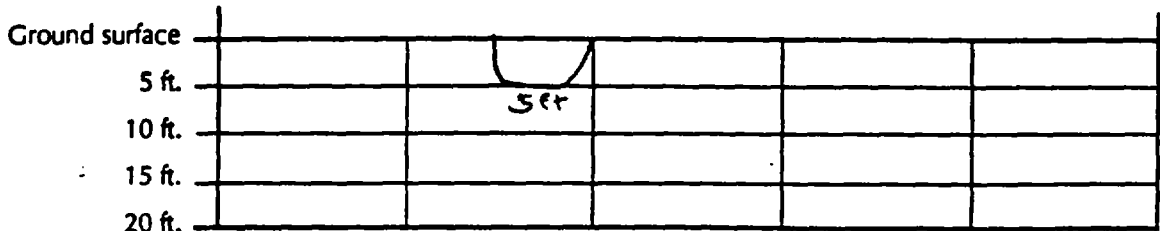
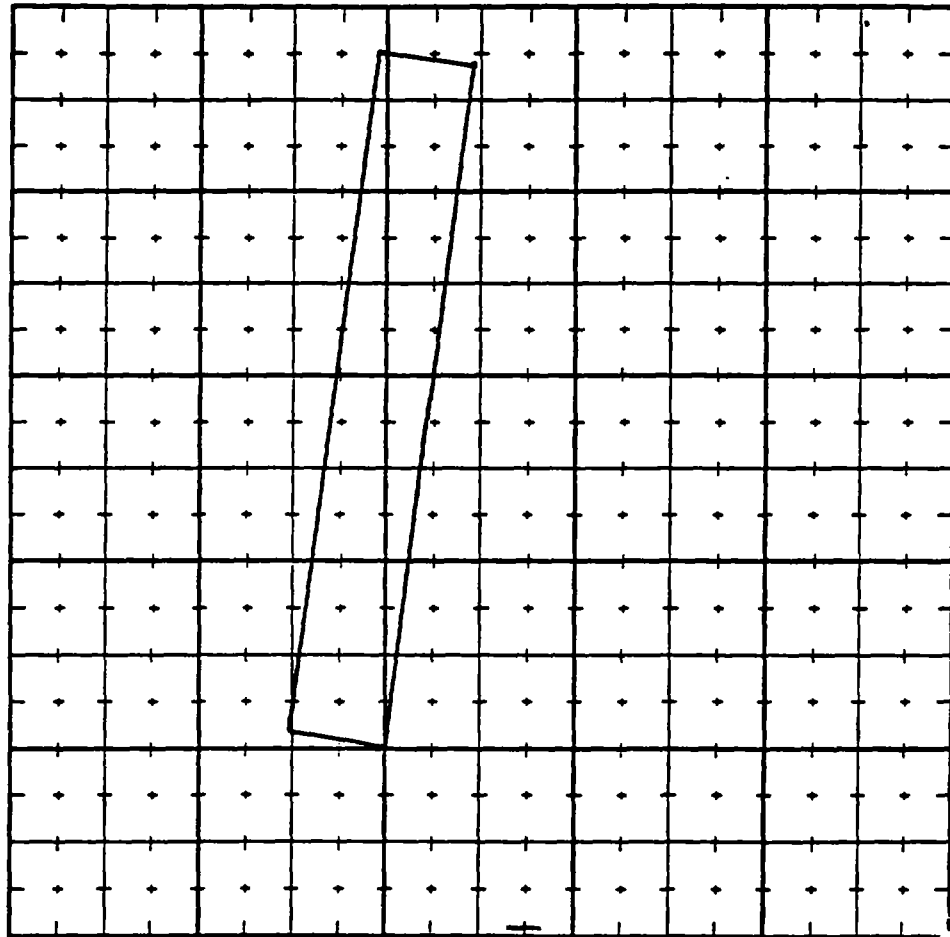
Coordinates NA

Date/Time Completed 10/7/93 1040

Geologist Richard Burden



Scale: 1 inch = 4 ft.



Notes Test Pit is oriented N5°E, Walls are vertical
No samples collected because only clean fill and
undisturbed soil was encountered. A second test pit is
started 50ft to the east.

* This second trench at 30-TP-1.
 No Samples collected. (RKT 10/8/93)

<h1>Field Bore Log</h1>		4 N Page 1 of 1
Tooele Army Depot - South Area Task 3 Group 2 SWMUs		Ebasco Environmental 143 Union Blvd., Ste. 1010 Lakewood, Colorado 80228
Site Type <u>Test Pit</u>		
Date/Time Started <u>10/17/93 1055</u>	Site ID <u>30-TP-1</u> Dia. of Hole <u>NA</u>	
Surface Elevation <u>NA</u>	Date/Time Completed <u>10/17/93 1135</u>	
Completion Depth (ft.) <u>10 ft</u>	Water Level Initial (ft.): <u>NA</u> ; After <u>NA</u> Hours <u>NA</u> (ft)	
Equipment and Drilling Method <u>SSD</u> <u>Case Backhoe</u>	Drilling Company <u>UXS</u> No. Samples <u>0</u>	
Size and Bit Type <u>18 in bucket</u>	Driller <u>Bruce Moe</u>	
Drilling Fluid <u>NA</u>		
Sampler Type <u>S</u> Length (ft.) <u>NA</u>	Diameter (in.) <u>NA</u> Driving Wt. (lbs) <u>NA</u> Drop (in.) <u>NA</u>	
Geologist/Date <u>RKT 10/17/93</u> (Signature)	Checked by/Date <u>RKT 10/21/93</u>	

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0							Light brown (10 YR 5/3) silty clay and clayey silt; medium stiff to medium, medium moist; not cemented
1					CL-ML		
2							Note: This excavation was begun atop a 5 ft pile of fill material
3							
4							
5							At approximately 5 ft soil changes to a fine sandy silt with minor clay (10 YR 5/3)
6							
7							Only clean fill and undisturbed soil encountered so no chemical samples were taken. A third trench is begun at 1140 about 72 ft to the west. Groundwater reached at 10 ft
8					ML		
9							
10							TD = 10 ft

EBASCO SERVICES INCORPORATED

Contractor Name UXB

Test Pit Record

SWMU 30

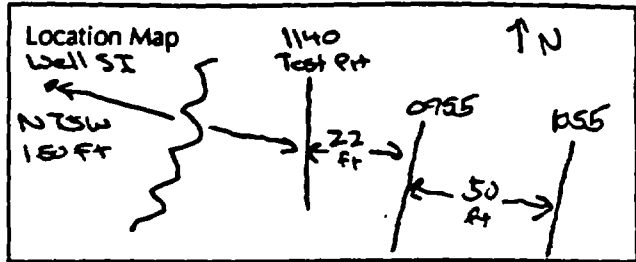
Test Pit 30-TP-1 (2nd Pit)

Date/Time Started 10/7/93 1055

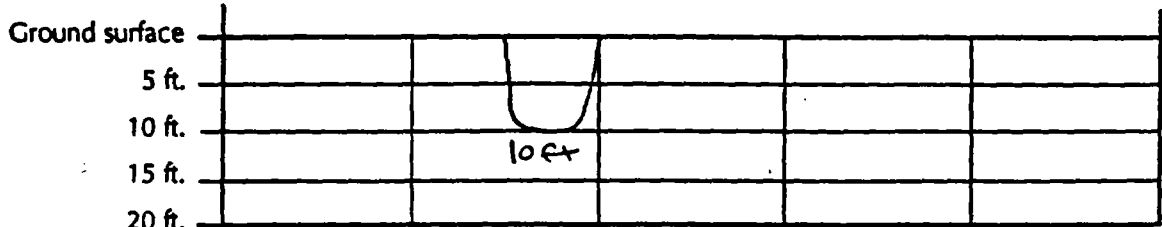
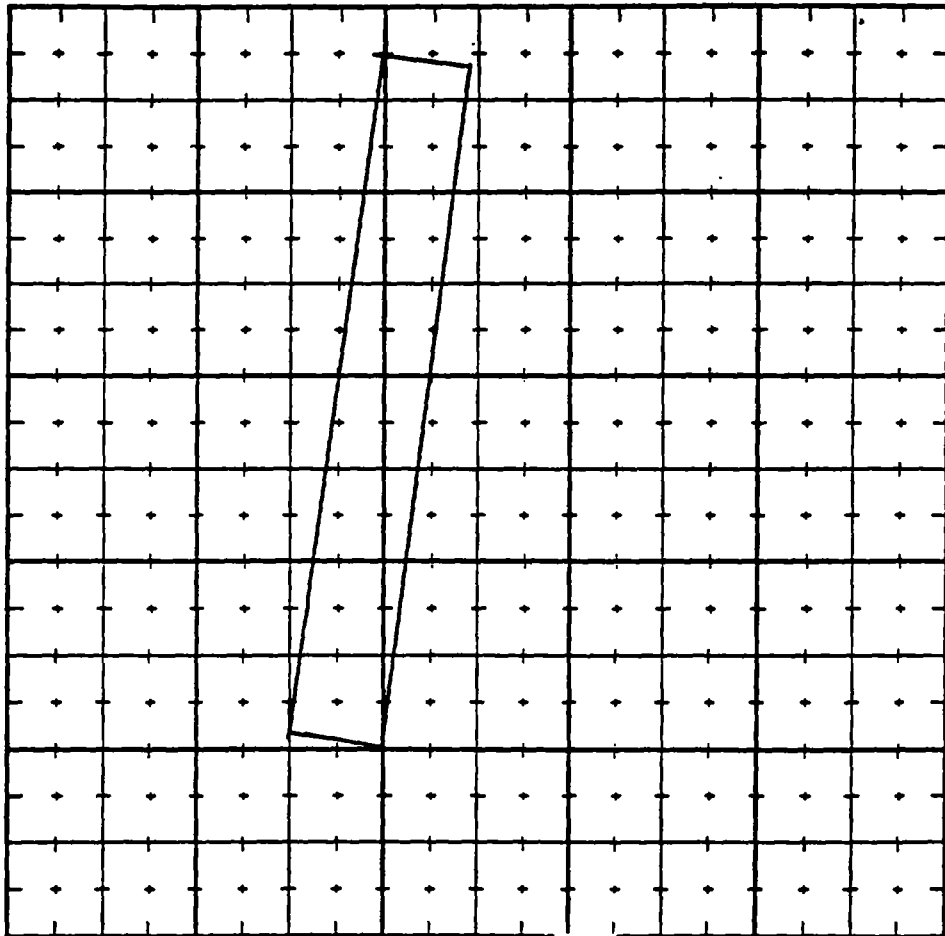
Coordinates NA

Date/Time Completed 10/7/93 1135

Geologist Richard Berden



Scale: 1 inch = 4 ft.



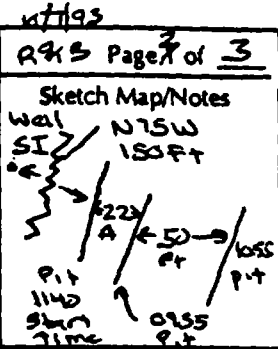
Notes Test pit is oriented N5°E, Walls are vertical, No samples collected because only clean fill and undisturbed soil were encountered. A third test pit is started 72 ft to the west.

* This is third trench at 30-TP-1.
 Samples were collected. (RKT 10/8/93)

<h1>Field Bore Log</h1>		↑ N Page 1 of 3
Tooele Army Depot - South Area Task 3 Group 2 SWMUs		Ebasco Environmental 143 Union Blvd., Ste. 1010 Lakewood, Colorado 80228
Site Type <u>Test Pit</u>		
Date/Time Started <u>10/17/93 1140</u>		
Surface Elevation <u>NA</u>	Site ID <u>30-TP-1</u> Dia. of Hole <u>NA</u>	
Completion Depth (ft.) <u>12 ft</u>	Date/Time Completed <u>10/17/93 1325</u>	
Equipment and Drilling Method <u>S80 Case Backhoe</u>	Water Level Initial (ft.): <u>NA</u> ; After <u>NA</u> Hours <u>NA</u> (ft)	
Size and Bit Type <u>18 in bucket</u>	Drilling Company <u>UXB</u> No. Samples <u>3</u>	
Sampler Type <u>S</u> Length (ft.) <u>NA</u>	Driller <u>Bruce Moore</u>	
Geologist/Date <u>M. R. M. 10/17/93</u> (Signature)	Drilling Fluid <u>NA</u>	
	Diameter (in.) <u>NA</u> Driving Wt. (lbs.) <u>NA</u> Drop (in.) <u>NA</u>	
	Checked by/Date _____	

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0			.5			ppm	light gray-brown (10 YR 5/3) clayey silt with minor angular fine sand (<270) firm, uncemented little moisture
1		S0187 to S0190 (S)	1		ML	0 AT 213 10/17/93	At 1 ft hit a steel pailer in center of trench; below it is a layer of charcoal, partially burned wood and heavily rusted scrap metal. Also mixed with a well sorted pea gravel that is heavily Fe oxide stained; The debris occurs in a 1 ft thick horizon that dips to the south at approx. 30°
2		S0191 to S0194 and S0224 (S)	3			0	
3							
4					ML	213 AT 10/17/93	By 3 ft the debris layer is thicker and contains pea gravel, pipe and steel cable; it is at least 1 1/2 ft thick; at 3 1/2 ft av. ammo can with some yellow powder found
5							

Field Bore Log



Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Test Pit

Date/Time Started 10/17/93 1140

Site ID 30-TE-1 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10-7-93 1325

Completion Depth (ft.) 12 Ft

Water Level Initial (ft.): NA; After NA Hours: NA (ft)

Equipment and Drilling Method 580 CASE BACKHOE

Drilling Company UXB No. Samples 3
Driller BRUCE MOE

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type S Length (ft.) NA

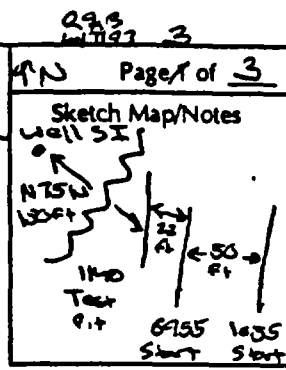
Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date MKB 10-7-93
(Signature)

Checked by/Date _____

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
3-6	R&S 10/17/93	SO145 to SO148 (S)	3-6		ML	PPM 0 AAE R&S 10/17/93	The debris layer is continuous from 3 to 12 feet deep in the center of the trench. Over the entire interval it contains: charcoal, partially burnt wood, steel cable, wire, pipes, ammo cans and other misc. rusted metal debris. It also contains pea gravel and strongly discolored red, yellow and purple sand and gravel fill.
6-7	R&S 10/17/93						
7-8	R&S 10/17/93						
8-9	R&S 10/17/93				CL AAE	AAE R&S 10/17/93	The surrounding soil is light brownish gray (10YR 4/2) silty clay
9-10	R&S 10/17/93						Groundwater is encountered at 6 ft
10-12	R&S 10/17/93						

Field Bore Log



Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Task 3 Group 2 SWMUs

Site Type Test Pit

Date/Time Started 10/17/93 1140

Site ID 30-TR-1 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/17/93 1325

Completion Depth (ft.) 12 ft

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method 580

Drilling Company UXB No. Samples 3

Case Backhoe

Driller Bruce Moe

Size and Bit Type 18 in Bucket

Drilling Fluid NA

Sampler Type S Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

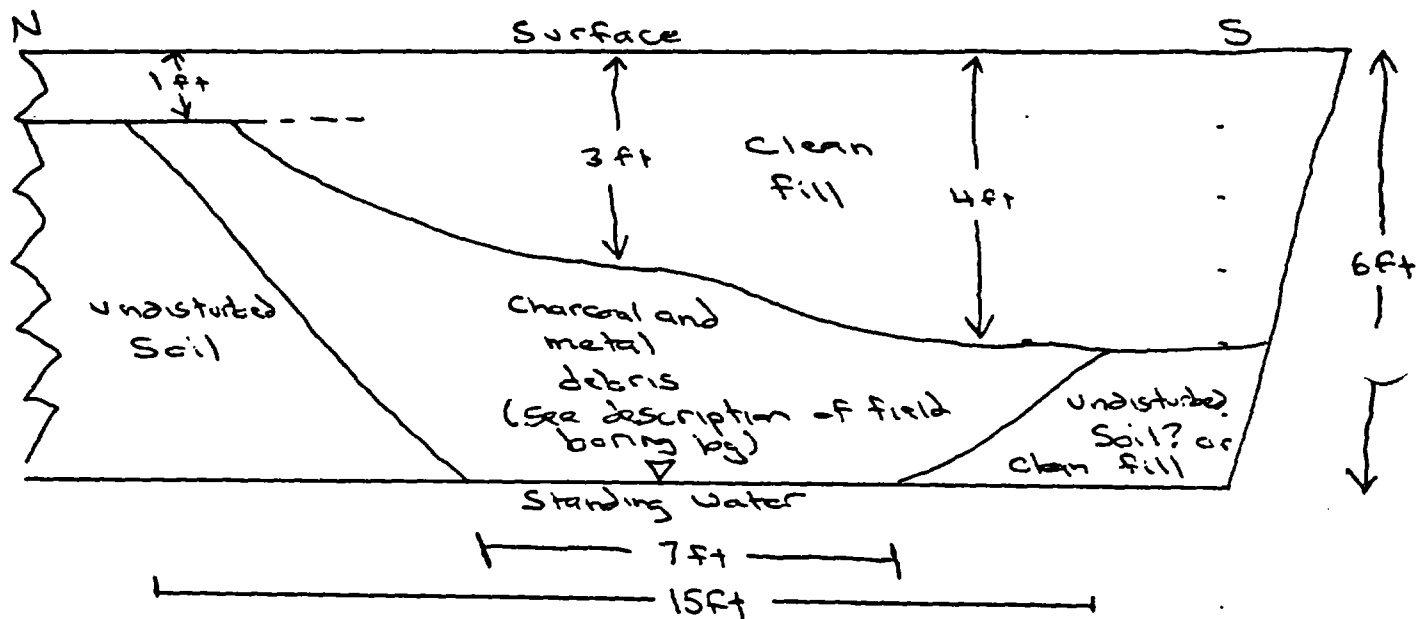
Geologist/Date M. J. B. 10/17/93
(Signature)

Checked by/Date _____

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
8	R7B 10/17/93						See description on page 2 and cross section on attachment
11							
12	R7B 10/17/93						
13	R7B 10/17/93						
14	R7B 10/17/93						TD is 12 ft
15	R7B 10/17/93						

Test Pit at 30-TP-1
 Date/Time Started 10/7/93 1140
 Date/Time Ended 10/7/93 1325
 Completion Depth 12 ft
 Pit orientation N-S

Schematic Diagram of Eastern Face of Pit 30-TP-1



The charcoal and metal debris
 extends to at least a depth of
 12 feet in the center of the
 test pit

EBASCO SERVICES INCORPORATED

UXB

Contractor Name

Test Pit Record

SWMU 30

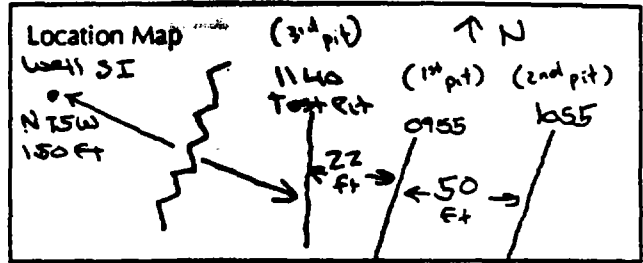
Test Pit 30-TP-1 (3rd pit)

Date/Time Started 10/7/93 1140

Coordinates NA

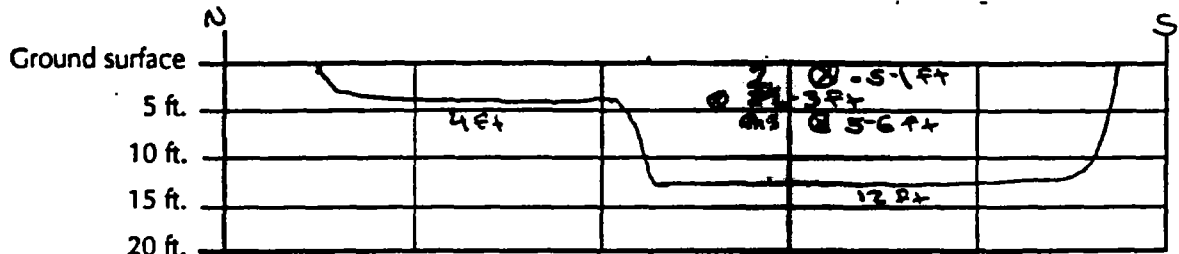
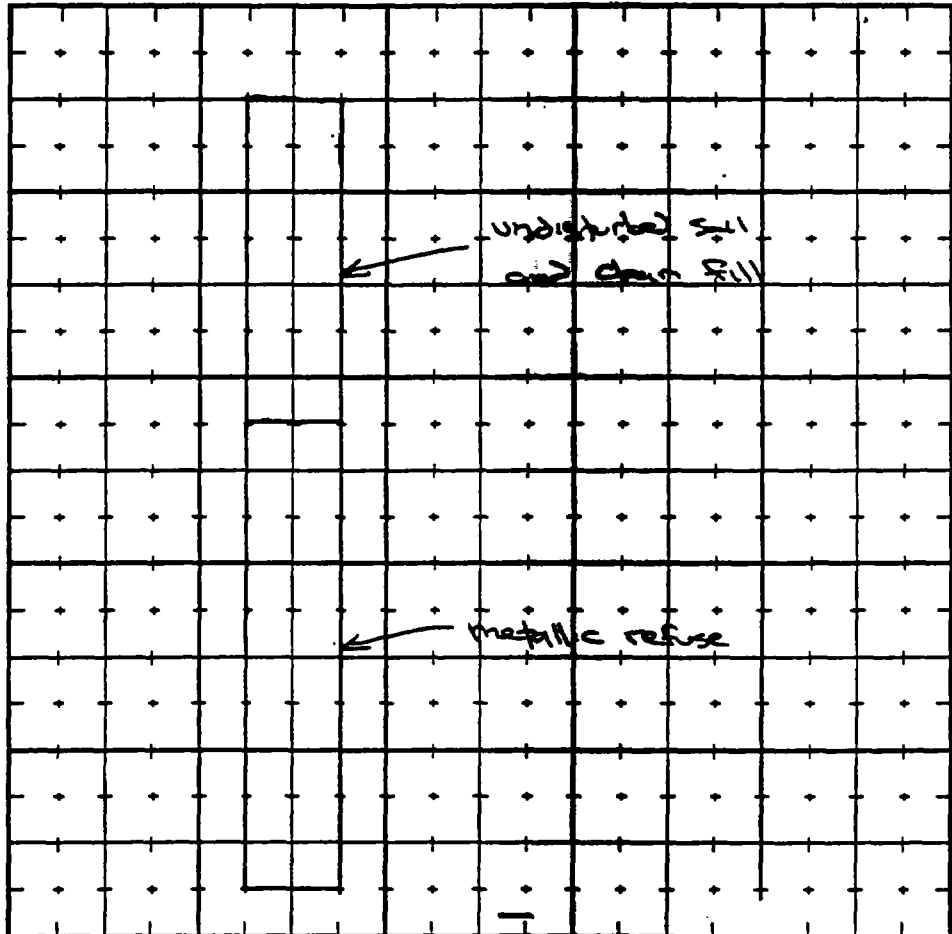
Date/Time Completed 10/7/93 1325

Geologist Richard Borden



Scale: 1 inch = 6 ft

↑ N

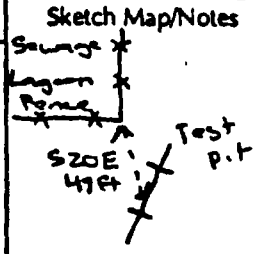


Notes Test Pit is oriented N-S, walls are vertical
3 samples collected

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/6/93, 1720

Site ID 30-TR-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/6/93, 1420

Completion Depth (ft.) 8 ft

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method S80 Case Backhoe

Drilling Company UXB No. Samples 4

Driller Bruce Mos

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type S Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbf.) NA Drop (in.) NA

Geologist/Date M R S H 10/6/93
(Signature)

Checked by/Date [Signature] 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0							
0.5		S0199 to S0202 (G)	0.5		ML		light brown, medium moist, clayey silt with very rare fine sand (<1%), firm uncemented
1			1				10YR 4/3; clay content increases with depth
2		S0203 to S0206 (G)	2.5				At 2 1/4 ft hit a pocket of black ash, plywood and wood fragments and a metal railroad tie? that is oriented N-S; also a thin layer of blue-green glassy powder; This pocket is about 4 ft long by 1 ft thick
3			3				The surrounding soil by 3 ft is a light brown (10YR 5/3) silty clay with no sand, firm, medium moist, not cemented
4		S0207 to S0210 and S0218 (G)	4		ML	3ppm	By a depth of 3 to 4 feet, along 17 ft of the exposed pit encounter metallic refuse - ammo boxes, sheet metal, wire, shell casings, buckshot, green heavily stained soil associated
5			5				

Field Bore Log

Page 2 of 2

Sketch Map/Notes

see 1st page

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Test Pit

Date/Time Started 10/6/93 1220

Site ID 30-TP-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/6/93, 1420

Completion Depth (ft.) 8 ft

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method SSD
Casa Backhoe

Drilling Company UXB No. Samples 4

Driller Bruce Moore

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type S Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date: MLK/ML 10/6/93
(Signature)

Checked by/Date _____

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
5							with one ammo box; everything is heavily rusted and commonly fused together This debris extends to 8 ft
6					ML		
7							
8						4 ppm	
8							TD 8 ft
9							
10							

EBASCO SERVICES INCORPORATED

UXB

Contractor Name

Test Pit Record

SWMU 30

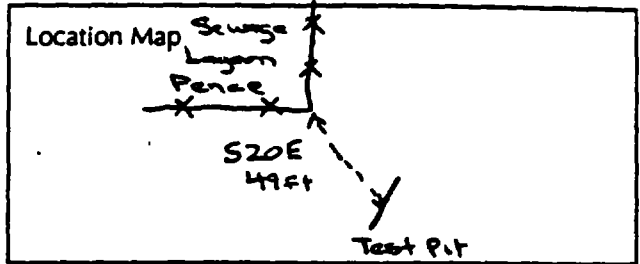
Test Pit 30-TP-2

Date/Time Started 10/6/93, 1220

Coordinates NA

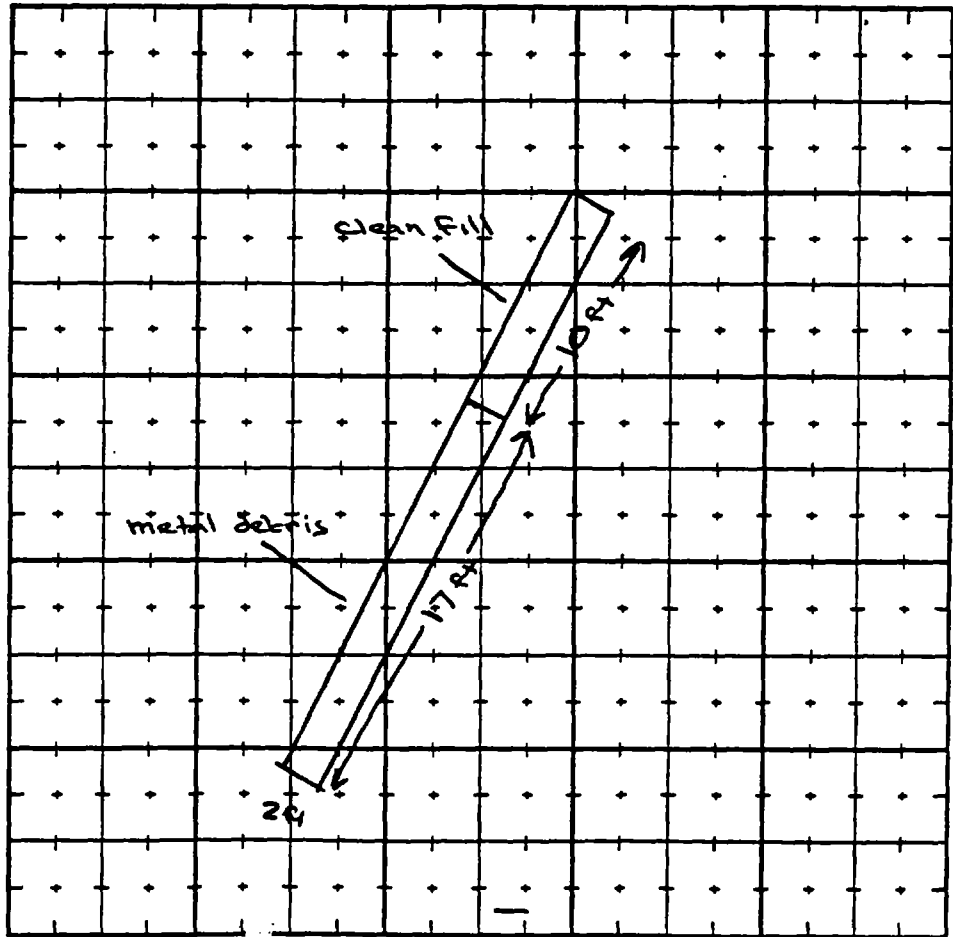
Date/Time Completed 10/6/93 1420

Geologist Rich Borden



Scale: 1 inch = 8 ft

↑
N
↑



Ground surface				
5 ft.				
10 ft.	5 ft			
15 ft.				
20 ft.				

Notes Test Pit is oriented N20E, walls are vertical

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Test Pit

Date/Time Started 10/7/93, 0820

Site ID 30-TR-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/13, 0915

Completion Depth (ft.) 9

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method S80

Drilling Company UXS No. Samples 0

Case Backhoe

Driller Bruce Moe

Size and Bit Type 18 in Bucket

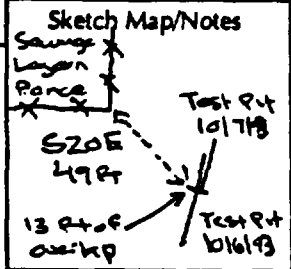
Drilling Fluid NA

Sampler Type S Length (ft.) NA

Diameter (in.) NA Driving Wt (lb) NA Drop (in.) NA

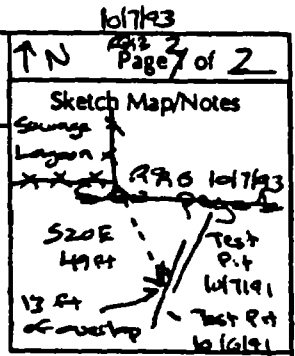
Geologist/Date MZ SN 10/7/93
(Signature)

Checked by/Date [Signature] 10/21/93



Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0							<p>light brown, clayey silt with very minor fine sand (<1%), uncemented, firm, little moisture 10 YR 4/3</p> <p>No samples collected because this test pit overlaps with the pit excavated on 10/6/93. The purpose of this pit is to find the total depth of the metallic debris.</p> <p>At 2 1/2 ft in southern end of trench have extremely rusted and fused metal debris.</p> <p>Becomes more clay rich with depth on northern end of trench</p>
1					ML	AAE R7B D7B	
1.5	R7B 10/7/93						
2							
2.5	R7B 10/7/93						
3							
3.5							
4					ML	AAE R7B D7B	
4.5							
5							
5.2							

Field Bore Log



Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Test Pit

Date/Time Started 10/7/93, 0820

Site ID 30-19-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/7/93 0915

Completion Depth (ft.) 9

Water Level Initial (ft.): NA ; After NA hours NA (ft)

Equipment and Drilling Method SBO
Case Backhoe

Drilling Company UXB No. Samples 0

Driller Bruce Moe

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type S Length (ft.) NA

Diameter (in.) NA Driving Wt.(lbs.) NA Drop (in.) NA

Geologist/Date MRS GH 10/7/93
(Signature)

Checked by/Date _____

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	RAS 10/7/93						
6					AL		metal debris
7	RAS 10/7/93				CL		By six feet becomes a silty clay; medium moist
8	RAS 10/7/93						metal debris/sail contact slope into south about 60° into
8							Bottom of refuse 8 1/2 ft
9	RAS 10/7/93				CL		At 8 ft reach the water table, soil became wet; water is flowing into trench from the metal refuse on the south side
9							By 9 ft - light brownish grey (10YR 6/2) fine sandy, silty clay; sand is angular, sub-angular rock fragments and atz
10	10/7/93						TD = 9 ft

no samples collected

EBASCO SERVICES INCORPORATED

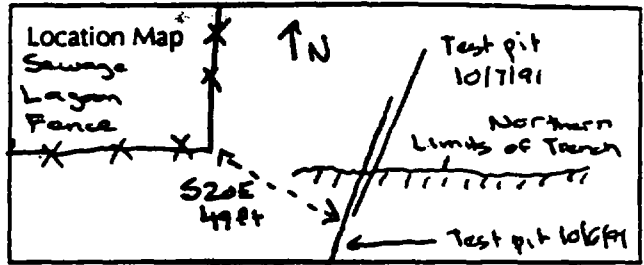
Contractor Name UXB

Test Pit Record

SWMU 30

Date/Time Started 10/7/93 0820

Date/Time Completed 10/7/93 0915

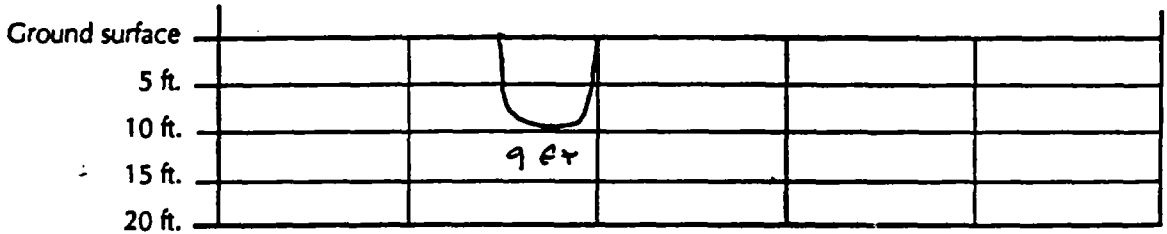
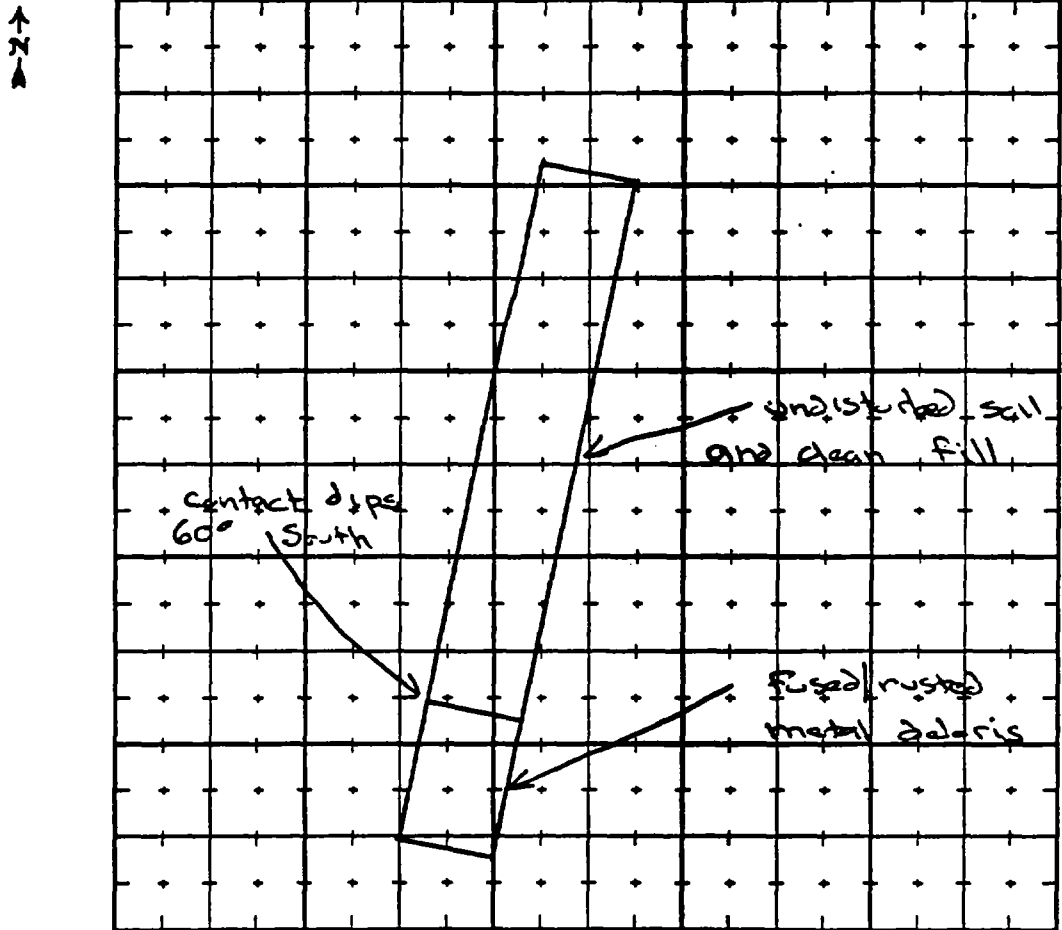


Test Pit 30-TR-2 (2nd pit)

Coordinates NA

Geologist Richard Borden

Scale: 1 inch = 4 ft.



Notes Trench is oriented N15E, walls are vertical
No samples collected, this pit overlaps with the pit
excavated on 10/6/93.

* This is 1st trench at 30-TP-3.
 Samples discarded on site and sample number
 used for 2nd trench (RKT 10/8/93).

Field Bore Log

Page 1 of 1
 Sketch Map/Notes
 • 558-90
 X 30-TP-3
 • 559-90

Tooele Army Depot - South Area
 Task 3 Group 2 SWMUs

Ebasco Environmental
 143 Union Blvd., Ste. 1010
 Lakewood, Colorado 80228

Site Type SWMU 30, TP-3

Test Pit

Date/Time Started 10/5/93, 1330

Site ID 30-TP-3 Dir. of Hole NA

Surface Elevation NA

Date/Time Completed 10/5/93, 1410

Completion Depth (ft.) 5 ft

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method Backhoe 580 case

Drilling Company UXB No. Samples 2

Driller Bruce Mae

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type S Length (ft.) NA

Diameter (in.) NA Driving Wt (lbs.) NA Drop (in.) NA

Geologist/Date Red R ch 10/5/93
 (Signature)

Checked by/Date [Signature] 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		Grab	0-5		ML		Dry, light brown, (10YR 4/3) clayey silt with a very minor sand component, firm to stiff, uncemented; very homogeneous no soil structure noted; upper 1 ft is rooted. Soil has little moisture by 3 ft and is moist by 5 ft.
1	Samples discarded and sample #s reused on 2nd test pit at 30-TP-3	50211 to 50214	1				
2		Grab 50215 to 50218	2				
3			3				
4							
5							At five ft at extreme northern end of trench, soil is strongly Fe-oxide stained, red and brown mottled

EBASCO SERVICES INCORPORATED

UXB
Contractor Name

Test Pit Record

SWMU 30

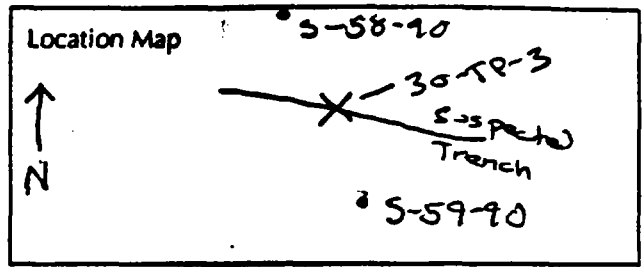
Test Pit 30-TR-3

Date/Time Started 10/5/93, 1330

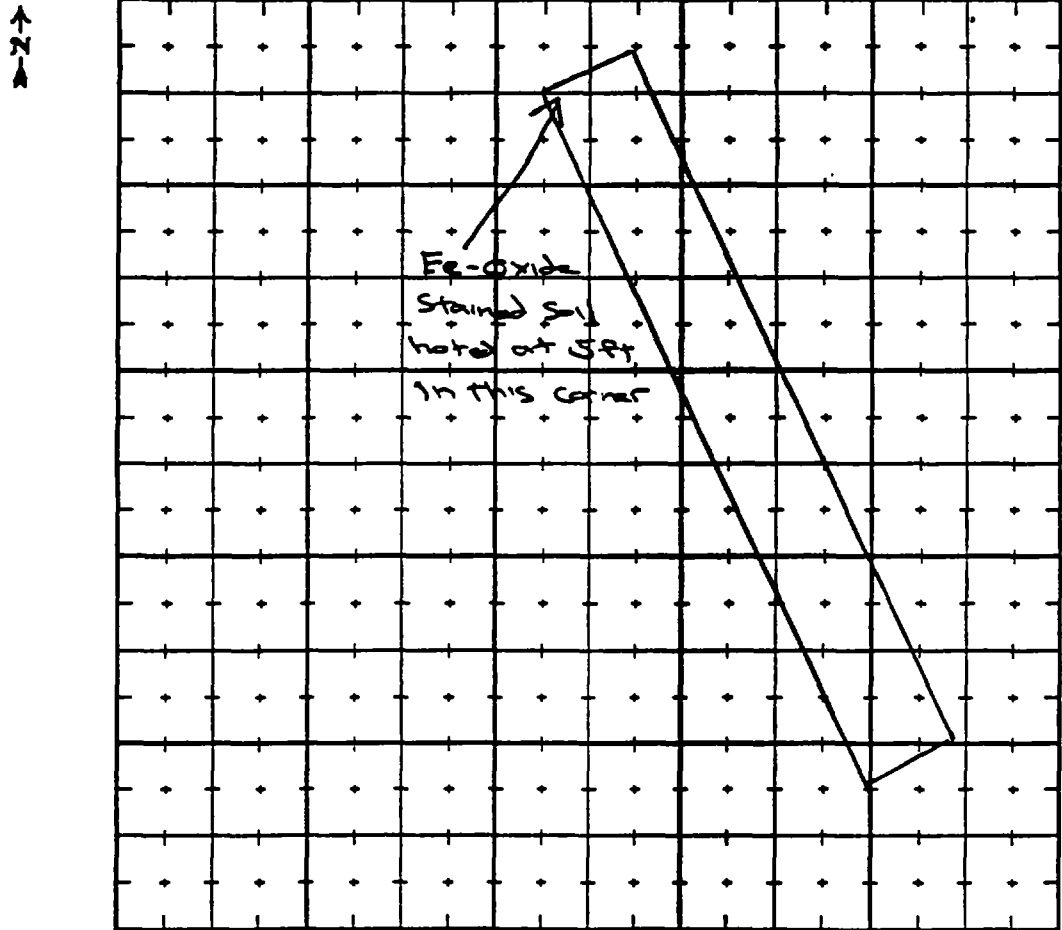
Coordinates NA

Date/Time Completed 10/5/93, 1410

Geologist Rish Borden



Scale: 1 inch = 4 ft.



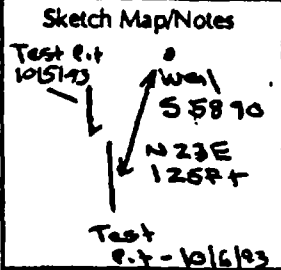
Ground surface				
5 ft.				
10 ft.				
15 ft.				
20 ft.				

Notes Side walls of trench are vertical; This ^{RR's} Test Pit did not encounter any debris or fill material except in extreme northern corner;

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/6/93, 0835

Site ID 30-TR-3 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/6/93, 1140

Completion Depth (ft.) 6 ft

Water Level Initial (ft.): NA ; After NA Hours NA (ft)

Equipment and Drilling Method SBO
Case Backhoe

Drilling Company UXB No. Samples 3

Driller Jim Moraitis

Size and Bit Type 18 in Bucket

Drilling Fluid NA

Sampler Type S Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date M. J. R. 10/6/93
(Signature)

Checked by/Date B. J. White 10/21/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0							
0.5		S0211 to S0214 (6)	0.5 ft		ML		<p>Light brown, stiff, unconsolidated, clayey silt with very minor (<2%) fine sand component, (color 10YR 4/3), little moisture, becomes more clay rich with depth</p> <p>At 2 1/2 ft the light brown clayey silt is mixed with other materials giving it a mottled appearance:</p> <ol style="list-style-type: none"> 1) red (10R 4/6) vuggy, hard vitrified clay (clinker?) 2) gray (10YR 5/2) clayey silt and silty clay 3) dark brown (10YR 2/2) organic rich (charcoal) clayey silt 4) fine green and clear white very poor quality glass <p>At 3 ft the burn remains are the highest concentration, become progressively less until by 5 ft there is no more evidence of burn remains.</p> <p>At 5 ft soil is moist and by 6 ft it is wet</p>
1			1 ft				
2		S0215 to S0218 (6)	2.5 ft				
3			3 ft				
4		S0219 to S0222 and S0231 (6)	4 ft		ML		
5							

Field Bore Log

Sketch Map/Notes

see page 1

Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Test Pit

Date/Time Started 10/6/93, 0835

Site ID 30-TP-3 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/6/93, 1140

Completion Depth (ft.) 6 ft

Water Level Initial (ft.): NA : iter NA Hours NA (ft)

Equipment and Drilling Method SSB
Case Backhoe

Drilling Company UXB No. Samples 3
Driller Jim Moraitis

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type S Length (ft.) NA

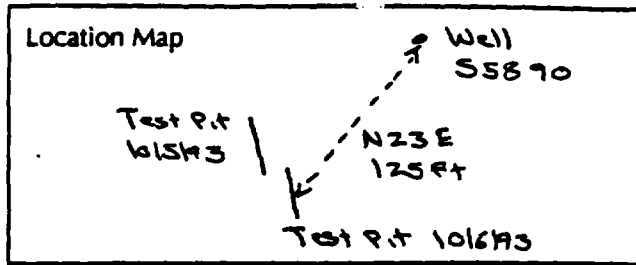
Diameter (in.) NA Driving Wt.(lbs.) NA Drop (in.) NA

Geologist/Date AKS 10/6/93
(Signature)

Checked by/Date _____

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
5.5					ML		From 5 to 6 ft soil is again light brown, stiff, uncemented, clayey silt and silty clay (color 10YR 4/3)
6							TO CRT
6.5							
7							
7.5							
8							
8.5							
9							
9.5							
10							
10.5							
11							
11.5							
12							

EBASCO SERVICES INCORPORATED



UXB
Contractor Name

Test Pit Record

SWMU 30

Test Pit 30-TR-3

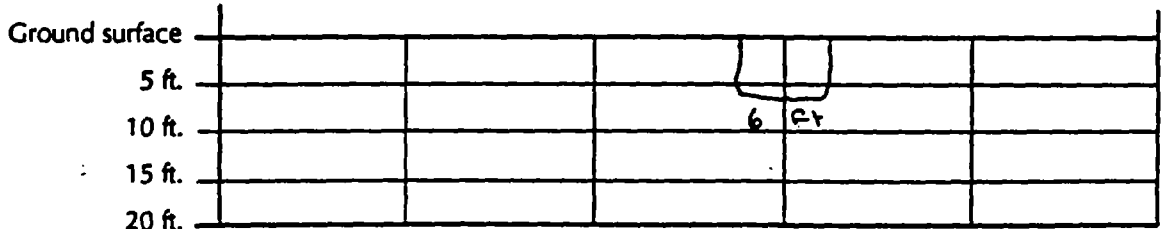
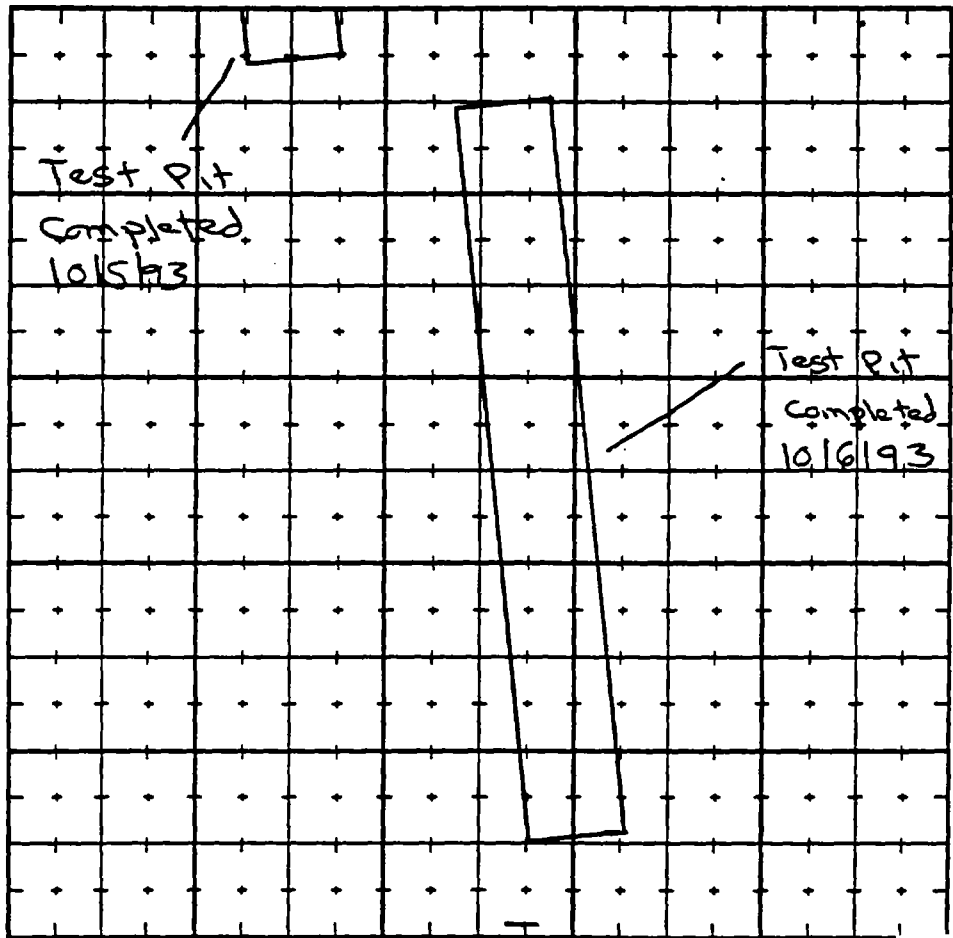
Date/Time Started 10/6/93 0835

Coordinates NA

Da. /Time Completed 10/6/93 1140

Geologist Rich Borden

Scale: 1 inch = 4 ft.



Notes Test pit is oriented NSW, walls are vertical

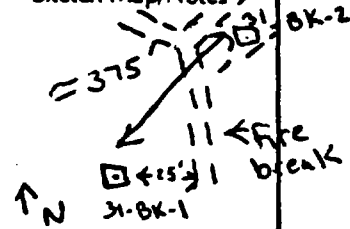
Field Bore Log

Page 1 of 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type GRAB/BORE

Date/Time Started 10-26-93/1400

Site ID 31-BK-1 Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-26-93/1415

Completion Depth (ft.) 3

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Mobile
B53; pushed
split spoon sampler

Drilling Company Boyles Bros. No. Samples 2 chemical
2 Geotech

Driller J. Holse

Size and Bit Type NA

Drilling Fluid NA

Sampler Type split spoon Length (ft.) 2

Diameter (in.) 2.5 Geotech
3.0 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date J. M. Berger 10-26-93
(Signature)

Checked by/Date [Signature] 11/2/93

Blow counts

pushed

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	C*	0-0.2*	NA	ML	0	0 - 0.5 ft fine sandy silt w/ some clay (15% clay, 30% sand, 55% silt); 104R 2/3 brown; little moisture; soft; not cemented; med. plasticity; roots;
1		S**	1-3				
2							0.5 - 3 ft fine sandy silt w/ some clay (15% clay, 25% sand, 60% silt); 104R 5/4 yellowish brown; dry; soft; not cemented; med. plasticity
3	NA	S	2-3	2/2	ML	0	
5							
10							
15							
20							

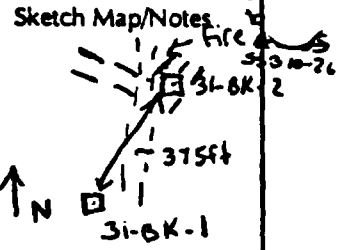
* Geotech collected at 0-0.2 ft

** Geotech collected at 1-3 ft

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type GRAB/BORE

Date/Time Started 10-26-93/1155

Site ID 31-BK-2 Dia. of Hole 3.0 inch
3.5 inch

Surface Elevation NA

Date/Time Completed 10-26-93/1321

Completion Depth (ft.) NA 3

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method Mobile

Drilling Company Boyles Bros No. Samples 2 chemical
1 Geotech

Driller J. Hulse

Size and Bit Type NA

Drilling Fluid NA
2.5 Geotech

Sampler Type split spoon Length (ft.) 2

Diameter (in.) 3.0 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date J. M. Brown 10-26-93
(Signature)

Checked by/Date R. M. White 11/2/93

Blow Counts
pushed

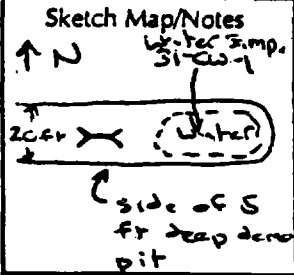
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval Ft	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G	0-0.2	NA	ML	0	brown 104R5/4, ³ ₁₀₋₂₆₋₉₃ 0-1.5 ft fine to coarse sand w/ some gravels and trace clay (10% clay, 45% silt, 25% sand, 20% gravels; dry; soft fine ; low plasticity; not cemented - gravels + coarse sand are subrounded to subangular cobbles are encountered w/ depth - very dense material
1		S*	1-2				
2	NA	S	2-3	1.5/2.0	GM	0	
3							1.5-3 ft fine to coarse sandy, silty gravel w/ trace clay and cobbles (12% clay; 30% silt, 25% sand, 35% gravels, 2% cobbles); 104R5/4 yellowish brown; dry, very dense; low plasticity; not cemented; coarse sand + gravels subangular to subrounded; cobble subrounded *Geotech sample collected at the 1-3 ft interval
5							
10							
15							
20							

Field Bore Log

Page 1 of 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/26/93, 1425

Site ID 3i-CS-1 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/26/93, 1520

Completion Depth (ft.) 3 ft

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method S80
CSS Behlmer

Drilling Company UAB No. Samples 3
Driller Ben Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type NA Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date M. Smith 10/26/93
(Signature)

Checked by/Date [Signature] 11/2/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D. (ppm)	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S0975 to S0977	S0975 to S0977	0 to 1			0	light grey green (5Y G/2) mottled with white (5Y 8/1) clayey (25%) silt (75%), moist, firm to hard, with rare very fine sand
1	S0980 to S0981	S0980 to S0981	1 to 2		ML	0	
2	S0982 to S0983	S0982 to S0983	2 to 3			0	
3			3				TD = 3 ft
4	S0985 to S0986	S0985 to S0986					
5	S0987 to S0988	S0987 to S0988					

EBASCO SERVICES INCORPORATED

UXB
Contractor Name

Test Pit Record

SWMU 31

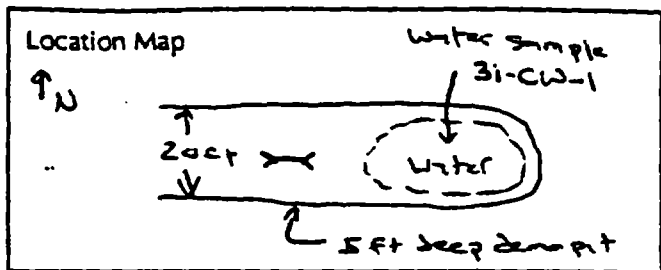
Test Pit 31-CS-1

Date/Time Started 10/26/93, 1425

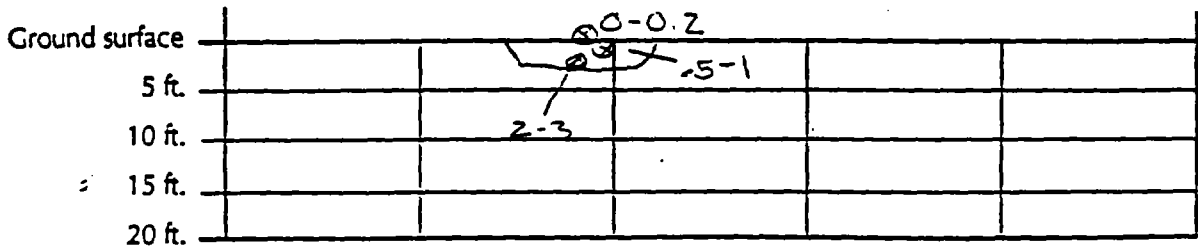
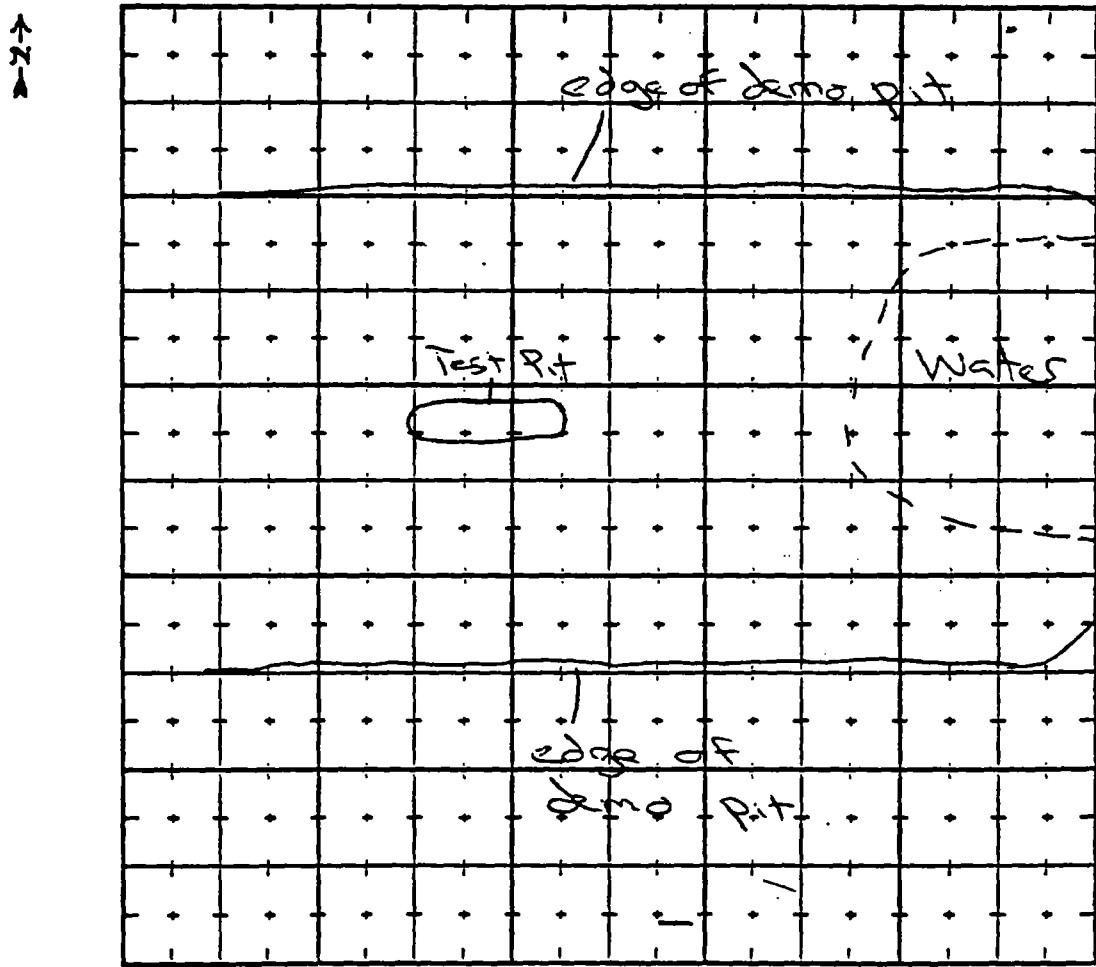
Coordinates NA

Date/Time Completed 10/26/93, 1520

Geol. ist Rich Boster



Scale: 1 Inch = 8 ft.

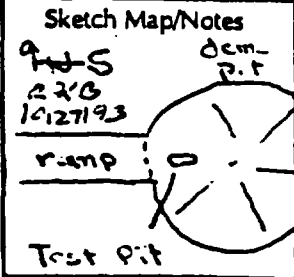


Notes Test pit oriented E-W 3ft deep and 7ft long; A
Water sample was also collected from
this demo pit

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/27/93 0725

Site ID 31-CS-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/27/93 0750

Completion Depth (ft.) 3

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method SKC

Drilling Company UAB No. Samples 3

Cross Backhoe

Driller Ben Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type NA Length (ft.) NA

Diameter (in.) NA Driving Wt (lbs.) NA Drop (in.) NA

Geologist/Date MKM 10/27/93
(Signature)

Checked by/Date [Signature] 11/2/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D. (ppm)	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		SC984 to SC985	0 to 0.2			0	light yellow brown (2.5Y 6/4) moist, loose to medium stiff, clayey silt with rare blades (2.5Y 2.5/1) mottled zones; By 2 ft moisture decreases and soil becomes looser.
1		SC986 to SC987	0.2 to 1		ML	0	
2	275 10/27/93	SC988 to SC989	1 to 2			0	
3			2 to 3				By 3 ft is a slightly very fine sandy (10%) clayey (2%) silt (70%)
4	275 10/27/93						
5	275 10/27/93						TD = 3 ft

EBASCO SERVICES INCORPORATED

UXB
Contractor Name

Test Pit Record

SWMU 31

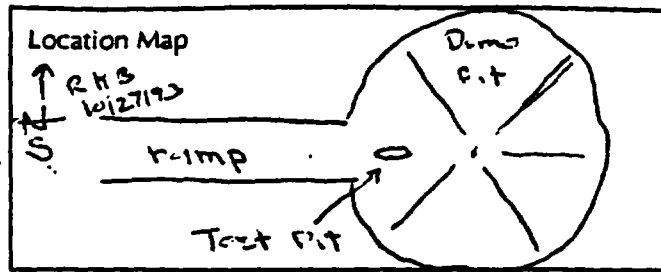
Test Pit 31-CS-2

Date/Time Started 10/27/93, 0925

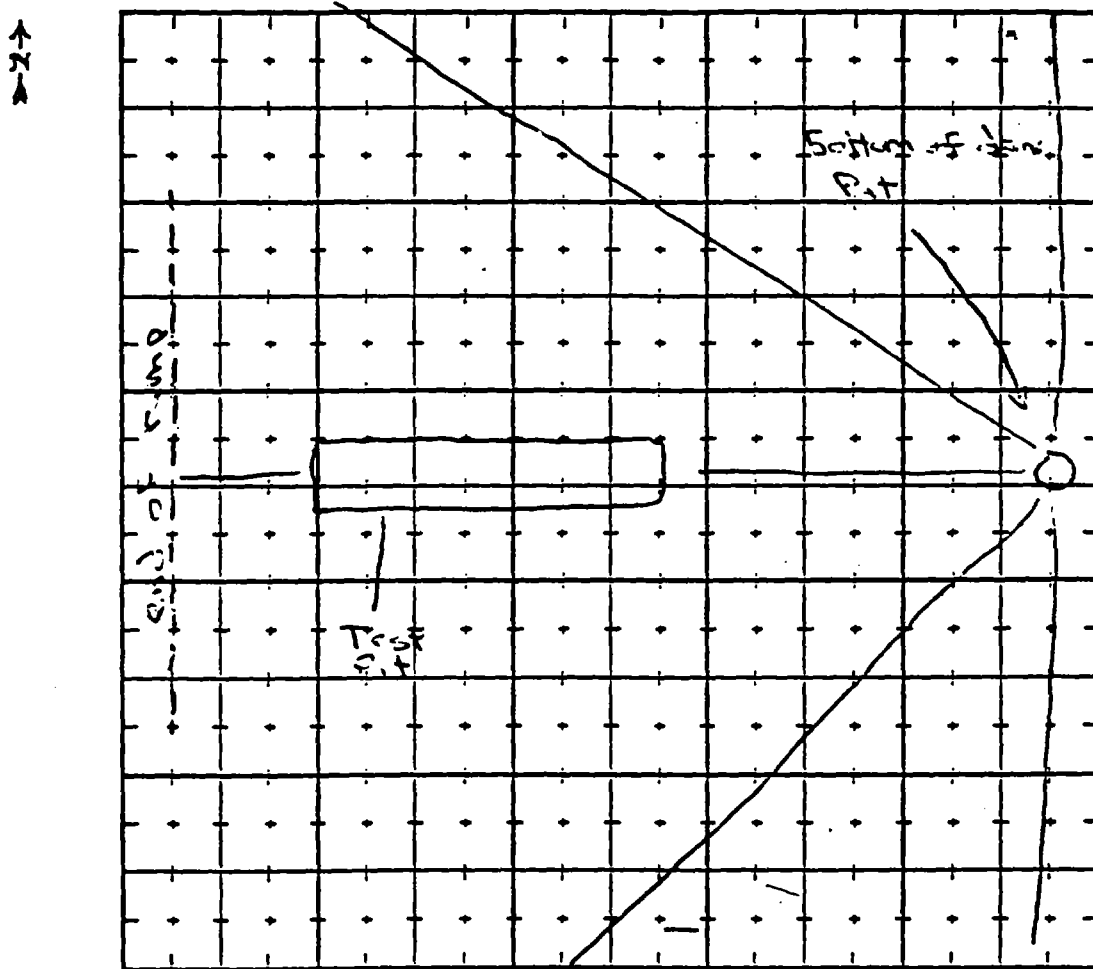
Coordinates NA

Date/Time Completed 10/27/93, 0950

Geologist Rich Borden



Scale: 1 inch = 4 ft



Ground surface	31-CS-2	
5 ft.	2-3 2 31-CS-1	
10 ft.		
15 ft.		
20 ft.		

Notes Test pit is 7 ft long, 3 ft deep, oriented approximately E-W; The Demo Pit is on the western line of pits, immediately north of 31-CS-3

Field Bore Log

Page 1 of 1

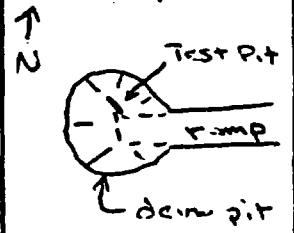
Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Test Pit



Date/Time Started 10/27/93, 1050

Site ID 31-C5-3 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/27/93, 1120

Completion Depth (ft.): 3 ft

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method 530
Casa backhoe

Drilling Company UXB No. Samples 3

Driller Ron W. Levin

Size and Bit Type 1 1/2 in bucket

Drilling Fluid NA

Sampler Type NA Length (ft.) NA

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date M R M 10/27/93

Checked by/Date [Signature] 11/2/93

(Signature)

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		SC910 to SC911	0 to 0.2				light yellow brown (2.5Y 6/2) moist, loose to med. stiff, clayey silt with very fine to very fine sand
1	273 10/27/93	SC912 to SC913	0.2 to 1				
2	273 10/27/93	SC914 to SC915	1 to 2				
3			2 to 3				color changes to 2.5Y 6/4 by 3 ft
4	273 10/27/93						
5	273 10/27/93						TD = 3 ft

EBASCO SERVICES INCORPORATED

Contractor Name UXB

Test Pit Record

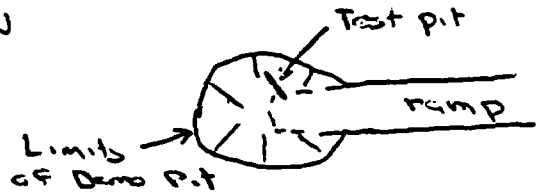
SWMU 31

Date/Time Started 10/27/93, 1050

Date/Time Completed 10/27/93, 1120

Location Map

↑ N

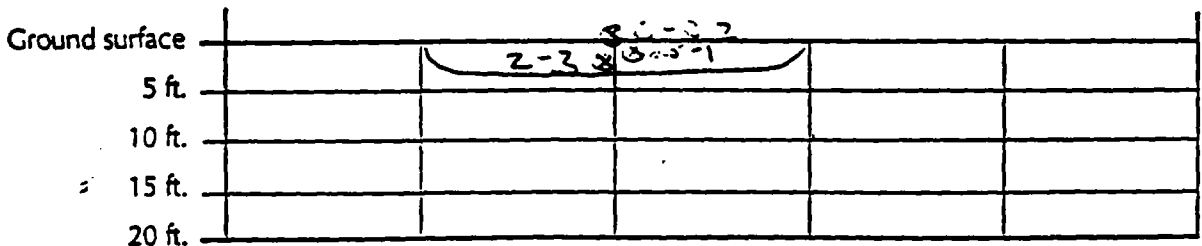
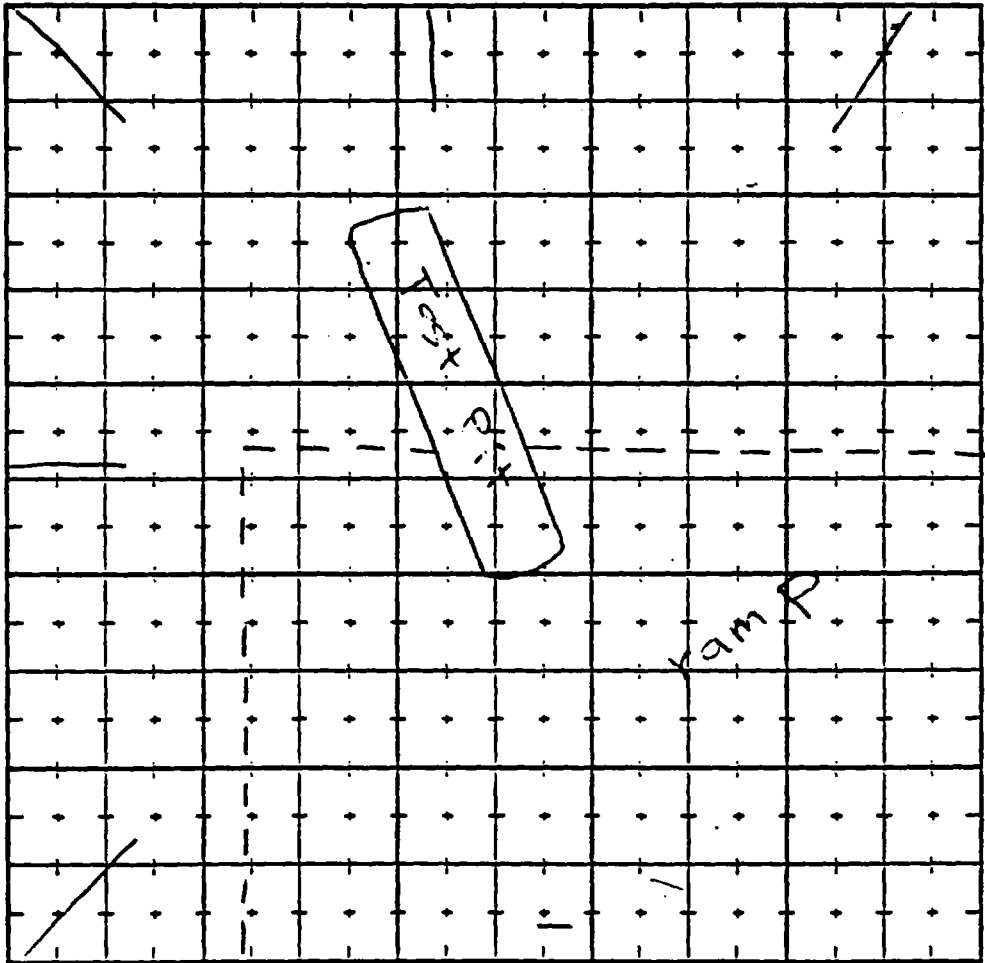


Test Pit 31-CS-3

Coordinates NA

Geologist Rich Borden

Scale: 1 inch = 4 ft

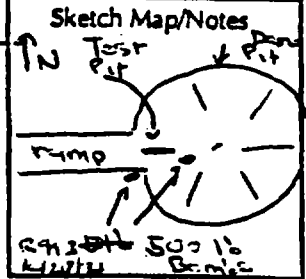


Notes Test pit is 3 ft long, oriented NNW, 3 ft
deep. The demo pit lies on the western line of
pits immediately south of 31-CS-2 and west of 31-CS-4

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/27/93

Site ID 31-C5-24 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/27/93

Completion Depth (ft.) 3 FT

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method 580
Caso Backhoe

Drilling Company UXB No. Samples 3

Driller Ben Wilson

Size and Bit Type 18 in Bucket

Drilling Fluid NA

Sampler Type NA Length (ft.) NA

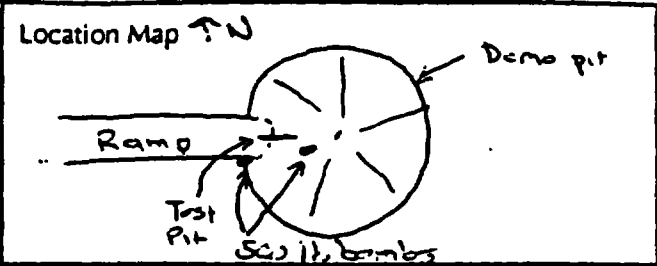
Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date M R M 10/27/93
(Signature)

Checked by/Date [Signature] 11/2/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft.)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D. (ppm)	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		SOFT R SOFT 7 SOFT 4 10 SOFT 7	0 0.2 0.5			0	light yellow brown, little moisture to moist, soft to medium stiff, clayey (15%) silt (85%) with rare white (5% 2.5Y 8/1) and black (2.5Y 2.5/1) mottled with brown (2.5Y 5/4) very hard, baked? clayey silt chips throughout
1	273 10/27/93		1		ML	0	
2	273 10/27/93	stone in soil	2			0	
3			3				TD = 3 FT
4	273 10/27/93						
5	273 10/27/93						

EBASCO SERVICES INCORPORATED



UXB
Contractor Name

Test Pit Record

SWMU 31

Test Pit 31-CS-4

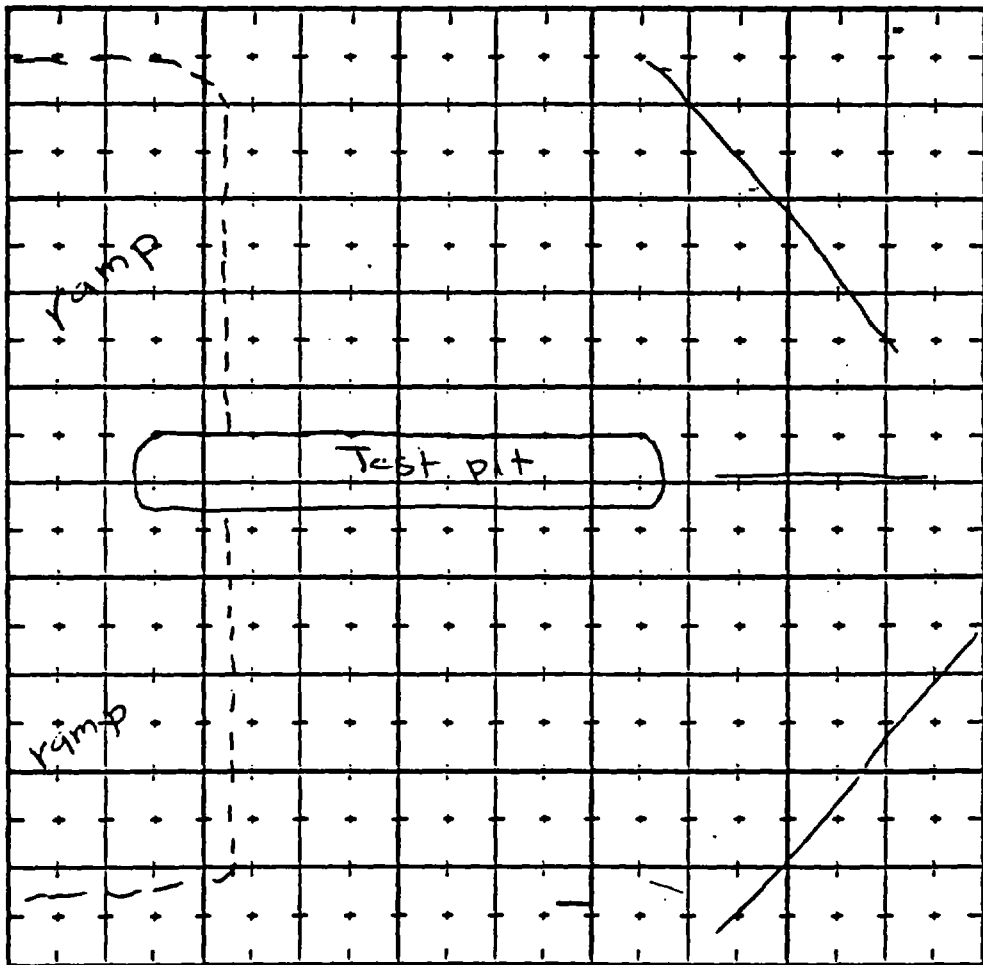
Date/Time Started 10/27/93

Coordinates NA

Date/Time Completed 10/27/93

Geologist Rich Borden

Scale: 1 Inch = 4 ft.



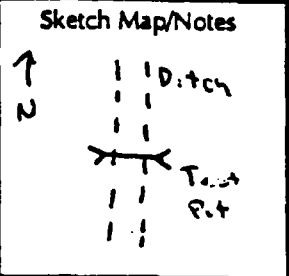
Ground surface	2-3 @ 0.2			
5 ft.	2-3 @ 0.5-1			
10 ft.				
15 ft.				
20 ft.				

Notes Test pit is 10ft long, 3ft deep in center and is oriented roughly E-W; 31-CS-4 is located due east from 31-CS-3

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/26/93, 1030

Site ID 31-DCH-1 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/26/93, 1100

Completion Depth (ft.) 3ft

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method S80

Drilling Company UXB No. Samples 2

Comp Backhoe

Driller Ron Wilson

Size and Bit Type 18 in bucket

Drilling Fluid NA

Sampler Type NA Length (ft.) NA

Diameter (in.) NA Driving Wt (lbs.) NA Drop (in.) NA

Geologist/Date W B H, 10/26/93
(Signature)

Checked by/Date [Signature], 11/2/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D. (ppm)	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S1002 to S1005	0 to 0.2			0	med brown, (10YR 4/3), medium moist, medium stiff, very fine sandy (L%) clayey (30%) silt (60%)
1	RAS 10/26/93				ML		
2		S1006 to S1009				0	
3	RAS 10/26/93						
4	RAS 10/26/93						
20.5	RAS 10/26/93						TD = 3ft

EBASCO SERVICES INCORPORATED

UXB
Contractor Name

Test Pit Record

SWMU 31

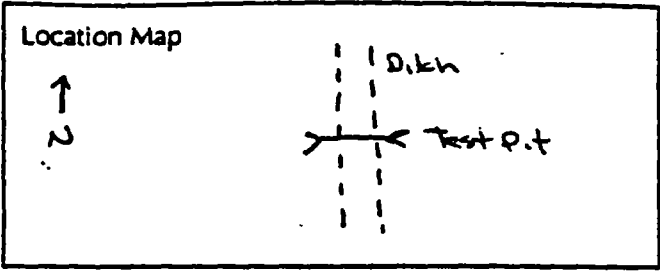
Test Pit 31-DCH-1

Date/Time Started 10/26/93, 1030

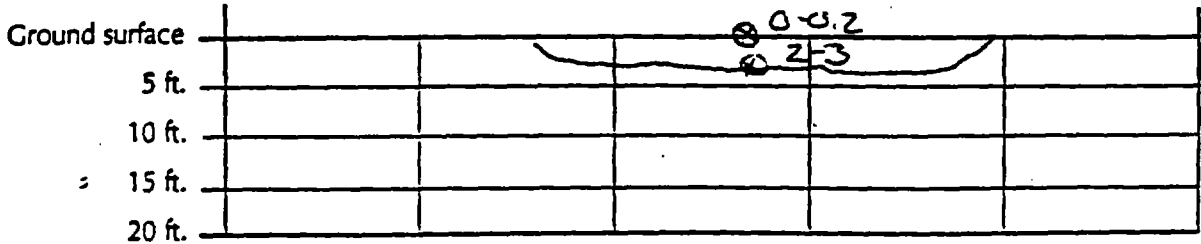
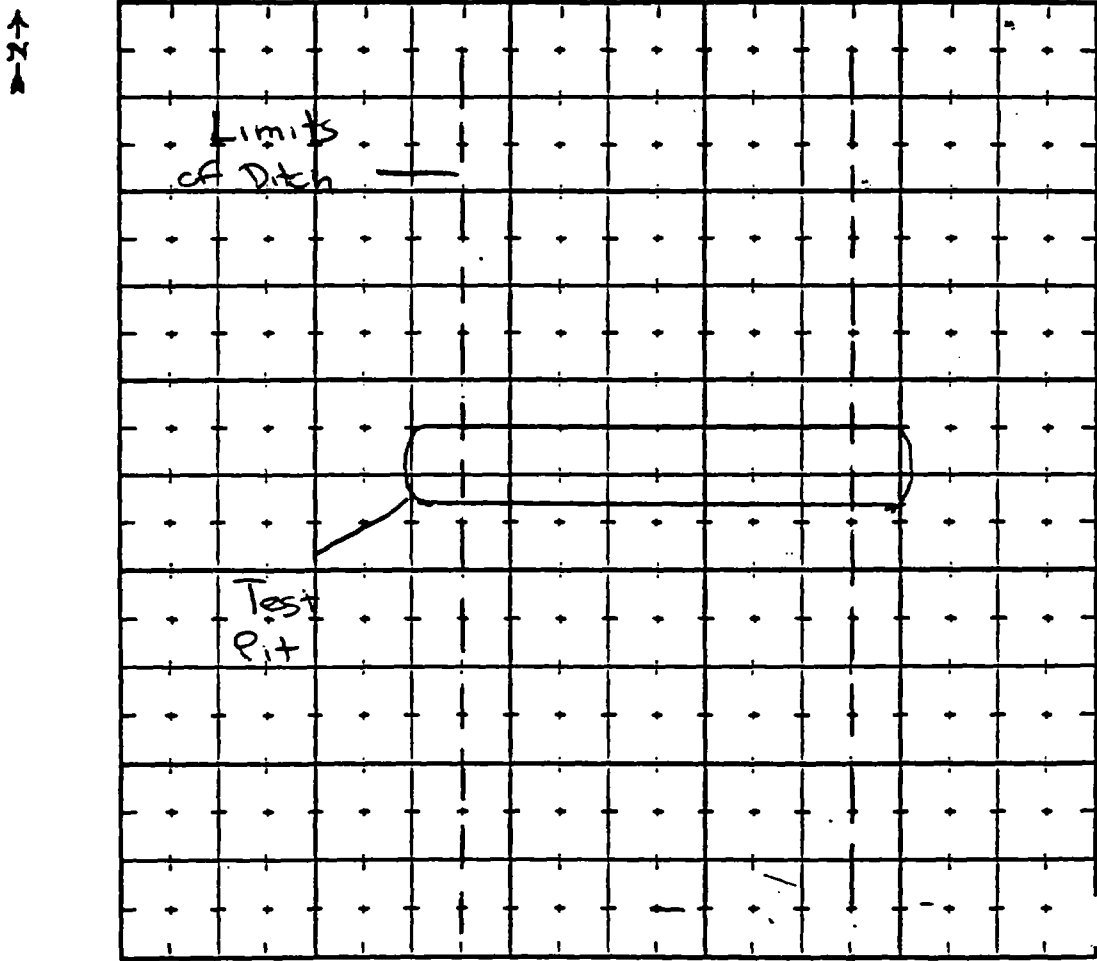
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Date/Time Completed 10/26/93, 1100

Geologist Rich Jordan



Scale: 1 inch = 4 ft.



Notes Test pit is 3ft deep, 8ft long and oriented
approximately E-W

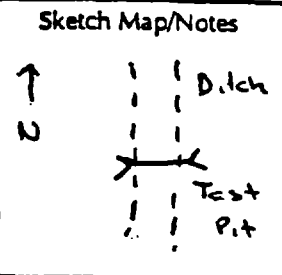
A.I-175

Field Bore Log

Page 1 of 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Test Pit

Date/Time Started 10/26/93, 12:05

Site ID 31-DCH-2 Dia. of Hole NA

Surface Elevation NA

Date/Time Completed 10/26/93, 13:15

Completion Depth (ft.) 3ft+

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method J80

Drilling Company UXB No. Samples 2

Case Backhoe

Driller Ron Wilson

Size and Bit Type 18 in Bucket

Drilling Fluid NA

Sampler Type NA Length (ft.) NA

Diameter (in.) NA Driving Wt (lbs.) NA Drop (in.) NA

Geologist/Date M R M 10/26/93
(Signature)

Checked by/Date [Signature] 11/2/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		S1010 to S1013	0 to 0.2			0	med brown, (10% R 5/4), soft at surface to firm, moist at surface to little moisture at 2 1/2 ft, clayey (35%) silt (70%) with rare fine sand
1	R913 10/26/93				ML		
2		S1014 to S1017	2 to 3			0	TO = 3ft+
3	R913 10/26/93						
4							
5							
5.26							

EBASCO SERVICES INCORPORATED

UXB

Contractor Name

Test Pit Record

SWMU 31

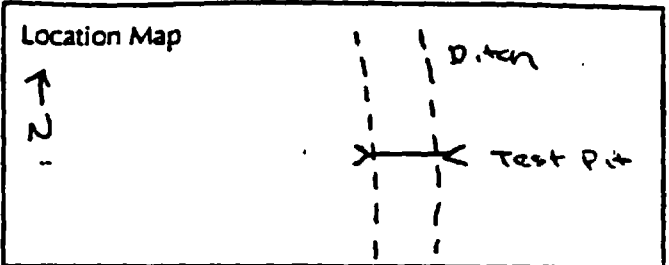
Test Pit 31-DCH-2

Date/Time Started 10/26/93 1205

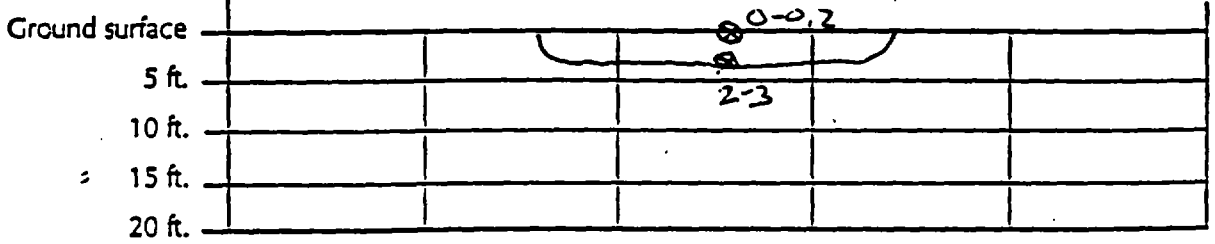
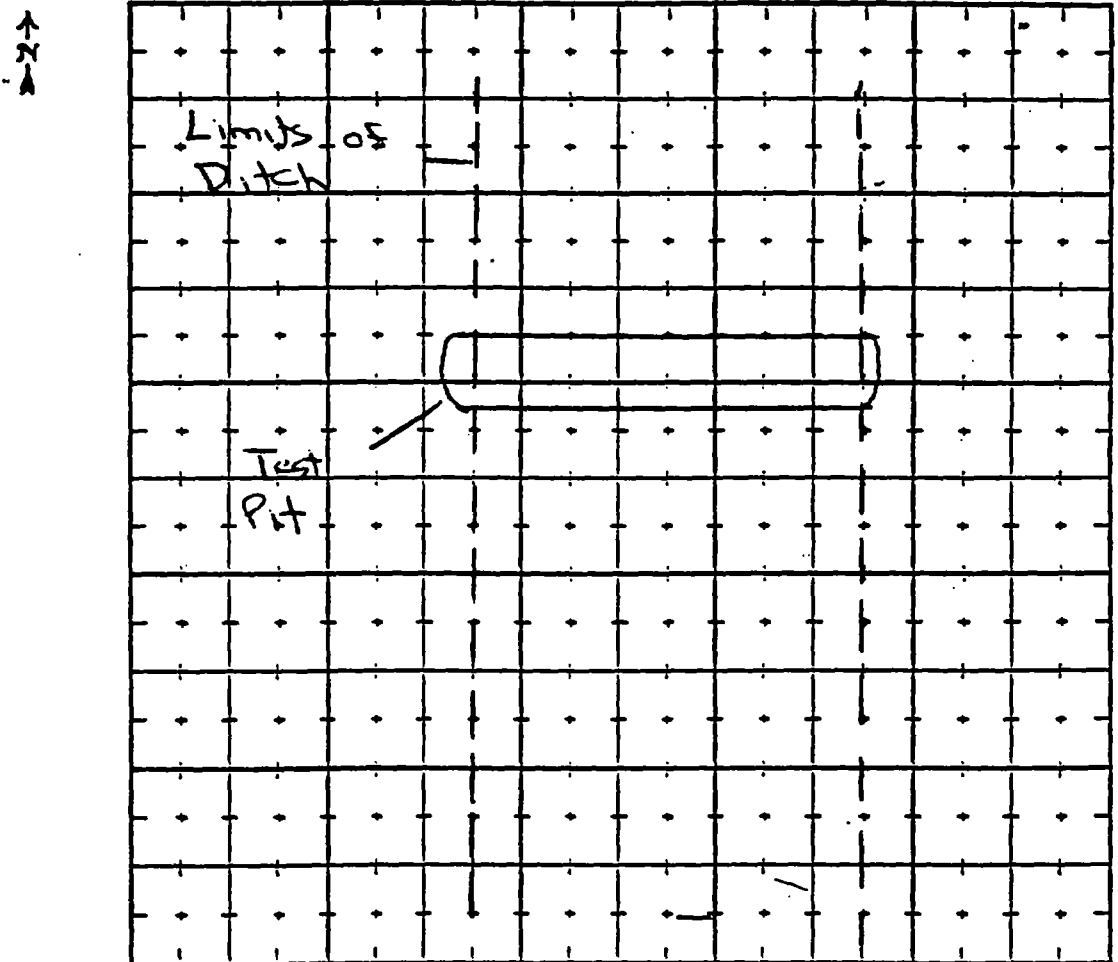
Coordinates NA

Date/Time Completed 10/26/93 1315

Geologist Rich Borden



Scale: 1 inch = 4 ft



Notes Test pit is 3ft deep, 8ft long and oriented
E-W

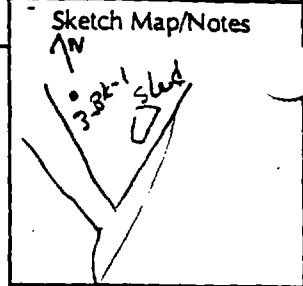
APPENDIX A1

Soil Bore Logs

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type BORE

Date/Time Started 10-20-93 0850

Site ID 3-3k-1 Dia. of Hole 3 1/2'

Surface Elevation _____

Date/Time Completed 10-20-93 0925

Completion Depth (ft.) 3'

Water Level Initial (ft.): N/A; After N/A Hours _____ (ft)

Equipment and Drilling Method HAND Auger

Drilling Company N/A No. Samples 4-2

Driller N/A

Size and Bit Type _____

Drilling Fluid N/A

Sampler Type N/A Length (ft.) N/A

Diameter (in.) N/A Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date [Signature]
(Signature) 10-20-93

Checked by/Date [Signature] 11/18/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S056	2A n/s	0-2'	-	CL	0	Silty clay - 40% silt 60% clay - 1072/4 yellow Brown, nonplastic, soft, unconsolid, Lt. moist. grains at 19"-29"
3	S1057 SB096	2A n/s 1062a	2-3	-		0	
5							TO 3'
10							
15							
20							

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes
N ←
3-TRN-5 TRENCH
TRENCH

Site Type Surface Sample

Date/Time Started 10-17-93 1527

Site ID 3-TRN-5 Dia. of Hole N/A

Surface Elevation _____

Date/Time Completed N/A

Completion Depth (ft.) 2'

Water Level Initial (ft.): N/A ; After N/A Hours N/A (ft)

Equipment and Drilling Method N/A

Drilling Company _____ No. Samples 1

Size and Bit Type N/A

Driller _____ Drilling Fluid _____

Sampler Type N/A Length (ft.) N/A

Diameter (in.) N/A Driving Wt. (lbs.) N/A Drop (in.) N/A

Geologist/Date [Signature] 10-17-93
(Signature)

Checked by/Date [Signature] 9/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S1106 S1108 S1109 S1107	200A 4A 4A	0-2"	N/A	CL	0	Silty Clay 40% clay 60% silt, 10TR 1/4 yellow brown and soft, not plastic, uncemented, moist
5							
10							
15							
20							

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Task 3 Group 2 SWMUs

3TRN-6
TRENCH
N

Site Type Surface Sample

Date/Time Started 12-17-93 1330

Site ID 3-TRN-6 Dia. of Hole n/a

Surface Elevation _____

Date/Time Completed n/a

Completion Depth (ft.) .2'

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method n/a

Drilling Company _____ No. Samples 1

Driller _____

Size and Bit Type n/a

Drilling Fluid _____

Sampler Type n/a Length (ft.) n/a

Diameter (in.) n/a Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date [Signature]
(Signature) 12-17-93

Checked by/Date [Signature] 9/25/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S1110 S1111 S1112 S1113	26A 4Ambs	0-2'	-	CL	0	Silty Clay - kaolinit, 60% clay 10YR2/4 yellow brown, mod plastic, soft, uncemented, soft moist
5							
10							
15							
20							

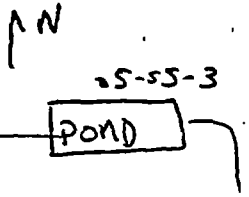
Field Bore Log

Page 1 of _____

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type Surface Sample

Date/Time Started 10-20-93 1115

Site ID S-55-3 Dia. of Hole n/a

Surface Elevation _____

Date/Time Completed 10/20/93 1130

Completion Depth (ft.) n/a

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method n/a

Drilling Company n/a No. Samples 1

Driller n/a

Size and Bit Type n/a

Drilling Fluid n/a

Sampler Type n/a Length (ft.) _____

Diameter (in.) n/a Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date PW 10-20-93
(Signature)

Checked by/Date [Signature] 5/11/94

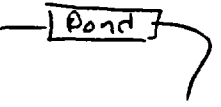
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S0025	2Bmbr	0-2'	n/a	GC	D	Silty Clayey Sand - 20% silt 30% clay 50% sand 10% 1/4 DK yellow brown, low plastic, zone, uncancelled, moist
5							
10							
15							
20							

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes
N/A
SS-4



Site Type Surface Sample

Date/Time Started 10-20-93 1132

Site ID S-SS-2/ Dia. of Hole N/A

Surface Elevation _____

Date/Time Completed N/A 1135

Completion Depth (ft.) N/A

Water Level Initial (ft.): N/A; After N/A Hours N/A (ft)

Equipment and Drilling Method N/A

Drilling Company N/A No. Samples 1

Driller N/A

Size and Bit Type N/A

Drilling Fluid N/A

Sampler Type N/A Length (ft.) N/A

Diameter (in.) N/A Driving Wt (lbs) N/A Drop (in.) N/A

Geologist/Date [Signature] (Signature) 10-20-93

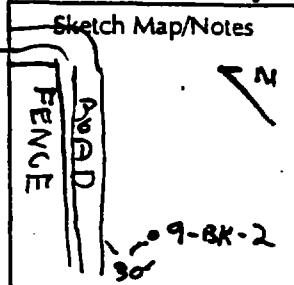
Checked by/Date [Signature] 5/11/94

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	S0026	RA-1	0-2"	N/A	GC	0	Silty Clayey Gravel - 25% silt, 25% clay 50% gravel 10% 1/2" dk yellow Brown - nonplastic, base, unconsolidated, moist
5							
10							
15							
20							

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type BORE

Date/Time Started 10-20-93 1015

Site ID 9-BK-2 Dia. of Hole 3 1/2

Surface Elevation _____

Date/Time Completed 10-21-93 1015

Completion Depth (ft.) 3'

Water Level Initial (ft.): n/a; After n/a Hours 1A (ft)

Equipment and Drilling Method ASA
Hand Auger, B-

Drilling Company Bayels No. Samples 3
Driller J. Hulso

Size and Bit Type WHA

Drilling Fluid n/a

Sampler Type SZ Length (ft.) 2'

Diameter (in.) 3" Drilling Wt (lbs.) n/a Drop (in.) n/a

Geologist/Date R. W. [Signature] 10-21-93
(Signature)

Checked by/Date [Signature] 11/18/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	50334	2hrbx	0-2	n/a	CL	0	Silty Clay - 35% silt 65% clay - 10YR 4/1 D yellow brown, homogeneous, soft, Lt moist, unconsolid
3	50335	2hrbx 8gr	2-3	0	GC	0	clayey gravel - 40% clay 60% gravel, 10YR 4/1 yellow brown, nonplastic, very dense, very coarse
5							
10							
15							
20							

TCS #
S8152 → S8097, S8118 - see tech/chem

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area

Ebasco Environmental

Task 3 Group 2 SWMUs

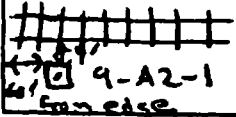
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type GRAB/BORE

↑N

Date/Time Started 10-8-93/1050

Site ID 9-A2-1 Dia. of Hole 3 inch



Surface Elevation NA

Date/Time Completed 10-8-93/1420

Completion Depth (ft.) 5.5

Water Level Initial (ft.): NA; After NA Hours NA (ft)

Equipment and Drilling Method SMEIS

Drilling Company PC Exploration No. Samples 4

Split spoon sampler driven

Driller R. Smith

Size and Bit Type NA

Drilling Fluid NA

Sampler Type Split Spoon Length (ft.) 2

Diameter (in.) 2.5 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date A. M. Byrne
(Signature) 10-8-93

Checked by/Date [Signature] 10/21/93

Samples were pushed not driven

Blow Counts

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval (ft)	Recovery (ft)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	NA	G+	0-0.2	NA	ML	0	0-0.2 Ft f-c sandy silt w/some clay and some gravel (15% clay, 20% gravel, 25% sand, 40% silt). 10YR 5/3 brown, soft, minor roots, low plasticity, not cemented; gravel road base at top
1	NA	SX+	0.2-0.5	1.5	ML	0	
2	NA	SX+	0.5-2.3	2.2	ML	0	
3	NA	Δ	2-3	2	ML	0	
4	NA	SAD	4-5	1.5	ML	0	
5				1.5			0.2-0.4 ft same as above
							0.5-1.5 ft fine sandy silt w/trace clay (10% clay, 30% sand, 60% silt) 10YR 5/4 yellowish brown, dry, soft; not cemented; low plasticity
							4.5-5.5 ft increase in clay content patches of caliche at 5.0-5.5 ft clayey silt w/some fine sand (40% clay, 45% silt, 15% fine sand) 10YR 5/4 yellow brown, dry, very stiff - hard, not cemented, med. plasticity
							* S9000, S9001, S9002, + S9003
							** S9004, S9005, S9006 + S9007
							Δ S9008, S9009, S9009 + S9010
							ΔΔ S9011, S9012, S9013, + S9014

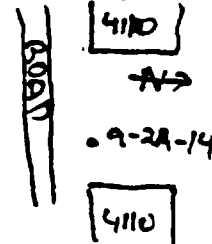
S9015
10-8-93

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Sketch Map/Notes



Site Type BORE

A2 CH 10/16/93

Date/Time Started 10-5-93 0930

Site ID 9-28-14 Dia. of Hole 4"

Surface Elevation _____

Date/Time Completed 10-5-93 0945

Completion Depth (ft.) 5'

Water Level Initial (ft.): N/A ; After N/A Hours N/A (ft)

Equipment and Drilling Method HSA
B-61 mobile Drill

Drilling Company PC Exploration No. Samples 3

Driller R. Smith

Size and Bit Type N/A

Drilling Fluid N/A

Sampler Type ST Length (ft.) 1 1/2

Diameter (in.) 3 1/2 Driving Wt (lbs.) N/A Drop (in.) N/A

Geologist/Date R. White 10-5-93
(Signature)

Checked by/Date [Signature] 5/11/94

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0		2500	0-2"	N/A		0	0-2" collected prior to drilling by R. Bordon
		2501	2-3		CL	0	Silty Clay trace fine sand - 15% sand 30% silt 55% clay 2.546/4, LT yellow Brown low plastic, soft - Lt moist - uncemented. no change in soils.
		2502	3-4			0	
		2503	4-5			0	
5							TD 5'
10							
15							
20							

Field Bore Log

Sketch Map/Notes

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type BORE

Date/Time Started 10-17-93 1150

Site ID 9-BA-1 Dia. of Hole 3 1/2

Surface Elevation _____

Date/Time Completed 10-17-93 1230

Completion Depth (ft.) 3'

Water Level Initial (ft.): n/a; After n/a Hours n/a (ft)

Equipment and Drilling Method HAND Auger

Drilling Company n/a No. Samples 2
Driller n/a

Size and Bit Type n/a

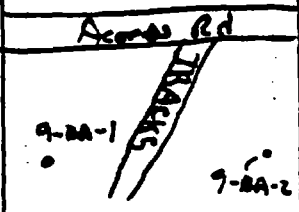
Drilling Fluid n/a

Sampler Type Auger Length (ft.) 6"

Diameter (in.) 3/2 Driving Wt. (lbs.) n/a Drop (in.) n/a

Geologist/Date R. Wiley 10-17-93
(Signature)

Checked by/Date [Signature] 10/25/93



Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	50252 50253 50254 50255	200A 200B	0-2'	n/a	CL	0	Silty Clay - 40% Silt 60% Clay - 10R2 1/2 - yellow brown, non plastic, soft, unconsolidated, friable. Full of Disturb and animal remnants
1	50252				ML CL	0	Silty Silty Clay - 25% Silt 75% clay - 2.5Y 1/3 pale yellow - soft, unconsolidated, non plastic, dry - very sandy falls out end of Hand auger.
2	50252 50253 50254 50255 50256	200A 200B	2-3'	n/a		0	
3							
10							
15							
20							

SWMU 5

MW -

S-108-93

Field Bore Log		Page 1 of <u>3</u>
Tooele Army Depot - South Area Task 3 Group 2 SWMUs		Ebasco Environmental 143 Union Blvd., Ste. 1010 Lakewood, Colorado 80228
Site Type <u>SWMU 5 MW S-108-93</u>		Sketch Map/Notes
Date/Time Started <u>10/6/93 9:15</u>	Site ID <u>SWMU 5</u> Dia. of Hole <u>8" 1/4</u>	
Surface Elevation <u>NA</u>	Date/Time Completed <u>10/10/93 11:40</u>	
Completion Depth (ft.) <u>75' 77</u>	Water Level Initial (ft.): <u>69.1</u> ; After <u>57.0</u> Hours <u>57.0</u> (ft)	
Equipment and Drilling Method <u>Hollow Stem Auger</u>	Drilling Company <u>PE Exploration</u> No. Samples <u>4 GREAT TECH ONLY</u>	
Size and Bit Type <u>8" 1/4 OD</u>	Driller <u>S. Mott</u>	
Sampler Type <u>Split Spoon</u> Length (ft.) <u>2'</u>	Drilling Fluid <u>NA</u>	
Geologist/Date <u>RJ Onzere 10/18/93</u>	Diameter (in.) <u>NA</u> Driving Wt. (lbs.) <u>NA</u> Drop (in.) <u>NA</u>	
(Signature)		Checked by/Date <u>[Signature]</u>

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	Blow Counts						Light Gray (HUE 2.5Y 7/2) Low plasticity Silty Clay with 1/8" Angular Gravel - DRY 75% clay, 20% silt, 5% Gravel
3-5		SPLIT SPOON 1	3-5	1/2	CL-MC	0	
5		SPLIT SPOON 2	5-7	0.5/2	CL-MC	0	Slight moisture @ 8'
10		SPLIT SPOON 3	10-12	1.5/2	CL	0	Grayish Brown (HUE 2.5Y 5/2) clay with minor amounts of silt. Very stiff, non-plastic dry moist. 90% clay 10% silt
15		SPLIT SPOON 4	15-17	0/1	GP	0	Very Angular Dark Gray (6.5Y N3) Gravel up to 1/4" Diameter Dry (No sample recovery from Split Spoon, Sample description from cuttings)
18.5'							see next page
20							

10/6

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

SWMU 5
Site ID MW-S-108-93 Site Type _____

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
10/7	12/28 39/43	SPLIT SPOON 5	20-22	1/2	ML	0	Brown (HUE 7.5 R 5H) silt with 5% black & clear rounded sand, very stiff, dry. Intermittent light gray clay blotches.
25	N/A	SPLIT SPOON 6	23-25	0.5/2	ML	23	Brown (HUE 7.5 R 4/3) silt with 10% well-rounded pebbles - Dry
30	20/20 40/45	SPLIT SPOON 6	28-30	0/2	?	?	No recovery from split spoon
35	7/24 37/39	SPLIT SPOON 7	33-35	1/2	CL	3	Yellowish Brown (HUE 10YR 5/4) stiff, sticky clay with 5% medium grained sand - Dry
40	15/22 33/50	SPLIT SPOON 8	38-40	1.5/2	CL	0	42'
45	15/29 30/50	SPLIT SPOON 9	43-45	0.5/2.0	CH	0	Reddish Brown (HUE 5YR 4/4) moderate plasticity clay with small amounts of light gray shale - Dry
50	5/11 13/50	SPLIT SPOON 10	48-50	2/2	CH	0	50'
Cont. Sampling	50/X X/X	SPLIT SPOON 11	50-52	0.2/0.5	CL	0	Reddish Brown (HUE 5YR 4/4) very stiff low plasticity clay. - Dry

Water Quality Field Data Sheet

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-10 Date 11/13/93 Samplers J. Lane
Time Start 1110 D. Hanzlick
Time Finish 1330

Well Information

Depth to Water 66.81 ft. Casing Diameter 4 in. = .33 ft. Casing Stickup 2.5 ft.
Well Depth 91.62 ft. Borehole Diameter 10 in. = .833 ft. Screened Interval 240 in. = 20 ft.
Sample Depth 24.81 ft. Well Volume 16.70 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h (7.48)$
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

pH Meter CSI Serial No. 2645 Bailer PVC Size 3x36 in.
E.C. Meter CSI Serial No. 2645 Water Level Meter Hydro-Sonic Serial No. 09986
Turbidity H&S Serial No. 3921
Temperature Meter CSI Serial No. 2645

Sample Filtering Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 7.03 @ 52.8 °F pH 10.00 = 10.00 @ 52.8 °F Time 1119
Conductance Standard NA umhos/cm @ 25°C Reading umhos @ °C Time NA
Calibrated Conductivity NA umhos/cm @ 25°C mg/l @ NA

Time	Volume Removed		Temp. °F	Elec. Conductivity umhos/cm @ 25°C	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
1134	0	0	53	0.82 x 10 ³	8.70	14.33	Clear
1153	16	1	53	0.68 x 10 ³	8.46	>200	slightly cloudy
1214	32	2	52.1	0.69 x 10 ³	8.38	>200	slightly cloudy
1230	48	3	51.6	0.69 x 10 ³	8.24	>200	slightly cloudy
1251	64	4	50.1	0.63 x 10 ³	8.23	145.5	Clear
1310	80	5	50.0	0.71 x 10 ³	8.35	>200	cloudy

C° = 5/9 (F° - 32); F° = 9/5 C° + 32

Water Quality Field Data Sheet

Page 1 of 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-50-90 Date 11-12-93 Samplers C. Bienialis
Time Start 0835 K. McCaslin
Time Finish 1010

Well Information

Depth to Water 63.38 ft. Casing Diameter 4 in. = .334 ft. Casing Stickup 2.4 ft.
Well Depth 69.96 ft. Borehole Diameter 10 in. = .833 ft. Screened Interval 120 in. = 10 ft.
Sample Depth 6.58 ft. Well Volume 4.297 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h$ (7.48)
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

Bailer PVC Size 3x36 in
pH Meter CSI Serial No. 00363 Water Level Meter Solinst Serial No. 12635
E.C. Meter CSI Serial No. 00363 Turbidity HF Sci Serial No. 3035
Temperature Meter CSI Serial No. 00363

Sample Filtering Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 7.0 @ 36.6 °F pH 10.00 = 10.09 @ 36.6 °F Time 0819
Conductance Standard 1000 umhos/cm @ 25°C Reading umhos @ °C Time 0819
Calibrated Conductivity 1000 umhos/cm @ 25°C mg/l @ 0819

Time	Volume Removed		Temp. °F	Elec. Conductivity umhos/cm @ °F	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
0835	1.1		42.4	.57 x 10 ³	7.70	51.5	v. sl. cloudy
0847	4.297	1	44.1	.52 x 10 ³	7.76	7200	lt. brownish, milky
0852	8.594	2	44.6	.54 x 10 ³	7.87	7200	lt. brownish, milky
0904	12.891	3	44.6	.54 x 10 ³	7.88	7200	lt. brownish, milky
0956	17.188	4	46.7	.57 x 10 ³	8.19	7200	lt brownish, milky
	Well purged dry after 3 rd volume - slow recharge.						
	Began sampling after completion of 4 th purged volume since slow recharge and stable parameters						

C° = 5/9 (F°-32); F° = 9/5 C° + 32

APPENDIX A2

Monitoring Well Bore Logs, Well Construction and Development Forms



SWMU 5

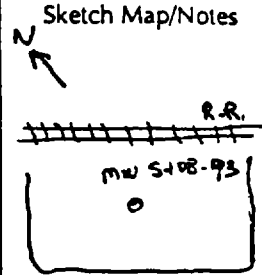
mw - S-108-93

Field Bore Log

Page 1 of 3

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type SWMU 5 mw S-108-93

Date/Time Started 10/6/93 9:15

Site ID SWMU 5 Dia. of Hole 8 1/4

Surface Elevation NA

Date/Time Completed 10/6/93 11:40

Completion Depth (ft.) 75' 77

Water Level Initial (ft.): 63.1 ; After 57.0 Hours 57.0 (ft)

Equipment and Drilling Method Hollow Stem Auger

Drilling Company PE Exploration No. Samples 4 GREATERN ONLY

Driller S. Mott

Size and Bit Type 8 1/4 OD

Drilling Fluid NA

Sampler Type Silt Spoon Length (ft.) 2'

Diameter (in.) NA Driving Wt. (lbs.) NA Drop (in.) NA

Geologist/Date RJ Onzere 10/8/93
(Signature)

Checked by/Date [Signature]

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	Blow Counts						Light Gray (MUE 2.54 712) Low plasticity Silty Clay with 1/8" Angular Gravel - DRY 75% clay, 20% silt, 5% gravel
14/12		SPLIT SPOON 1	3-5	1/2	CL-ME	0	Slight moisture @ 8'
14/17							
12/14		SPLIT SPOON 2	5-7	0.5/2	CL-ME	0	
16/25							
7/12		SPLIT SPOON 3	10-12	0.5/2	CL	0	Grayish Brown (MUE 2.51 5/2) clay with minor amounts of silt. Very stiff, non-plastic dry moist. 90% clay 10% silt
22/31							
49/50		SPLIT SPOON 4	15-17	0/1	GR	0	Very Angular Dark Gray (6LFY N3) Gravel up to 1 1/4" diameter Dry (No sample recovery from split spoon, sample description from cuttings)
X/X							
							18.5'
							see next page

10/6

Field Bore Log

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

SWMU 5
Site ID MW-S-108-93 Site Type _____

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
10/7	Blow Count 12 / 28 39 / 43	SPLIT SPOON 5	20-22	1/2	ML	0	Brown (HUE 7.5 R 5/4) silt with 5% black & clear rounded sand, very stiff, dry. Intermittent light gray clay blotches.
25	NOT AVAILABLE etc. [unclear]	SPLIT SPOON 6	23-25	0.5/2	ML	28	Brown (HUE 7.5 R 4/3) silt with 10% well rounded pebbles - Dry
30	20 / 20 40 / 45	SPLIT SPOON 6	28-30	0/2	?	?	No recovery from split spoon
10/9 Sample Every 5 feet	7 / 24 37 / 39	SPLIT SPOON 7	33-35	1/2	CL	3	Yellowish Brown (HUE 10YR 5/4) stiff, sticky clay with 5% medium grained sand - Dry
	15 / 22 33 / 50	SPLIT SPOON 8	38-40	1.5/2	CL	0	
	15 / 29 30 / 50	SPLIT SPOON 9	43-45	0.5/2.0	CH	0	42' REDDISH BROWN (HUE 5YR 4/4) Moderate plasticity clay with small amounts of light gray shale - Dry
Cont. Sampling	5 / 11 13 / 50	SPLIT SPOON 10	48-50	2/2	CH	0	
	50 / X X / X	SPLIT SPOON 11	50-52	0.2/1.5	CL	0	50 Reddish Brown (HUE 5YR 4/4) Very stiff low plasticity clay. - Dry

05-MW-5-108-93

Well Construction Log

103

Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

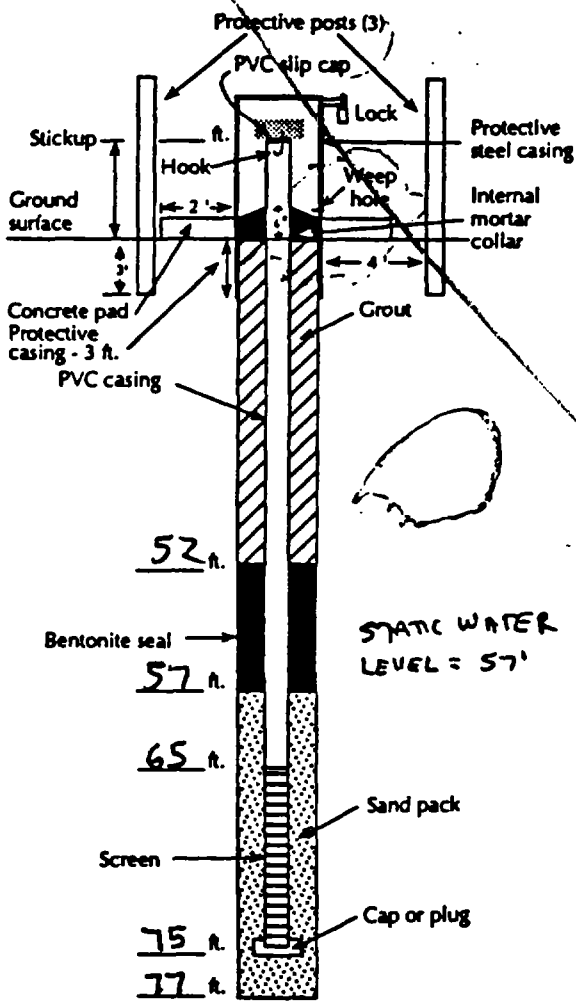
Project Tooele Task 3, Group 2 SWMUs

Well No. 05-MW-5-108-93

Field Geologist R. J. ONDERK

Installation Date 10/11/93

QA Checked by R. J. ONDERK



Drilling Summary

Total depth 77 ft.
Borehole diameter 8 1/4 inches
Drilling company PC Exploration
Driller Steve Matt
Rig type Mobile Drill Model B-61
Method Hollow stem auger
 Air rotary
 Air rotary/driven casing
 Water rotary
 Mud rotary
 Other

Well Construction Materials

Grout
Quantity 188 lbs (20 bags)
Type Wasatch Type 2P Portland Cement
Bentonite
Pellet size 3/8" (Fluid Drive Pellets)
Quantity _____
Type Fluid Drive Pellets
Sand Pack
Quantity 1100 lbs
Sand type and size Silica sand, 10-20 (CST Env. Media)

Screen
Length 20' Other 10
I.D. 4" Other _____
Slot size 010
Type AC
Schedule (casing) 40 80
Initial water level 57' ft.

Comments

8 feet of sand above top of screen - this was used to place bentonite seal above static water level of 57'

Not to scale

Measuring point is from ground surface unless otherwise noted. Stickup is distance from top of casing to ground surface.

Well Construction Log

103

Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

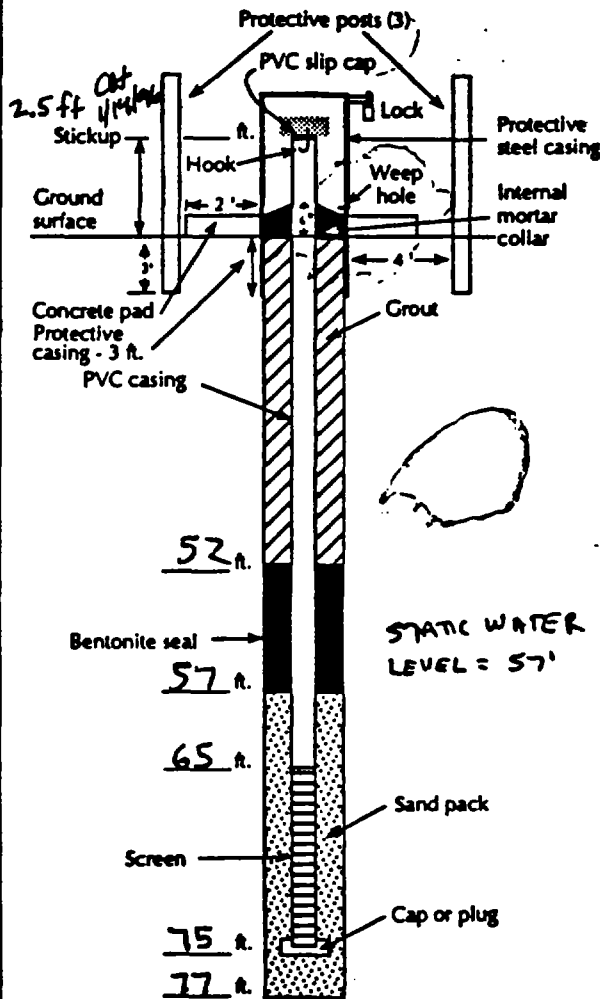
Project Tooele Task 3, Group 2 SWMUs

Well No. 05-MW-S-108-93

Field Geologist R. J. ONDERK

Installation Date 10/11/93

QA Checked by R. J. ONDERK



Drilling Summary

Total depth 77 ft.
Borehole diameter 8 1/4 inches
Drilling company PC Exploration
Driller Steve Mott
Rig type Mobile Drill Model B-61
Method Hollow stem auger
 Air rotary
 Air rotary/driven casing
 Water rotary
 Mud rotary
 Other

Well Construction Materials

Grout
Quantity 188 lbs (20 bags)
Type Wascor Type 20 Portland Cement

Bentonite
Pellet size 3/8" (Fluid Dr. Pellets)
Quantity 150 LBS Oct 1/19/96
Type Amery Pellets

Sand Pack
Quantity 1100 lbs
Sand type and size Silica sand, 10-20 (CSST Env. Media)

Screen
Length 20' Other 10
I.D. 4" Other _____
Slot size 010
Type PC
Schedule (casing) 40 80
Initial water level 57' ft.

Not to scale

Measuring point is from ground surface unless otherwise noted. Stickup is distance from top of casing to ground surface.

Comments

8 Feet of Sand Above Top of Screen - This was used to place bentonite seal above static water level of 57'

Well Development Record Form

Page 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Date: 10-19-93
Site Geologist: R. Weinberg

Well Number: S-108-93
Equipment: Drill Rig, Bailor, Surge Block.

	Before	Reference Point	After
Depth to Water (ft.)	<u>58.94</u>	Top of PVC casing	<u>59.04</u>
Depth to Sediment (ft.)	<u>77.33</u>	Top of PVC casing	<u>77.15</u>
Thickness of Sediment (ft.)	<u>—</u>		
Depth of Well (ft.)	<u>75</u>	Water Column Height (h) (ft.)	<u>18.39</u>
Diameter of Casing (C) (ft.)	<u>.33'</u>	✓ Diameter of Boring (B) (ft.)	<u>.66'</u>
Casing Volume (gals.) = $\pi(C/2)^2(h)(7.48 \text{ gals/ft.}^3)$	= <u>11.8</u>		
Well Volume (gals.) = $[\pi(B/2)^2 - \pi(C/2)^2](h)(0.30) + [\pi(C/2)^2h] \times 7.48$	= <u>22.6</u>		
Total Volume Purged (gals.)	<u>165</u>	Casing/Well Volumes Purged	<u>7.3</u>

Time	pH	Temp. °C	Conductivity (umhos)	Pump Rate (gpm)	Vol. of Water Removed (gal.)	Turbidity (NTUs)	Comments
1305	8.41	62.5	1.45	2 gal	0	-	
1310	9.38	59.2	.87	"	1	-	
1320	9.13	59.6	.74	"	2	-	
1345	8.88	52.8	.72	"	3	-	
1355	8.97	51.7	.69	"	4	-	
1432	8.62	54.8	.71	"	5	-	
1445	8.56	52.8	.71	"	6	-	
1453	8.53	50.5	.73	"	6 1/4	-	
1500	8.46	50.1	.72	"	6 1/2	-	
1505	8.40	50.7	.71	"	6 3/4	-	
1517	8.39	50.5	.73	"	7.0	-	

Notes Sampling Procedures:

1520	8.33	51.0	.73	"	7.3	-	
------	------	------	-----	---	-----	---	--

⊕ off scale

WHAT IS MULTIPLIER?

$C^{\circ} = 5/9 (F^{\circ} - 32); F^{\circ} = 9/5 C^{\circ} + 32$

Well Development Record Form

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Date: 10-19-93
Site Geologist: R. Wempe

Well Number: S-108-93
Equipment: Drill Rig, Baile, Surge Block.

	Before	Reference Point	After
Depth to Water (ft.)	<u>58.94</u>	Top of PVC casing	<u>59.04</u>
Depth to Sediment (ft.)	<u>77.33</u>	Top of PVC casing	<u>77.15</u>
Thickness of Sediment (ft.)	<u>-</u>		
Depth of Well (ft.)	<u>75</u>	Water Column Height (h) (ft.)	<u>18.39</u>
Diameter of Casing (C) (ft.)	<u>.33'</u>	Diameter of Boring (B) (ft.)	<u>.66'</u>
Casing Volume (gals.) = $\pi(C/2)^2 (h) (7.48 \text{ gals./ft.}^3)$	<u>11.8</u>		
Well Volume (gals.) = $[\pi(B/2)^2 - \pi(C/2)^2](h)(0.30) + [\pi(C/2)^2 h]$	<u>22.6</u>		
Total Volume Purged (gals.)	<u>165</u>	Casing/Well Volumes Purged	<u>7.3</u>

Time	pH	Temp. °C	Conductivity (umhos)	Pump Rate (gpm)	Vol. of Water Removed (gal.)	Turbidity (NTUs)	Comments
1305	8.41	62.5	1.45	2 gal	0	-	
1310	9.38	59.2	.87	"	1	-	
1320	9.13	59.6	.74	"	2	-	
1345	8.88	52.8	.72	"	3	-	
1355	8.97	51.7	.69	"	4	-	
1432	8.62	56.8	.71	"	5	-	
1445	8.56	52.8	.71	"	6	-	
1453	8.63	50.5	.73	"	6 1/4	-	
1500	8.46	50.1	.72	"	6 1/2	-	
1505	8.40	50.7	.71	"	6 3/4	-	
1517	8.39	50.5	.73	"	7.0	-	

Notes Sampling Procedures:

1520	8.33	51.0	.73	"	7.3	-	
------	------	------	-----	---	-----	---	--

⊙ off scale

WHAT IS MULTIPLIER?

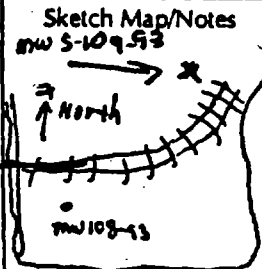
$C^{\circ} = 5/9 (F^{\circ} - 32); F^{\circ} = 9/5 C^{\circ} + 32$

Field Bore Log

05- MW S-109-93

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type SWMU S

SWMU S

Date/Time Started 10-11-93 1120

Site ID MW S 109-53 Dia. of Hole 8 1/4"

Surface Elevation _____

Date/Time Completed 10/20/93 1742

Completion Depth (ft.) 74.3

Water Level Initial (ft.): 65.5^{RTE}; After 14 Hours 65.5 (ft)

Equipment and Drilling Method _____

Drilling Company PC Exploration No. Samples 1

Moble Rig - model B 61 - hollow stem Auger

Driller S. Mott to 66.0 ft; J. Hulse, Boyles Brothers, 66.0-74.3 ft TD

Size and Bit Type 8 1/4 Inch

Drilling Fluid None

Sampler Type Silt Spoon Length (ft.) 2

Diameter (in.) 2 Driving Wt. (lbs.) 140 Drop (in.) 30

Geologist/Date R. J. Canon 10/15/93

Checked by/Date R. T. Canon 10/17/93

R. J. Canon (Signature)

R. T. Canon 10/28/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0	Blow Count ↓ # of blows per 6 inches	RTE 10/13/93			ML-GC		Light Gray (HUE 2.5Y 7/2) Silt with 20% well rounded gravel (1/2" diameter), Dry
20	20/20 Spoon 1/1 X	SILT SPOON 1	3-5'	1 7/15	AL-GC	○	
15	15 30 35 43	SILT SPOON 2	7-10	2 1/2	ML	○	Light Olive Brown (HUE 2.5Y 5/4) Compact Silt with rust and black streaking staining - Moist
12'							
15	31 (Spoon) X Y	SILT SPOON 3	13-15	1/1	GP-SG	○	Highly variable, poorly sorted angular Gravel (up to 2" diameter) with 30% poorly sorted off Olive Brown (HUE 2.5Y 4/4) Sand
30	30 40 41 50	SILT SPOON 4	19-20'	2 1/2	GP-SG GP-SG	○	Becomes less sandy and more silty @ 19-20'

10/12

Field Bore Log

Page 2 of 3

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Site ID SW MU 5 Site Type MW S-109-93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
	Blow Count # of blows per 6 inches						Highly variable, poorly sorted angular gravel with 30% finer olive brown (HUE 2.5 Y 4/4) silt-dry
25	Safor 3" NO RECORD	split spoon 5	23-25	0/3	Grat ?		
							27'
							Brown (HUE 7.5 YR 5/4) stiff silt with minor amounts of sand-dry
30	15/22 41/47	split spoon 6	28-30	2/2	ML	0	End Tu 10/12/93 by B. Ondirko Start Wed 10/13/93 by R.T. Canon
							(90%) RTC 10/13/93
35	4, 8, 11, 16	split spoon 7	34-36	2/2	CH ML	⊖	clay; trace silt (10%); high plasticity; 7.5 YR 5/4; NC; moist; firm
							rtc 10/13/93
40	10, 10, 15	split spoon 8	39-40.5	1.5/1.5	CH ML	⊖	As above
							rtc 10/13/93
45	9, 8, 25	split spoon 9	44-45.5	1.5/1.5	CH	⊖	As above except some silt (15%)
50	7, 6, 10	split spoon 10	49-50.5	1.5/1.5	CH	⊖	As above except some silt (20%)
	X X X RTC						

10/13/93

A.2-7

Field Bore Log

SWM 45 SWM 5 Background Well Page 3 of 3

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

R.T. Canan
10/13/93

MWS
site ID 109-93 Site Type Bore

Depth (ft)	# of hammer blows per Well Construction 6 inch Cols	Sample Type and Number	Sample Interval	Recovery (ft./hr.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
50 ft	↓						
55 ft	3, 7, 31, 20	Split spoon 11	54-56	2.9 / 2.0	CH	⊕	54 ft. As above except medium moist
60 ft		Split spoon 12	59-61	2.0 / 2.0	CL	⊕	59.2 ft. clay (55%); silty (25%); some sand (20%); moderate plasticity; 7.5 YR 5/4; NC; fresh; moist; sand is very fine grained except for 25% of sand (5% of total) is medium-coarse grained sand; well rounded; 59.2-59.3 ft is fresh water limestone (angular; appears "in situ", not transported)
	3, 10, 15, 27, 40, 44	#13	61-64	2.5 / 3.0	SC	⊕	62.8 ft. clayey (30%) silty (30%) sand (40%); very fine grained sand; low plasticity; 10 YR 4/3; NC; medium dense; moist; very crudely laminated.
65 ft	∇ G.W. 65.52		64-66	2.0 / 2.0	CH		64.0 ft - End 10/13/93
	Push 32	SGT -035 -036 -037	68-70	2.0 / 2.0	SC		64.0 ft - End 10/13/93
	Push	Ardu	70-72	2.0 / 2.0	CL		As above 66.0 ft End 10/15/93 RTC at 66.0 ft
			72-74	2.0 / 2.0	CL		66.5 ft. clay (65%); some sand (20%); very fine grained sand; some silt (15%); moderate plasticity; 10 YR 6/4 light yellowish brown; soft; NC; Very moist
75 ft	TD at 74.3 ft				CH		68.0 ft. Silty (25%) clayey (35%) sand (40%); very fine grained sand; low plasticity; 10 YR 6/4 light yellowish brown; soft; loose; NC; Wet
							71.3 ft. same as 64.0-66.5 ft interval to 68.0 ft
							74.3 ft measured
80 ft							TD at 74.3 ft on 10/28/93; measured

RTC 10/13/93

on 10/29/93; hole augered to 74.3 ft

G.W. = Groundwater

A.2-8

Well Construction Log

MWS-109-93

Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

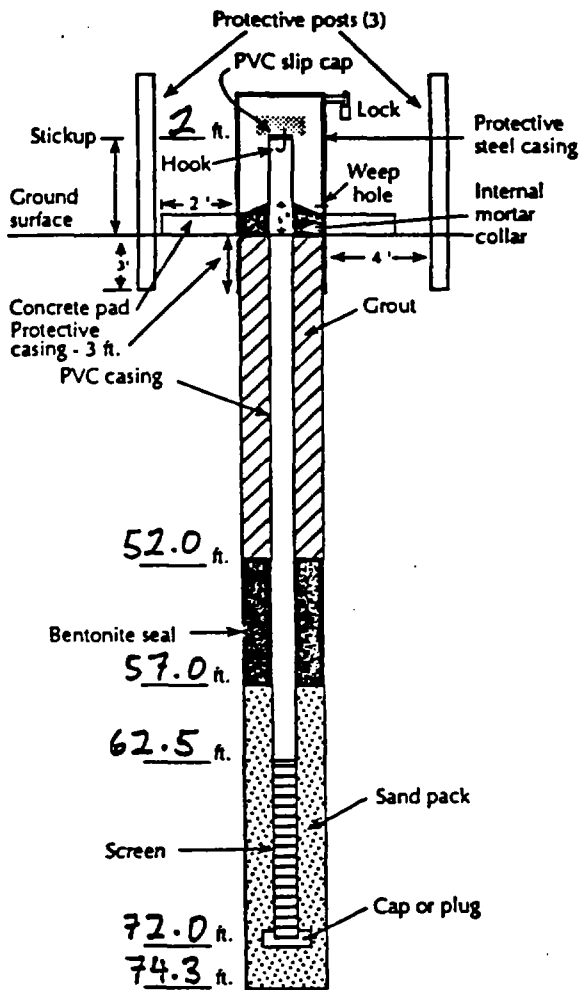
Project Tooele Task 3, Group 2 SWMUs

Well No. MWS-109-93

Field Geologist R.T. Canon

Installation Date 10/29/93

QA Checked by R. P. [unclear] 11/17/93



Drilling Summary

Total depth 74.3 ft
 Borehole diameter 10 inches inches measured
 Drilling company RTC 10/29/93 Exploration Boyles Brothers
 Driller Jay Hulse
 Rig type Mobile B-57
 Method Hollow stem auger
 Air rotary
 Air rotary/driven casing
 Water rotary
 Mud rotary
 Other

Plus 5 bags later in afternoon for cement sinkage

Well Construction Materials

Grout
 Quantity 14 bags, 94 pounds / bag = 1,316 pounds
 Type I-II Portland Cement

Bentonite
 Pellet size 1/4 inch
 Quantity 3 buckets, 13.5 gallons
 Type Fluidrill

Sand Pack
 Quantity 8 bags, 400 pounds
 Sand type and size Silica sand, 10-20

Screen

Length 20' Other 9.5
 I.D. 4" Other _____
 Slot size 0.010 0.010 RTC 10/29/93
 Type PVC
 Schedule (casing) 40 80
 Initial water level ? ft; 65.5 ft after 14 hours on 10/29/93 at 0753 hours.

Comments

The 65.5 ft was measured just before crew began to install the well. The cement was mixed 20 parts cement w/ one part bentonite powder

Not to scale

Measuring point is from ground surface unless otherwise noted. Stickup is distance from top of casing to ground surface.

Exhibit 4.2-1
Wall Development Record

Procedure No.: 4.0
Revision No.: 1
Date: December 1
Page: 3 of 3

ESASCO SERVICES INCORPORATED
2111 Wilson Blvd., Ste. 1000, Arlington, VA 22201

Wall Development Record

Project TEAD - South Area
RFI - Phase II
Geologist Rich Borden
Wall No. S-107-93
Date of Installation 10/29/93

Wall Information

Total Depth 72.30 FT
Casing Stickup 2 FT
Screen Length 10 FT
Amt. of fluid in well (Prior to development)
In well casing 4 gallons
In sat. annulus 9 gallons
(30% porosity)
Amt. of mud/water lost:
During drilling N/A
During fluid purging N/A

Development

Date/time started 11/2/93, 0950
Completed 11/2/93, 1520
Water level
Before development 66.25
24 hrs. after _____
Depth to sediment
Before development 72.3
After development 72.3

Measurement	Turbidity	pH	Specific Conduct.	Temp	Time	Vol. Wtr. Removed
Before Development						
1	off scale	6.98	1.2	48.8	1000	0 gal
2	off scale	7.42	1.2	50.4	1013	13 gal
3	off scale	7.33	1.2	63.0	1120	26 gal
4	144	7.50	1.2	65.2	1201	39 gal
5	off scale	7.18	3800	60.8	1324	52 gal
After development	off scale	7.89	346	54.9	1439	65 gal
Surge technique	6th	8.07	372	50.8	1520	78 gal

Type, size and capacity of bailer or pump one gallon bailer
Physical character of water removed (clarity, color, odor, particulates, etc.)
brown, highly turbid with silt and some fine sand

Quantity of fluid removed 78 gallons
Time for removal 5 hrs 20 min

Note: all depths measured from top of casing
A.2-10

Field Bore Log

MWS-110-93

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Site Type Bore / Well

I.D. MWS-110-93
Diameter of Hole 4 1/4 inch
Rem 6 1/4 inch

Date/Time Started 10/30/93 0800

Site ID MWS-110-93
Date/Time Completed 10/31/93 1148

Surface Elevation _____

Water Level Initial (ft.): 72.12 ; After 21 Hours 71.36 (ft)

Completion Depth (ft.) 84.0

Equipment and Drilling Method HSA

Drilling Company Boyles Brothers No. Samples 1

Mobile R-57

Driller Jay Hulse

Size and Bit Type 4 1/4 inch Tooth / Rem 6 1/4 inch tooth

Drilling Fluid None

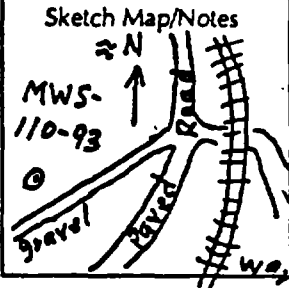
Sampler Type Split Spoon Length (ft.) 2

Diameter (in.) 2 1/2 hammer and push Drop (in.) 30

Geologist/Date R. T. Canon

Checked by/Date [Signature] 11/15/93

(Signature) 10/31/93



Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0							silty clay (75%); silt (25%); low-moderate plasticity; very pale brown 10YR 7/4; soft; NC; dry
5		Archive 4-5			CL		
10		Archive 9-10			CL		8.0 ft clay (50%); some gravel (20%); some silt (20%); trace very fine grained sand (10%); low plasticity; 10YR 6/4 light yellowish brown; soft and loose; NC; dry
15		Archive 14-15			CL		10.0 ft 11.0 Same as 0-8.0 ft; silty clay
					CL		13.8 ft 11.0/30/93 silty clay; Same as 8.0 ft to 11.0 ft
20		Archive 19-20			CL		15.3 ft 11/30/93 silty (25%) clay (55%); trace very fine and very coarse grained sand (10%); trace granules to small fine gravel (10%); low to no plasticity; 10YR 6/3 pale brown; soft to loose; NC; dry

Field Bore Log

MWS-110-93

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Site ID MWS-110-93 Site Type Bore/well

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
25		Archive 24-25		Auger	CL	Ø	silty clay; trace sand, granules, and small pebbles; same as above
30		Archive 29-30		Auger			same as above
35		Archive 34-35			CL	Ø	34 ft same as above; little moisture
40		Archive 39-40		31	CL	Ø	36.0 ft clay (85%); some silt (15%); moderate plasticity; 7.5 YR 6/4 light brown; medium moist; NC; firm
45		Archive 44-45		Auger	CH	Ø	same as above; trace silt (10%); high plasticity
50		Archive 2	47.5 to 51.5	2.0 / 2.0	SC		49.8 ft sand (75%); very fine to fine grained, trace medium grained; clayey (25%); no plasticity; 2.5 Y 6/2 light brownish grey; loose; NC; low/little moisture

Field Bore Log

MWS-110-93

Page 3 of 4

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

MWS-110-93 Site ID Site Type Bore/well

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
							approximation 52.0 ft
55	55	Archive 54	54-55.5	1.5 / 1.5	CH		clay (85%); trace silt (10%); trace very fine grained sand (5%); high plasticity; 10YR 6/4 light yellowish brown; firm; NC; medium moisture; crudely laminated
			55.5				55.2 ft
60		Archive 59-61		2.0 / 2.0	CH		clay (90%); trace silt (10%); high plasticity; 10YR 5/4 yellowish brown; medium stiff; NC; moist
							64.0 ft estimated
65			64.5	1.3	ML	rec n/s/m/s 65.8	clayey (35%) silt (55%); massive; trace some very fine grained sand (10%); 10YR 6/4 light yellowish brown; low plasticity; 5x medium dense; NC; very moist
			66.5	2.0			60.8 ft
	RTC	SGTD 41 RTC SGTD 2 10/31/93	66.5	2.0	CL		silty (25%) clay (75%); medium plasticity; 10YR 6/4 light yellowish brown; stiff; NC; very moist
			68.5	2.0			68.2 ft
70		SGTD 39 SGTD 40	68.5	1.5	ML	69.9	clayey (35%) silt (55%); trace sand (10%); same as 64.0 - 65.8 ft; wet
			70.5	2.0	CL		68.9 ft
			70.5	2.0	CL		Some as 65.8 - 68.2 ft
			71.5	2.0			71.6 ft * See below
			72.5	2.0	CH		clay (90%); trace silt (10%); high plasticity; soft; NC; 10YR 6/4 light yellowish brown; wet
			74.5	2.0			73.4 ft
75		End 10/30/93 Start 10/31/93	74.5	2.0			As above except very moist
			76.5	2.0			75.3 ft
			76.5	1.6			trace gravel (10%); wet; as above
			78.5	2.0			76.0 ft
			78.5	1.8	CL	rec n/s/m/s 80.4	Same as 73.4 - 75.3 ft
80			80.5	2.0	CL		77.4 ft
							sandy clay (70%); some silt (15%); some very fine - fine grained sand (15%); low-moderate plasticity; 10YR 6/4 light yellowish brown; med; NC; very moist
							79.0 ft
							clay (50%); some silt (20%); sandy (30%) very fine - fine grained; low plasticity; 10YR 6/4 light yellowish brown; soft; NC; wet.
							80.4 ft

* 70.4 - 71.6 : clay (75%); some silt (15%); trace limestone gravel (10%); low-moderate plasticity; 10YR 6/4 light yellowish brown; medium; NC; little moisture

Field Bore Log

MWS - 110 - 93

Page 4 of 4

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

RTC 10/31/93

Site ID MWS-110-93 Site Type Bore/Well

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
80							80.4 ft
		Archive	80.5 - 82.5	1.0 / 2.0	SC		clayey (25%) silty (25%) sand (50%); very fine to fine grained sand; no to low plasticity; 2.5Y 4/2 dark grayish brown; loose; NC; wet
		SGT 042	82.5 - 84.0	1.1 / 1.5	CH		clay (95%); silt (5%); high plasticity; 10YR 5/4 yellowish brown; firm; NC; very moist from
85							84.0 ft 82.5 - 83.5 ft, medium moist 83.5 - 84.0 ft
90							TD w/ 4 1/4 inch I.D. augers = 84.0 ft
95							The borehole was reamed to 83.6 ft w/ 6 1/4 inch I.D. augers.

Well Construction Log

MWS-110-93

Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

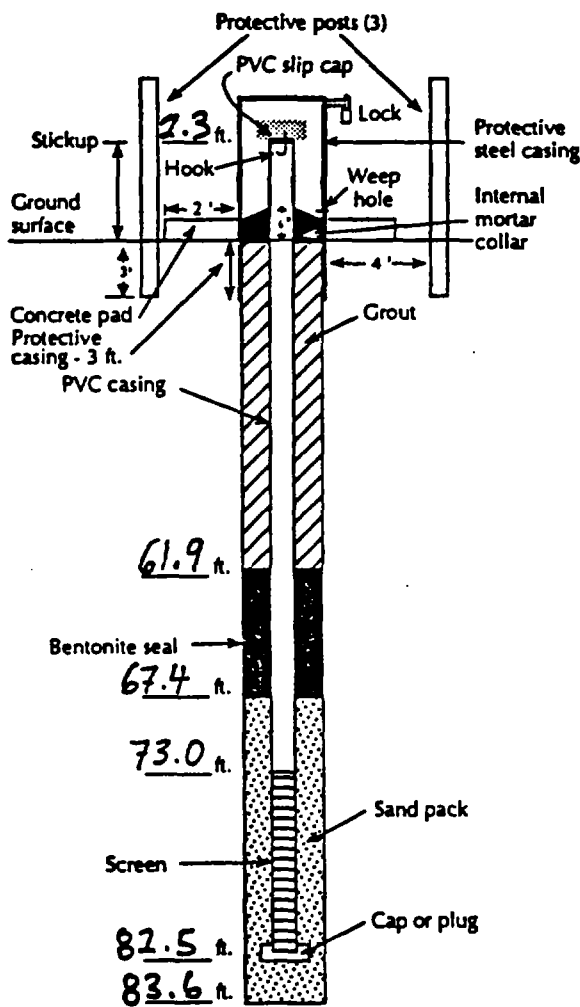
Project Tooele Task 3, Group 2 SWMUs

Well No. MWS-110-93

Field Geologist R.T. Canon

Installation Date 11/1/93

QA Checked by _____



Drilling Summary

Total depth 83.6 ft. ream depth
Borehole diameter 10 inches
Drilling company RC Exploration inc Boyles Brothers
Driller J. Hulse 11/1/93
Rig type Mobile B-57
Method Hollow stem auger
 Air rotary
 Air rotary/driven casing
 Water rotary
 Mud rotary
 Other

Well Construction Materials

Grout
Quantity 21- 100 pound bags
Type Portland I-II type cement
one bag bentonite powder (100 pound bag)
Bentonite
Pellet size 1/4 inch
Quantity 3 2/3 buckets (4 1/2 gal / bucket)
Type Fluidrill
Sand Pack
Quantity 12- 50 pound bags
Sand type and size Silica sand, 10-20

Screen

Length 20' Other 9.5 ft
I.D. 4" Other _____
Slot size 0.010
Type PVC

Schedule (casing) 40 80
Initial water level 71.36 ft. today (11/1/93)

4 1/4 inch I.D. augers to 84.0 ft
6 1/4 inch I.D. augers to 83.6 ft

Comments

Grouting occurred on Tu, 11/2/93.

Not to scale

Measuring point is from ground surface unless otherwise noted.
Stickup is distance from top of casing to ground surface.

Well Development Record Form

Page 1 of

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Date: 11-12-93 Well Number: S-110-93
Site Geologist: C. Bienialis Equipment: pH, cond., temp.: CSI
(Serial # 00363) Herb. Lab: AF Scientific (serial # 3095); PVC bailer: 3' 3"

	Before	Reference Point	After
Depth to Water (ft.)	<u>73.46</u>	Top of PVC casing	<u>76.27</u>
Depth to Sediment (ft.)	<u>85.15</u>	Top of PVC casing	<u>85.15</u>
Thickness of Sediment (ft.)	<u>0.0</u>		<u>0.0</u>
Depth of Well (ft.)	<u>94.8 (from well const. diag.)</u>		Water Column Height (h) (ft.) <u>11.69</u>
Diameter of Casing (C) (ft.)	<u>00 = .375' ID = .336'</u>		Diameter of Boring (B) (ft.) <u>.833</u>
Casing Volume (gals.) = $\pi(C/2)^2 (h) (7.48 \text{ gals./ft.}^3)$	= <u>7.69</u>		
Well Volume (gals.) = $[\pi(B/2)^2 - \pi(C/2)^2](h)(0.30) + [\pi(C/2)^2 h]$	x 7.48 = <u>19.17</u>		
Total Volume Purged (gals.)	<u>95.85</u>		Casing/Well Volumes Purged <u>5 / 5</u>

Time	pH	Temp. F	Conductivity (umhos)	Pump Rate (gpm)	Vol. of Water Removed (gal.)	Turbidity (NTUs)	Comments
1204	6.34	51.3	.53 x 10 ³	bailer	1.1	>200	initial sample
1233	6.47	49.4	.46 x 10 ³	bailer	19.17	>200	1 st volume
1249	6.56	50.6	.47 x 10 ³	bailer	38.34	>200	2 nd volume
1305	6.98	48.1	.46 x 10 ³	bailer	57.51	7200	3 rd volume
1326	7.00	49.6	.47 x 10 ³	bailer	76.68	>200	4 th volume
1354	7.23	47.2	.45 x 10 ³	bailer	95.85	>200	5 th volume

Notes Sampling Procedures:

1204	v. slightly cloudy	1354	lt. brownish, milky
1233	lt. brownish, milky		
1249	lt. brownish milky	note: parameters stable after 5 volumes	
1305	lt. brownish, milky	despite milky appearance of water -	
1326	lt. brownish milky	well is considered developed.	

C° = 5/9 (F° - 32); F° = 9/5 C° + 32

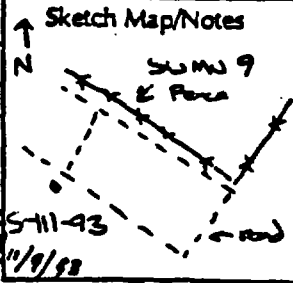
MWS-111-93

Field Bore Log

~~MWS-111-93~~
 MWS-112
 RTC 11/9/93

Tooele Army Depot - South Area
 Task 3 Group 2 SWMUs

Ebasco Environmental
 143 Union Blvd., Ste. 1010
 Lakewood, Colorado 80228
 ① 4 1/4 inch I.D.
 ② 6 1/4 inch I.D. ream



Site Type Auger Boring

Date/Time Started 10/30/93, 0900

Site ID S-111-93 Dis. of Hole 1445 11/11/93 1445 11/11/93
 Date/Time Completed 11/11/93 1445 11/11/93 1445

Surface Elevation NA

Completion Depth (ft.) 78.0 ft
 RTC 11/11/93

Water Level Initial (ft.) 78.5 ; After 18 hours 75.90 (ft)
 18 hours RTC 6.15 11/9/93

Equipment and Drilling Method Mobile
BSS Rig HSA

Drilling Company Boyer Bros. No. Samples 0 64. 95
 Driller Te 25: Tom Giles; Jay Hulse to 78.0 ft

Size and Bit Type 7 1/2 inch tooth

Drilling Fluid none 2 1/2 inch 30-78 ft

Sampler Type split Length (ft.) 2

Diameter (in.) 3.0 and 2 1/2 push Driving Wt. (lbs.) 140 Drop (in.) 30 in

Geologist/Date M.R.M. 10/30/93
Rich h. Borden (Signature)

Checked by/Date R.T. Canon 11/11/93

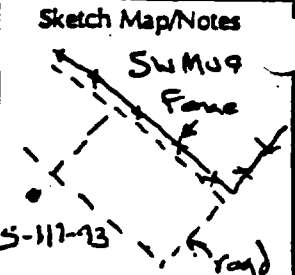
Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./in.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0							med brown, (10YR 4/3) organic rich at surface changes to a med brown (10YR 5/4), medium stiff, little moisture, clayey to slightly clayey, very fine grained quartz <u>sandy silt</u> , abundant CaCO ₃ with 2-3% white CaCO ₃ clasts, subhorizontal partings with 2.5 cm partings of <u>bluish grey</u> silt
2			2	1/1	ML	0	
9			9	.5/5	GM	0	At 8 ft med. brown (10YR 5/3) slightly clayey, very fine grained to med grained moderately sorted quartz sand and limestone rock fragment <u>sandy, gravelly silt and silty gravel</u> ; clasts are 100% grey, micritic limestone, up to 3 in in diameter; subround, subangular to subelongate
14			14	.25/25		0	
14.25			14.25	36 in			
19			19	.25/25		0	Sample from 19-20 ft is: yellow grey (2.5Y 5/2) stiff, little moisture, slightly clayey, very fine grained quartz <u>sandy gravelly silt</u> with a 2 cm interval of red-brown (7.5YR 5/6) iron stained well sorted, fine grained quartz sand with weak CaCO ₃ cement
20			20	8 in			

Field Bore Log

Page 4 of 4

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Auger Boring

Date/Time Started 10/30/93

Site ID S-111-93 Dia. of Hole 3 in

Surface Elevation NA

Date/Time Completed 11/8/93 11/11/93 11/14/93

Completion Depth (ft.) 78.0

Water Level Initial (ft.): 69.5 ; After 18 Hours 57.6 (ft)

Equipment and Drilling Method Mobile

Drilling Company Boyles Bros. No. Samples 11/14/93

B 53 Rig / Mobile B-57

Driller Tom Giles to 25 ft / Jay Hulse

Size and Bit Type 7 1/2 inch tooth / 10 inch tooth

Drilling Fluid none 64.85 ft

Sampler Type split Length (ft.) 2

Diameter (in.) 3 Driving Wt. (lbs.) 140 Drop (in.) 30 in

Geologist/Date RM 10/30/93

Checked by/Date _____

Rich K. Barden (Signature)

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./in.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
20	22AS 10/30/93				GM		At 22 ft auger is on rock and making very little progress
24			24	25.25	ML	0	medium brown (10TR 616), hard, CaCO ₃ rich, little moisture, slightly very fine sandy, slightly clayey, silt
25	22AS 10/30/93		25	8 in			End 10/30/93 RTC
26	27AS 10/30/93						Note: Due to cobbles and boulders filling in the previous 0-25 ft, crew shifted 18 inches west and started an offset bore. No samples collected by RTC 0-25 ft. RTC 11/14/93
28	28AS 10/30/93						R.T. Canon assumed this bore at 40 ft on Monday 11/9/93 11/10/93 at 25 ft on Wednesday 11/10/93.
40	29AS 10/30/93						11/10/93 RTC 11/8/93

Field Bore Log

MWS-111-93

Page 3 of 4

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Site ID MWS-111-93 Site Type Bore/Well

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
							RTC started this borehole at 25ft on 11/10/93.
25							End 10/30/93
							start 11/10/93
30	End 11/10/93 Start 11/11/93	Archive 29-30	0.9/1.0	Auger	ML	Ø	silty (25%) clayey (35%) sand (40%); very fine grained sand; no plasticity; 2.5 Y 6/3 light yellowish brown; medium dense; NC; dry; massive
							Estimate 32.0 ft
35		Archive 34-35	0.9/1.0	Auger	CL ML	Ø	clay (60%); some silt (20%); some very fine grained sand (20%); low plasticity; 10YR 6/4 light yellowish brown; firm; NC; dry; massive
40		Archive 39-40	0.8/1.0	Auger	CL ML	Ø	clay (50%); some silt (20%); sandy (30%); very fine grained sand; low plasticity; 10YR 6/4 light yellowish brown; firm; NC; dry; massive
							42.5 ft estimated
45		Archive 44-45	0.8/1.0	Auger	SM	Ø	sand (75%); trace clay (10%); some silt (15%); mostly very fine grained sand, some fine grained; rare coarse grained muscovite flakes; no plasticity; 10YR 6/4 light yellowish brown; loose; NC; little moisture; very crudely laminated; subangular - subrounded
							46.5 ft Estimated
50		Archive 49-50	0.8/1.8	Auger	CH		clay (90%); trace silt (10%); high plasticity; 7.5 YR 5/4 strong brown; soft; NC; medium moisture; massive

Field Bore Log

MWS-111-93

Page 4 of 4

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

RTC 11/11/93

Site ID MWS-111-93 Site Type Bore/well

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./hr.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
50-55				Auger			* 60.0 - 60.3 ft: recent, freshwater limestone; no: 2 boulder; possibly sideritic
55	Archive	59-55		push 1.0-1.0 Auger	CH	φ	clay (90%); same as above
60	Archive	59-60		Hammer 1.8 1.8 Auger	CH	φ	clay (95%); trace silt (5%); high plasticity; 10YR 5/3 brown; medium stiff; NC; moist; massive
60.0 ft							limestone (80%); some clay (20%) in matrix; no plasticity; 2.5 Y 6/3 light Yellowish brown; very dense; highly cemented; dry; massive
60.3 ft							clay (95%); trace silt (5%); high plasticity; 2.5 Y 6/3 light yellowish brown; firm; NC; medium moist
65	Archive	64-65		Hammer 1.8 1.8 Hammer 1.0-1.0 Auger	CH	φ	as above; 10YR 5/4 Yellowish brown; partly cemented (calcareous)
68.0							possibly perched 2-6 inch sandy zone
68.0 ft							clay; as above; wet
70	SGT 043 SGT 044 SGT 045 SGT 046	70.0 72.0		push 2.0 2.0 2.0	ml-SC-CL	φ	sand (40%)/clay (40%) mix; some silt (20%); very fine to fine grained sand, trace medium; low plasticity; 10YR 5/3 brown; loose/soft; NC; wet
72.5	Archive	72.0-74.0		2.0 2.0	CH	φ	clay (80%); some silt (15%); trace very fine grained sand (5%); high plasticity; 10YR 5/3 brown; NC; wet
75	RTC 11/11/93	74.0-76.0		2.0 2.0	CH	φ	as above; very moist 74.0-75.0 ft; moist 75.0-76.0 ft
76.0 ft							No Recovery but spoon pushed easily as it usual does in clay.
78.0							TD at 78.0 ft on 11/11/93
80							This borehole was reamed to 72.0 ft on 11/12/93.

Well Construction Log

MWS-111-93

Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

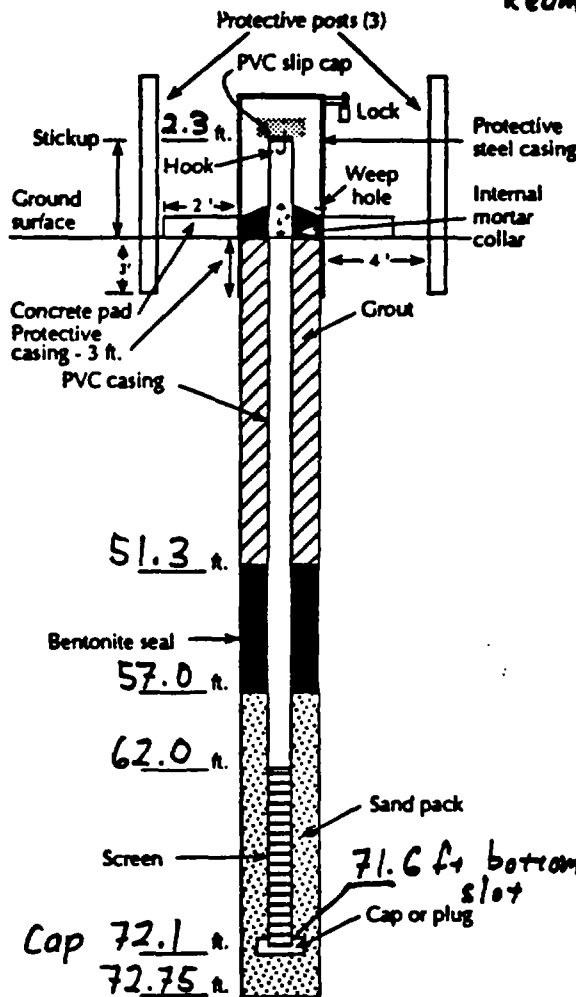
Project Tooele Task 3, Group 2 SWMUs

Well No. MWS-111-93

Field Geologist R.T. Canon

Installation Date 11/12/93

QA Checked by _____



Drilling Summary
Reamed with 1) To 76.0 ft w/ 4 1/4 inch I.D. augers
2) To 72.75 ft w/ 6 1/4 inch I.D. augers

Total depth 72.75 ft
Borehole diameter 10 inches
Drilling company Exploration Bayles Brothers
Driller Jay Hulse
Rig type Mobile B-57
Method Hollow stem auger
 Air rotary
 Air rotary/driven casing
 Water rotary
 Mud rotary
 Other

Well Construction Materials

Grout
Quantity 4 buckets 19-94 lb. bags
Type Portland I-II cement
plus one 50 lb bag bentonite powder

Bentonite
Pellet size 1/4 inch
Quantity 4 buckets
Type Fluidrill

Sand Pack
Quantity 11 1/4 - 50 pound bags
Sand type and size Silica sand, 10-20

Length 20' Other 9.5 ft
I.D. 4" Other _____
Slot size 0.010
Type PVC
Schedule (casing) 40 80
Initial water level 64.85 ft at 0835, on 11/12/93
(69.5 ft at 1440 on 11/11/93)

Not to scale

Measuring point is from ground surface unless otherwise noted. Stickup is distance from top of casing to ground surface.

Comments
Reamed to 72.75 ft w/ 10 inch O.D. augers.
Two gallons of approved water was poured into the well to thin out muddy well water and make sand pack installation easier.

Well Development Record Form

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Date: 11-15-93 Well Number: S-111-93
Site Geologist: Conrad J. Bieniulis Equipment: pH, cond., temp.: CSI
(Serial #00363); turbidity: HF Scientific (serial #3035); PVC bailer: 10' long, 3" diam.

Depth to Water (ft.)	<u>Before</u> <u>67.43</u>	Reference Point	<u>After</u> <u>68.10</u>
Depth to Sediment (ft.)	<u>74.23</u>	Top of PVC casing	<u>74.25</u>
Thickness of Sediment (ft.)	<u>.17</u>	Top of PVC casing	<u>.15</u>
Depth of Well (ft.)	<u>74.4</u>	Water Column Height (h) (ft.)	<u>6.8</u>
Diameter of Casing (C) (ft.)	<u>OD = .375 ID = .336</u>	Diameter of Boring (B) (ft.)	<u>.833</u>
Casing Volume (gals.) = $\pi(C/2)^2(h)(7.48 \text{ gals/ft.}^3)$	= <u>4.47</u>		
Well Volume (gals.) = $[\pi(B/2)^2 - \pi(C/2)^2](h)(0.30) + [\pi(C/2)^2h]$	= <u>11.15</u>		
Total Volume Purged (gals.)	<u>57.75</u>	Casing/Well Volumes Purged	<u>515</u> (+ 2 gals)
(includes 2.0 gals added during well installation)			

Time	pH	Temp. F	Conductivity (umhos)	Pump Rate (gpm)	Vol. of Water Removed (gal.)	Turbidity (NTUs)	Comments
1535	7.51	45.9	1.20×10^3	bailer	0.49	>200	Initial Sample
1544	7.87	47.7	1.13×10^3	bailer	11.15	>200	1 st Volume
1603	7.98	41.5	0.54×10^3	bailer	27.30	>200	2 nd Volume
1612	7.90	43.8	0.54×10^3	bailer	33.45	>200	3 rd Volume
1626	7.76	43.1	0.48×10^3	bailer	44.66	>200	4 th Volume
1651	8.03	40.6	0.48×10^3	bailer	55.75	>200	5 th Volume

Notes Sampling Procedures:

1535	H. brownish, milky	1651	H. brownish, milky
1544	H. brownish, milky		
1603	H. brownish, milky	Note: parameters stable after 5 volumes	
1612	H. brownish, milky	despite milky appearance of water -	
1626	H. brownish, milky	well is considered developed. Remove	
		2 gals more of water beyond 5 volumes	
		for water added during well	
		installation.	

$C^\circ = 5/9 (F^\circ - 32); F^\circ = 9/5 C^\circ + 32$

Field Bore Log

MWS-112-93

Tooele Army Depot - South Area

Task 3 Group 2 SWM/Is

Ebasco Environmental

143 Union Blvd., Ste. 1010
11/9/93 Lakewood, Colorado 80228

Site Type Auger Boring

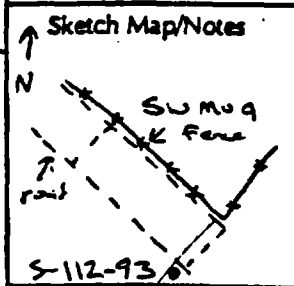
Date/Time Started 10/30/93, 1410

Site ID S-112-93

① 7 1/4 inch I.D.
② Reamed 6 1/4 I.D.
Diz. of Hole

Surface Elevation NA

Date/Time Completed 11/9/93 1355



Completion Depth (ft.) 85.0 (Ream 80.2)

Water Level Initial (ft.): 78.35; After 17 1/2 Hours 75.90 (ft)

Equipment and Drilling Method Mobile

Drilling Company Boyle Bros. No. Samples 0

BS3 rig -> to 40 ft (4 1/4 inch)

Driller Tom Giles / Jay Hulse (2nd rig)

Size and Bit Type 7 1/2 Tooth (Reamed w/ 10 inch tooth)

Drilling Fluid None NA

Sampler Type split Length (ft.) 2

Diameter (in.) 3 -> 2 1/2 inch 40 -> 85 ft Driving Wt. (lbs.) 140 Drop (in.) 30 in

Geologist/Date Rich K. Borden 10/30/93

Checked by/Date R.T. Canon 11/17/93

Rich K. Borden (Signature) R.T. Canon 11/9/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
0					GM		yellow brown (2.5Y 5/3) CaCO ₃ rich, slightly clayey, slightly very fine to medium sandy silty gravel; clasts are small pebbles to 3 inch cobbles subround, subequant to subhangular
4			4' - 4'2"	4.2 50% 2 in		0	grey micritic limestone and lesser amounts of recrystallized iron stained limestone
9			9' - 11'	15/2 21,17 23,9 2/6 in	GM	0	
14			14' - 14'8"	7/7 55% 8 in		0	same as first description except color is yellow brown (2.5Y 5/4)
19			19' - 20'	111	ML	0	At approximately 17 ft - light reddish brown (7.5YR 6/6) hard clayey silt, little or no CaCO ₃ , little moisture, horizontal partings with 1/2 cm spacings

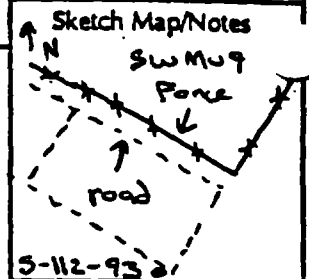
Mobile B-57 -> 40 - 85 ft

Field Bore Log

MWS-112-93

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228



Site Type Auger Boring

① 4 1/4 inch I.D.
② Ream 6 1/4 inch

Date/Time Started 10/30/93 1410

Site ID S-112-93 Dia. of Hole

Surface Elevation NA

Date/Time Completed 11/9/93 1355

Completion Depth (ft.) 85.0 (Ream 80.2)

Water Level Initial (ft.): 78.35 ; After 17 1/2 Hours 75.90 (ft)

Equipment and Drilling Method B-57
Mobile HSA

Drilling Company Boyles Bros No. Samples 0
Driller J. Hulse (40 → 85.0 ft plus reaming)

Size and Bit Type 7/8 inch tooth

Drilling Fluid NA

Sampler Type split Length (ft.) 2

Diameter (in.) 3 Driving Wt.(lbs.) 140 Drop (in.) 30 in

Geologist/Date M R M 11/2/93

Checked by/Date

Rich K. Borden (Signature)

R.T. Canon 11/9/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
24			24	1/2	ML	0	Hole reworked 25 ft west of original (log) on sheet 1
25			26				med brown, (10YR 5/4), very fine grained, angular, subround quartz sandy, clayey silt, slightly micaceous, rare grey micritic limestone pebbles, little moisture, firm, CaCO ₃ rich
29			29	2/2	ML	0	By 29 ft has changed to a reddish brown (7.5YR 5/6) clayey silt with very rare very fine sand, firm, little moisture, minor CaCO ₃ , common carbonaceous root traces
34			34	1.5/2		0	By 34 ft is the same except less carbonaceous material and increased CaCO ₃
39			39	1.5/2		0	By 39 ft is the same except med brown (10YR 5/4), more carbonaceous material

R.T. Canon assumed this borehole at 40 ft on Mon, 11/8/93. Tooele Task 3 Grp. 2 9.93.jb

112 RTC 11/9/93

Field Bore Log

MWS-HI-93

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

RTC 11/8/93

start date for RTC

Site ID MWS-HI-93 Site Type Bore/well
RTC 11/9/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
40							
45		Archive 44-45		1.0 / 1.0	CH	Ø	clay (95%); silt (5%); high plasticity; 7.5 YR 5/6 strong brown; medium; NC; little moisture; massive
45							
50		Archive 49-50		1.5 / 1.5	CH	Ø	As above
50							
55		Archive 54-55		1.0 / 1.0	CH	Ø	49.2 ft clay (85%); trace silt (10%); trace very fine grained sand (5%); high plasticity; 10YR 5/4 yellowish brown; medium; NC; little moisture; massive
55							
60		Archive 59-60		1.5 / 1.5	CH	Ø	Estimate 58.0 ft clay (90%); trace silt (10%); high plasticity; 7.5 YR 5/6 strong brown; medium; NC; medium moisture; massive
60							
65		Archive 64-65		1.5 / 1.5	CL		64.3 ft silty some silt (20%); clay (65%); trace very fine grained sand (15%); low-medium plasticity; 7.5 YR 5/4 Brown; medium; NC; low moisture
65							
70		Archive 69-70		2.0 / 2.0	SC	Ø	Estimate 68.5 ft silty sand (50%); clayey (25%); silt (25%); very fine grained sand; trace fine grained; No plasticity; medium dense; NC; Very moist; massive
70					CH		70.4 ft

40

45

50

55

60

65

70

RTC 11/8/93

11/9/93

RTC

RTC 11/9/93

Field Bore Log

MWS-44-93 112

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Site ID MWS-44-93 Site Type Bore Well
RTC 11/9/93

Depth (ft)	Well Construction	Sample Type and Number	Sample Interval	Recovery (ft./ft.)	USCS Abbreviation	P.I.D.	Description - Soil Classification (Color, Texture, Structures, Moisture, Consistency, Comments)
70							
	2.0 / 2.0			11/8/93	CH		70.4 ft clay (90%); same as the 58.0-64.3 ft; moist; a 1/2 inch fresh-water limestone at 72.5 ft
75	75.90 ft on 11/9/93			Auger 2.0 / 2.0	CH		as above Top of sand/clay mix could reach up to 78.0 ft
80		Archive 81-83		Auger 2.0 / 2.0	CH		79.0 ft Wet sand/clay mix; not collectable; flow out of split spoon 79.7 ft
	End 11/8/93			2.0 / 2.0	CH		clay; very moist; as 70.4 - 79.0 ft but no limestone; trace 10% silt; 90% clay
85		83-85		2.0 / 2.0	CH		82.7 ft color change: 2.5Y 6/2 light brownish grey; moist 84.2 ft
							As above except: 10YR 5/3 brown; medium moist
90							85.0 ft TD at 85.0 ft on 11/8/93

* Geologist estimates SC for the 79.0 - 79.7 ft zone. This material was very soupy and easily flowed out of the brass sleeves when split spoon was removed from borehole.

Well Construction Log

MWS-112-93

Tooele Army Depot - South Area

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

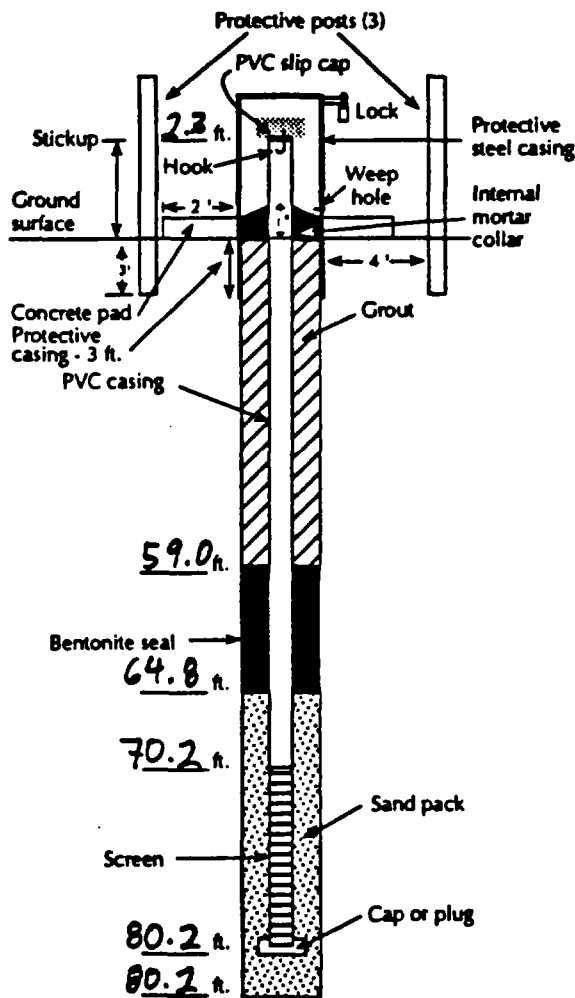
Project Tooele Task 3, Group 2 SWMUs

Well No. MWS-112-93

Field Geologist R.T. Canon

Installation Date 11/9/93 and 11/10/93

QA Checked by [Signature] 11/17/93



Bottom screen slot at 79.7 ft

Drilling Summary 85.0 ft w/ 4 1/4 inch I.D. augers
 Total depth 80.2 ft w/ 6 1/4 inch I.D. augers (ream)
 Borehole diameter 10 inches
 Drilling company ~~PG Exploration~~ Bayles Brothers
 Driller Jay Hulse rec 11/9/93
 Rig type Mobil B-57
 Method Hollow stem auger
 Air rotary
 Air rotary/driven casing
 Water rotary
 Mud rotary
 Other

Well Construction Materials
Grout
 Quantity 18 bags + one bentonite powder
 Type Portland Type I-II cement bag
Bentonite
 Pellet size 1/4 inch
 Quantity 4 - 4 1/2 gallon buckets
 Type Faldrill
Sand Pack
 Quantity eleven bags (50 lb each)
 Sand type and size Silica sand, 10-20 ✓

Screen
 Length 20' Other 9.5 ft
 I.D. 4" Other _____
 Slot size 0.010
 Type PVC
 Schedule (casing) 40 80
 Initial water level 75.9 ft on 11/9/93

Not to scale

Measuring point is from ground surface unless otherwise noted. Stickup is distance from top of casing to ground surface.

Comments 2 1/2 gallons Tooele approved water was poured down well on 11/9/93. PVC, sand pack, and bentonite seal installed on 11/9/93. Grout installed on 11/10/93.

Well Development Record Form

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Date: 11-13-93 → 11-16-93 Well Number: S-112-93

Site Geologist: Conrad J. Bienialis Equipment: pH, cond., temp.: CSI
(serial # 00363); turbidity: HF Scientific (serial # 3035); PVC bailer: 3' long 3" diam.

	Before	Reference Point	After
Depth to Water (ft.)	<u>76.41</u>	Top of PVC casing	<u>81.63</u>
Depth to Sediment (ft.)	<u>82.41</u>	Top of PVC casing	<u>82.52</u>
Thickness of Sediment (ft.)	<u>.29</u>		<u>.18</u>
Depth of Well (ft.)	<u>82.7</u>	Water Column Height (h) (ft.)	<u>6.00</u>
Diameter of Casing (C) (ft.)	<u>0.375 ± 0.003</u>	Diameter of Boring (B) (ft.)	<u>.833</u>
Casing Volume (gals.) = $\pi(C/2)^2(h)(7.48 \text{ gals/ft.}^3)$	<u>3.95</u>		
Well Volume (gals.) = $[\pi(B/2)^2 - \pi(C/2)^2](h)(0.30) + [\pi(C/2)^2h] \times 7.48$	<u>9.87</u>		
Total Volume Purged (gals.)	<u>51.85</u>	Casing/Well Volumes Purged	<u>5 / 5</u> (+ 2.5 gals)
(includes 2.5 gals added during well installation)			

	Time	pH	Temp. F	Conductivity (umhos)	Pump Rate (gpm)	Vol. of Water Removed (gal.)	Turbidity (NTUs)	Comments
11-13-93	1040	6.23	51.5	$.64 \times 10^3$	bailer	1.1	>200	Initial Sample
	1247	7.65	53.3	$.51 \times 10^3$	bailer	9.87	>200	1st Volume
11-14-93	0849	7.86	34.2	$.43 \times 10^3$	bailer	19.74	>200	2nd Volume
	1436	8.21	45.7	$.53 \times 10^3$	bailer	29.61	>200	3rd Volume
11-15-93	1030	5.70	47.0	$.60 \times 10^3$	bailer	39.48	>200	4th volume
11-16-93	0815	7.07	31.0	00.5×10^3	bailer	49.35	>200	5th volume

Notes Sampling Procedures:

11-13-93	1040 lt. brownish, milky	0815 lt brownish, milky
	1247 lt. brownish, milky	
11-14-93	0849 lt. brownish, milky	note: parameters show trend towards stabilization so that well can be considered developed after 5 volumes purged. Removed 2.5 gals more of water beyond 5
	1436 lt. brownish, milky	
11-15-93	1030 lt. brownish, milky	

$C^\circ = 5/9 (F^\circ - 32); F^\circ = 9/5 C^\circ + 32$

APPENDIX A3

Water Quality Field Data Sheets

Water Quality Field Data Sheet

Page 1 of 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-2 Date 11/13/93 Samplers J. Lane
Time Start 848 D. Hanzlick
Time Finish 1040

Well Information

Depth to Water 58.74 ft. Casing Diameter 4 in. = .33 ft. Casing Stickup 2.5 ft.
Well Depth 79.50 ft. Borehole Diameter 10 in. = .833 ft. Screened Interval 240 in. = 20 ft.
Sample Depth 20.4 ft. Well Volume 13,346 gal.
Calculation: Well volume = $\pi r^2 h (7.48)$
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Note: All depths measured from top of inner well casing

Field Equipment

Bailer PVC Size 3x36 in.
pH Meter CSI Serial No. 2645 Water Level Meter Selinist Serial No. 09986
E.C. Meter CSI Serial No. 2645 Turbidity HESI Serial No. 3921
Temperature Meter CSI Serial No. 2645

Sample Filtering

Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 7.00 @ 35 °F pH 10.00 = 10.00 @ 35 °F Time 848
Conductance Standard NA umhos/cm @ 25°C Reading umhos @ °C Time NA
Calibrated Conductivity NA umhos/cm @ 25°C mg/l @ NA

Time	Volume Removed		Temp. °F	Elec. Conductivity umhos/cm @ 25°C	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
850	0	0	37	0.63 x 10 ³	7.23	7200	Clear
939	13	1	46	0.74 x 10 ³	8.92	7200	Muddy
951	26	2	45.5	0.66 x 10 ³	7.26	7200	Muddy
1004	39	3	47.6	0.73 x 10 ³	7.99	7200	Muddy
1011	52	4	47.9	0.78 x 10 ³	8.09	7200	Muddy

C° = 5/9 (F°-32); F° = 9/5 C° + 32

Water Quality Field Data Sheet

Page 1 of 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-10 Date 11/13/93 Samplers J. Lane
Time Start 1110 D. Hanzlick
Time Finish 1330

Well Information

Depth to Water 66.81 ft. Casing Diameter 4 in. = .33 ft. Casing Stickup 2.5 ft.
Well Depth 91.62 ft. Borehole Diameter 10 in. = .833 ft. Screened Interval 240 in. = 20 ft.
Sample Depth 24.81 ft. Well Volume 16.70 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h (7.48)$
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

pH Meter CSI Serial No. 2645 Bailer PVC Size 3x36 in.
E.C. Meter CSI Serial No. 2645 Water Level Meter Hydro-Solinst Serial No. 09986
Turbidity H&Sci Serial No. 3921
Temperature Meter CSI Serial No. 2645

Sample Filtering Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 7.03 @ 52.8 °F pH 10.00 = 10.00 @ 52.8 °F Time 1119
Conductance Standard NA umhos/cm @ 25°C Reading umhos @ °C Time NA
Calibrated Conductivity NA umhos/cm @ 25°C mg/l @ NA

Time	Volume Removed		Temp. °F	Elec. Conductivity umhos/cm @ °C	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
1134	0	0	53	0.92×10^3	8.70	14.33	Clear
1153	16	1	53	0.68×10^3	8.46	>200	slightly cloudy
1214	32	2	52.1	0.69×10^3	8.38	>200	slightly cloudy
1230	48	3	51.6	0.69×10^3	8.24	>200	slightly cloudy
1251	64	4	50.1	0.63×10^3	8.23	145.5	clear
1310	80	5	50.0	0.71×10^3	8.35	>200	cloudy

C° = 5/9 (F° - 32); F° = 9/5 C° + 32

Water Quality Field Data Sheet

Page 1 of 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-50-90 Date 11-12-93 Samplers C. Bienialis
Time Start 0835 K. McClain
Time Finish 1010

Well Information

Depth to Water 63.38 ft. Casing Diameter 4 in. = .334 ft. Casing Stickup 2.4 ft.
Well Depth 69.96 ft. Borehole Diameter 10 in. = .833 ft. Screened Interval 120 in. = 10 ft.
Sample Depth 6.58 ft. Well Volume 4.297 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h$ (7.48)
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

Bailer PVC Size 3x36 in.
pH Meter CSI Serial No. 00363 Water Level Meter Selinst Serial No. 12635
E.C. Meter CSI Serial No. 00363 Turbidity HF Sci Serial No. 3035
Temperature Meter CSI Serial No. 00363

Sample Filtering

Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 7.0 @ 36.6 °F pH 10.00 = 10.09 @ 36.6 °F Time 0819
Conductance Standard 1000 umhos/cm @ 25°C Reading umhos @ °C Time 0819
Calibrated Conductivity 1000 umhos/cm @ 25°C mg/l @ 0819

Time	Volume Removed		Temp. °F	Elec. Conductivity umhos/cm @ °F	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
0835	1.1		42.4	.57 x 10 ³	7.70	51.5	v. sl. cloudy
0847	4.297	1	44.1	.52 x 10 ³	7.76	>200	lt. brownish, murky
0852	8.594	2	44.6	.54 x 10 ³	7.87	>200	lt. brownish, murky
0904	12.891	3	44.6	.54 x 10 ³	7.88	>200	lt. brownish, murky
0956	17.188	4	46.7	.57 x 10 ³	8.19	>200	lt. brownish, murky
Well purged dry after 3 rd volume - slow recharge.							
Began sampling after completion of 4 th purged volume since slow recharge and stable parameters							

C° = 5/9 (F°-32); F° = 9/5 C° + 32

Water Quality Field Data Sheet

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-51-90 Date 11/12/93 Samplers J. Lane
Time Start 1330 S. DeWitt
Time Finish 1445

Well Information

Depth to Water 58.71 ft. Casing Diameter 4 in. = .33 ft. Casing Stickup 2.5 ft.
Well Depth 67.52 ft. Borehole Diameter 10 in. = .83 ft. Screened Interval 120 in. = 10 ft.
Sample Depth 8.81 ft. Well Volume 5.75 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h (7.48)$
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

pH Meter CSI Serial No. 2645 Bailer PVC Size 3X36 in
E.C. Meter CSI Serial No. 2645 Water Level Meter Edinist Serial No. 09986
Turbidity HFSCI Serial No. 3921
Temperature Meter CSI Serial No. 2645

Sample Filtering Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 6.98 @ 44.7 °F pH 10.00 = 9.98 @ 48.7 °F Time 1325
Conductance Standard NA umhos/cm @ 25°C Reading umhos @ °C Time NA
Calibrated Conductivity NA umhos/cm @ 25°C mg/l @ NA

Time	Volume Removed		Temp. °F	Elec. Conductivity umhos/cm @ 25°C	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
1349	0	0	50.2	0.84 x 10 ³	8.83	8.55	Clear
1358	6	1	49.8	0.84 x 10 ³	8.25	7200	cloudy (Brown)
1405	12	2	50.6	0.80 x 10 ³	8.49	7200	cloudy (Brown)
1414	18	3	49.0	0.76 x 10 ³	8.00	7200	cloudy (Brown)
1427	24	4	48.1	0.75 x 10 ³	8.04	7200	cloudy (Brown)
1434	30	5	48.2	0.76 x 10 ³	7.97	7200	cloudy (Brown)

C° = 5/9 (F°-32); F° = 9/5 C° + 32

Water Quality Field Data Sheet

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-53-90 Date 11/12/93 Samplers J. Lane
Time Start 1515 S. DeWitt
Time Finish 1640

Well Information

Depth to Water 62.13 ft. Casing Diameter 4 in. = .33 ft. Casing Stickup 25 ft.
Well Depth 71.45 ft. Borehole Diameter 10 in. = .83 ft. Screened Interval 120 in. = 10 ft.
Sample Depth 9.32 ft. Well Volume 6.08 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h (7.48)$
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

pH Meter CSI Serial No. 2645 Bailer PVC Size 3x36 in.
E.C. Meter CSI Serial No. 2645 Water Level Meter Solinist Serial No. 09986
Turbidity HSci Serial No. 3921
Temperature Meter CSI Serial No. 2645

Sample Filtering

Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 7.00 @ 46 °F pH 10.00 = 10.09 @ 46 °F Time 1515
Conductance Standard NA umhos/cm @ 25°C Reading umhos @ °C Time NA
Calibrated Conductivity NA umhos/cm @ 25°C mg/l @ NA

Time	Volume Removed		Temp. °F	Elec. Conductivity umhos/cm @ 25°C	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
1541	0	0	45.2	1.26×10^3	8.92	48.3	clear
1547	6	1	46.1	1.26×10^3	8.54	>200	slightly cloudy
1552	12	2	46.5	1.32×10^3	8.37	>200	cloudy
1609	18	3	46.4	1.25×10^3	8.24	>200	cloudy brown
1623	24	4	46.4	1.25×10^3	8.37	>200	cloudy brown

C° = 5/9 (F°-32); F° = 9/5 C° + 32

Water Quality Field Data Sheet

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-61-90 Date 11/11/93 Samplers J. Lane
Time Start 910 C. Bieniculis
Time Finish 1145 K. McKaslin

Well Information

Depth to Water 90.35 ft. Casing Diameter 4 in. = .334 ft. Casing Stickup 2.5 ft.
Well Depth 99.50 ft. Borehole Diameter 10 in. = .833 ft. Screened Interval 120 in. = 10 ft.
Sample Depth 7.15 ft. Well Volume 5.98 gal. SSC 11/11/93

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h (7.48)$
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

Bailer PUC Size 3X36 in
pH Meter CSI Serial No. 00363 Water Level Meter Solinist Serial No. 12635
E.C. Meter CSI Serial No. 00363 Turbidity HFsci Serial No. 3035
Temperature Meter CSI Serial No. 00363

Sample Filtering Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 301 @ 46 ϕ pH 10.00 = 10.01 @ 46 ϕ Time 920
Conductance Standard NA umhos/cm @ 25°C Reading umhos @ °C Time NA
Calibrated Conductivity NA umhos/cm @ 25°C mg/l @ NA

Time	Volume Removed		Temp. ϕ	Elec. Conductivity umhos/cm @ 25°C	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
926	0	0	48.6	.38 x 10 ³	6.05	99.0	Slightly Cloudy
931	6	1	48.3	.39 x 10 ³	6.28	off scale	Slightly Muddy
950	12	2	46.0	.38 x 10 ³	7.13	147.2	Muddy
1124	18	3	50.1	.36 x 10 ³	7.76	2200	Muddy
*	24	4	Recovery slow; samples				
*	30	5	Obtained as soon as sufficient H ₂ O Available (USAEC, 1993)				

C° = 5/9 (F°-32); F° = 9/5 C° + 32

Water Quality Field Data Sheet

Page 1 of 1

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-62-90 Date 11-10-93 Samplers J. Lang
Time Start 1150 C. Bieniulis
Time Finish 11:00 1638 S. DeWitt

Well Information

Depth to Water 89.01 ft. Casing Diameter 4 in. = 334 ft. Casing Stickup 2.5 ft.
Well Depth 107.43 ft. Borehole Diameter 10 in. = 833 ft. Screened Interval 240 in. = 20 ft.
Sample Depth 18.42 ft. Well Volume 12.028 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h$ (7.48)
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

Bailer PVC Size 3x36 in
pH Meter CSI Serial No. 00365 2645 Water Level Meter Solinist Serial No. 12635
E.C. Meter EST Serial No. 00365 2645 Turbidity HF Sci Serial No. 3036
CS 11-10-93 Temperature Meter CSI Serial No. 00363

Sample Filtering Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 7.0 @ 59.0 °F pH 10.00 = 9.95 @ 59.0 °F Time 1152
Conductance Standard 1000 umhos/cm @ 25°C Reading umhos @ °C Time 1152
Calibrated Conductivity 1000 umhos/cm @ 25°C mg/l @ 1152

Time	Volume Removed		Temp. °F	Elec. Conductivity umhos/cm @ °F	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
1235	1.1	.09	55.4	.39 x 10 ³	8.71	.02	v. sl. cloudy
1247	2.028	1	53.3	.40 x 10 ³	8.80	>.02	lt. brown, sl. cloudy
1307	24.056	2	53.6	.39 x 10 ³	8.82	>.02	lt. brown, milky
1313	36.084	3	54.9	.38 x 10 ³	8.73	>.02	lt. brown, milky
1500	48.112	4	54.7	.42 x 10 ³	8.73	.02	lt. grayish, sl. cloudy
16H	60.140	5	54.9	.38 x 10 ³	8.71	.02	lt. grayish, sl. cloudy
well S-62-90 demonstrates parameter stability and reasonable clarity after 5 volumes of water purged. Sampling completed afterwards.							
note - turbidity meter readings are approx. - problems w/ meter							

C° = 5/9 (F°-32); F° = 9/5 C° + 32

A.3-7

60.140 gals is the calculated total volume removed - actual water removed was approximately 55 gallons - difference due to estimating the 12.028 gals/vol. within the drum during purging

Water Quality Field Data Sheet

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-63-90 Date 11-10-93 Samplers C. Bieniulis
Time Start 1059 11-10-93 J. Lane
Time Finish 0850 11-11-93 S. DeWitt

Well Information

Depth to Water 90.02 ft. Casing Diameter 4 in. = 334 ft. Casing Stickup 2.5 ft.
Well Depth 106.56 ft. Borehole Diameter 10 in. = 833 ft. Screened Interval 240 in. = 20 ft.
Sample Depth 16.54 ft. Well Volume 10.80 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h$ (7.48)
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

pH Meter CSI Serial No. 00363 Water Level Meter Solinst Serial No. 12635
E.C. Meter CSI Serial No. 00363 Turbidity HF Sci. Serial No. 3036
Temperature Meter CSI Serial No. 00363
Bailer PVC Size 3x36 in

Sample Filtering Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 7.0 @ 55 °F pH 10.00 = 10.0 @ 55 °F Time 1003
Conductance Standard 1000 umhos/cm @ 25°C Reading umhos @ °C Time 1003
Calibrated Conductivity 1000 umhos/cm @ 25°C mg/l @ 1003

Time	Volume Removed		Temp. °F	Elec. Conductivity umhos/cm @ °F	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
1059	1.1	.10	54.9	.30 x 10 ³	6.76	.02	H. grayish, sl. cloudy
1110	10.8	1	55.5	.30 x 10 ³	6.93	.02	H. grayish, sl. cloudy
1125	21.6	2	54.9	.30 x 10 ³	7.36	>.03	H. brownish, sl. murky
1257	32.4	3	54.3	.30 x 10 ³	7.60	.02	v. sl. cloudy
1547	43.2	4	53.1	.30 x 10 ³	7.80	.02	H. grayish, sl. cloudy
0839	54.0	5	47.3	.33 x 10 ³	6.39	>.00	brown, cloudy
Since well has bailed dry between the 2nd & 3rd, 3rd & 4th, and 4th & 5th volumes, samples were obtained as soon as sufficient water was available after purging for volumes despite instability of parameters.							

C° = 5/9 (F°-32); F° = 9/5 C° + 32

note - turbidity meter readings are approx. - problems w/ meter A.3-8

Water Quality Field Data Sheet

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. 5-108-93 Date 12/3/93 Samplers J. Lane
Time Start 850 K. Mc Kaslin
Time Finish 1130

Well Information

Depth to Water 55.76 ft. Casing Diameter 4 in. = ft. Casing Stickup 2.5 ft.
Well Depth 78.92 ft. Borehole Diameter 4 in. = ft. Screened Interval in. = 10 ft.
Sample Depth 19.96 ft. Well Volume 12.77 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h (0.48)$
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

pH Meter Hydac Serial No. 9209B Bailer 1.1 gal PVC Size JX36 in
E.C. Meter Hydac Serial No. 9209B Water Level Meter Solinst Serial No. 09986
Turbidity HFI Serial No. 3035
Temperature Meter Hydac Serial No. 9209B

Sample Filtering Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 6.96 @ 42.9 °F pH 10.00 = 9.98 @ 42.9 °F Time 850
Conductance Standard NA umhos/cm @ 25°C Reading umhos @ °C Time NA
Calibrated Conductivity NA umhos/cm @ 25°C mg/l @ °C

Time	Volume Removed		Temp. °F	Elec. Conductivity umhos/cm @ 25°C	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
949	0	0	35	0.54 x 10 ³	8.75	109.3	Cloudy
1003	13	1	34	0.57 x 10 ³	8.31	>200	Cloudy Brown
1027	26	2	34.5	0.56 x 10 ³	8.12	>200	Cloudy Brown
1040	39	3	32.1	0.59 x 10 ³	8.14	>200	Cloudy Brown
1054	52	4	41.3	0.52 x 10 ³	8.27	>200	Cloudy Brown
1114	65	5	45.4	0.63 x 10 ³	8.26	>200	Cloudy Brown

C° = 5/9 (F°-32); F° = 9/5 C° + 32

Water Quality Field Data Sheet

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. 5-109-93 Date 12/2/93 Samplers J. Lane
Time Start 1515 K. McKaslin
Time Finish 1630

Well Information

Depth to Water 66.17 ft. Casing Diameter 4 in. = ___ ft. Casing Stickup 2.5 ft.
Well Depth 74.08 ft. Borehole Diameter 10 in. = ___ ft. Screened Interval ___ in. = 10 ft.
Sample Depth 7.91 ft. Well Volume 5.14 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h (7.48)$
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

pH Meter Hydac Serial No. 9209B Bailer 1.1 gal PVC Size JK56 in
E.C. Meter Hydac Serial No. 9209B Water Level Meter Solinst Serial No. 09986
Turbidity HFI Serial No. 3035
Temperature Meter Hydac Serial No. 9209B

Sample Filtering Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 6.99 @ 40.1 °F pH 10.00 = 9.96 @ 40.1 °F Time 1515
Conductance Standard NA umhos/cm @ 25°C Reading umhos @ °C Time NA
Calibrated Conductivity NA umhos/cm @ 25°C mg/l @ NA

Time	Volume Removed		Temp. °C	Elec. Conductivity umhos/cm @ 25°C	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
1536	0	0	41.7	0.41 x 10 ³	8.66	21.0	Clear
1539	5	1	43.9	0.43 x 10 ³	8.26	7200	Muddy
1543	10	2	44.7	0.40 x 10 ³	8.04	7200	Muddy
1549	15	3	42.2	0.41 x 10 ³	8.14	7200	Muddy
*	20	4		226		226	12/2/93
*	25	5		12/2/93			
*	Well Bailed			Dry after		3 volumes	

C° = 5/9 (F° - 32); F° = 9/5 C° + 32

Water Quality Field Data Sheet

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-110-93 Date 12/21/93 Samplers J. Lane
Time Start 840 K. McKaslin
Time Finish 1045

Well Information

Depth to Water 73.75 ft. Casing Diameter 4 in. = ft. Casing Stickup 2.5 ft.
Well Depth 85.42 ft. Borehole Diameter 10 in. = ft. Screened Interval in. = 10 ft.
Sample Depth 11.61 ft. Well Volume 7.59 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h (7.48)$
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

pH Meter Hydac Serial No. 9209B Bailer 1.1 gal PVC Size JK56 in
E.C. Meter Hydac Serial No. 9209B Water Level Meter Solinst Serial No. 09986
Turbidity HFI Serial No. 3035
Temperature Meter Hydac Serial No. 9209B

Sample Filtering Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 7.00 @ 36.1 F pH 10.00 = 10.07 @ 36.1 F Time 840
Conductance Standard NA umhos/cm @ 25°C Reading umhos @ °C Time NA
Calibrated Conductivity NA umhos/cm @ 25°C mg/l @ °C

Time	Volume Removed		Temp. °C	Elec. Conductivity umhos/cm @ 25°C	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
911	0	0	40.6	0.27×10^3	8.81	81.1	clear
921	8	1	39.6	0.47×10^3	8.54	>200	cloudy brown
930	16	2	42.1	0.53×10^3	8.26	>200	cloudy brown
943	24	3	42.0	0.50×10^3	8.22	>200	cloudy brown
954	32	4	40.1	0.49×10^3	7.81	>200	cloudy brown
1005	40	5	40.2	0.48×10^3	8.07	>200	cloudy brown

C° = 5/9 (F°-32); F° = 9/5 C° + 32

Water Quality Field Data Sheet

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-111-93 Date 12/2/93 Samplers J. Lane
Time Start 1230 K. Mc Kaslin
Time Finish 1400

Well Information

Depth to Water 67.42 ft. Casing Diameter 4 in. = ft. Casing Stickup 2.5 ft.
Well Depth 74.31 ft. Borehole Diameter 10 in. = ft. Screened Interval in. = 10 ft.
Sample Depth 6.89 ft. Well Volume 4.48 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h$ (7.48)
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

Bailer 1.1 gal PVC Size JX56 in
pH Meter Hydac Serial No. 9209B Water Level Meter Solinst Serial No. 09986
E.C. Meter Hydac Serial No. 9209B Turbidity HFI Serial No. 3035
Temperature Meter Hydac Serial No. 9209B

Sample Filtering Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 7.03 @ 45 °F pH 10.00 = 9.94 @ 45 °F Time 1230
Conductance Standard NA umhos/cm @ 25°C Reading umhos @ °C Time NA
Calibrated Conductivity NA umhos/cm @ 25°C mg/l @ °C

Time	Volume Removed		Temp. °C	Elec. Conductivity umhos/cm @ 25°C	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
1305	0	0	44.6	0.57 x 10 ³	8.53	185.6	cloudy
1310	5	1	44.6	0.54 x 10 ³	8.31	7200	muddy
1315	10	2	44.2	0.61 x 10 ³	8.26	>200	Muddy
1320	15	3	44.7	0.49 x 10 ³	8.16	>200	Muddy
1325	20	4	45.0	0.53 x 10 ³	8.01	>200	Muddy
1330	25	5	43.9	0.50 x 10 ³	7.97	>200	Muddy

C° = 5/9 (F°-32); F° = 9/5 C° + 32

Water Quality Field Data Sheet

Tooele Army Depot - South Area
Task 3 Group 2 SWMUs

Ebasco Environmental
143 Union Blvd., Ste. 1010
Lakewood, Colorado 80228

Well No. S-112-93 Date 12/1/93 Samplers J. Lane
Time Start 1000 K. McKaslin
Time Finish 1650 C. Bieniulis

Well Information

Depth to Water 76.76 ft. Casing Diameter 4 in. = ft. Casing Stickup 2.5 ft.
Well Depth 82.56 ft. Borehole Diameter 10 in. = ft. Screened Interval in. = 10 ft.
Sample Depth 5.80 ft. Well Volume 3.77 gal.

Note: All depths measured from top of inner well casing

Calculation: Well volume = $\pi r^2 h (7.48)$
Where r = Casing radius in ft.
h = Well depth - depth to water in ft.
Volume in well casing and saturated annulus

Field Equipment

pH Meter Hydac Serial No. 9209B Bailer 36" x 3" PVC Size 36 x 3 in
°E.C. Meter Hydac Serial No. 9209B Water Level Meter Solimit Serial No. 07986
Turbidity HEI Serial No. 3035
Temperature Meter Hydac Serial No. 7209B

Sample Filtering Pump NA Serial No. NA
Pumping Rate NA gal/min Filter Apparatus NA Filters NA

Field Chemistry

Calibration pH 7.00 = 6.96 @ 36.2 F pH 10.00 = 9.99 @ 36.2 F Time 1000
Conductance Standard NA umhos/cm @ 25°C Reading umhos @ °C Time NA
Calibrated Conductivity NA umhos/cm @ 25°C mg/l @ NA

Time	Volume Removed		Temp. °C	Elec. Conductivity umhos/cm @ 25°C	pH	Turbidity N.T.U.	Physical Characteristics
	Gals	Csng Vols					
1450	0	0	45.6	0.56×10^3	8.76	29.0	initial sample clear
1454	4	1	47.2	0.49×10^3	8.72	> 200	1st volume clear
1507	8	2	44.1	0.53×10^3	8.59	> 200	muddy

C° = 5/9 (F° - 32); F° = 9/5 C° + 32

APPENDIX A4

Geotechnical Test Results

March 29, 1994

Enserch Environmental
143 Union Boulevard
Suite 1010
Lakewood, Colorado 80228

Attention: Ms. Pamela Moss

Subject: Laboratory Test Results, Tooele Army Depot

Job No. 1 137 94

Dear Ms. Moss:

We have completed some of the testing you requested for the subject project. Four permeability tests, four effective porosity tests, and four cation exchange capacity tests remain to be performed. The results of the total organic carbon, cation exchange capacity, and pH tests are given in the enclosed Table I and the results of the moisture content, density, Atterberg limits, and the unified soils classifications are given in the enclosed Table II. Table III contains the results of the effective porosity tests as well as the calculated total porosities for reference. Table IV contains the results of the permeability tests, and Table V contains the results of the grain size analysis. The results of the grain size analysis are also presented graphically in figures 1 through 11. I am also enclosing two copies of the laboratory work sheets and a diskette with the data in ASCII format. The chain-of-custody forms have been returned under separate cover.

In some cases the samples were too loose to extract from the liners intact to place them in the permeameter cell or measure them for the density test in these cases the samples were weighed and measured in the liners and then dried for the moisture content or extracted directly in the membrane of the permeameter.

Thank you for this opportunity to assist you with your testing needs. Please call if you have any questions regarding this project.

Sincerely,
HUNTINGDON ENGINEERING AND ENVIRONMENTAL



Samuel D. Urton, E.I.T.
Laboratory Manager

SDU/sdu
enclosures

A.4-1

**TABLE I
CHEMICAL TEST RESULTS**

**ENSERCH ENVIRONMENTAL, TOOELE ARMY DEPOT
March 29, 1994**

Hole No.	Depth (ft.)	Sample No.	Total Organic Carbon	Cation Exchange Capacity (meq/100g)	pH
8 BK 1	1 - 3	SGT 001	0.14	15	9.15
8 BK 2	2 - 3	SGT 005	0.19		9.34
30 OSA 1	1.5 - 3	SGT 008	0.46	24/25	8.16
30 OSA 2	2 - 3	SGT 012	0.35	23	8.74
30 OSA 3	2 - 3	SGT 015	0.31		9.49
31 BK 1	0 - 0.2	SGT 016	1.75		8.76
31 BK 1	1 - 3	SGT 017	0.26	19	9.67
31 BK 2	1 - 2.5	SGT 021	0.28	12	9.19
5 BK 1	1.5 - 3	SGT 024	0.41		9.61
5 BK 2	1.5 - 3	SGT 028	0.33		8.96
5 BLD 17	2 - 3	SGT 032	0.48		8.73
MWS 109 93	72 - 73	SGT 038	0.052		8.94
MWS 110 93	67.5 - 68	SGT 041	0.053/0.053		7.92
MWS 111 93	72.5 - 73	SGT 046	0.07	23	8.68
3 BK 2	2 - 2.5	S8092	0.21	27/102%	8.70
3 BK 2	2.5 - 3	S8096	0.27	18	7.80
9 BK 1	2 - 3	S8150	0.29/0.29	18	8.43
9 BK 2	0 - 2	S8152	0.81		7.78
05 MW S 108 93	69 - 71	S9512	0.06/0.06	14	8.78

**TABLE II
PHYSICAL PROPERTIES TEST RESULTS**

**ENSERCH ENVIRONMENTAL, TOOELE ARMY DEPOT
JOB NO. 1 137 94**

March 29, 1994

Hole No.	Depth (ft)	Sample No.	Moisture Content (%)	Density (pcf)	Liquid Limit	Plasticity Index	Unified Classification
8 BK 1	1 - 3	SGT 002	9.1	83	41	20	CL
8 BK 2	1 - 3	SGT 006	10.1	91	28	10	CL
30 OSA 1	1.5 - 3	SGT 009	25.2	81	42	21	CL
30 OSA 2	2 - 3	SGT 013	24.0	92	43	22	CL
31 BK 1	1 - 3	SGT 018	6.6	73	27	7	ML-CL
31 BK 2	1 - 2.5	SGT 022	4.3	95	34	11	GC
5 BK 1	1.5 - 3	SGT 025	20.1	81	25	3	ML
5 BK 2	1.5 - 3	SGT 029	13.8	98	38	20	CL
5 BLD 17	2 - 3	SGT 033	17.4	79	28	6	ML-CL
MWS 109 93	69 - 70	SGT 037	33.9	92	38	19	CL
MWS 109 93	70 - 71	SGT 037	46.6	76	42	23	CL
MWS 110 93	67 - 67.5	SGT 041	26.5	96	41	24	CL

A.4-3

**TABLE II
PHYSICAL PROPERTIES TEST RESULTS**

**ENSERCH ENVIRONMENTAL, TOOELE ARMY DEPOT
JOB NO. 1 137 94**

March 29, 1994

Hole No.	Depth (ft)	Sample No.	Moisture Content (%)	Density (pcf)	Liquid Limit	Plasticity Index	Unified Classification
MWS 110 93	67.5 - 68	SGT 041	30.0	96	38	23	CL
MWS 110 93	68 - 68.5	SGT 041	24.4	103	32	16	CL
MWS 111 93	70 - 70.5	SGT 043	35.6	89	37	20	CL
MWS 111 93	70.5 - 71	SGT 043	38.5	86	38	24	CL
MWS 111 93	71 - 71.5	SGT 043	31.7	93	36	19	CL
3 BK 1	0 - 1.5	S 8093	5.8	93	35	18	CL
3 BK 2	0.5 - 2	S8097	8.5	92	52	30	CL
9 BK 1	0.5 - 2	S 8151	12.7	85	25	5	SM-SC
05 MW S 108 93	72.5 - 73	S 9513	20.7	103	34	18	CL

A.4-4

TABLE III
EFFECTIVE POROSITY TEST RESULTS

ENSERCH ENVIRONMENTAL, TOOELE ARMY DEPOT
March 29, 1994

Site Identification	Depth (ft)	Sample No.	Effective Consolidation Pressure (psi)	Total Porosity (%)	Effective Porosity (%)
9-BK-1	0.5	S8153	3.0	38.1	9.7
8-BK-1	1-3	SGT004	3.0	49.4	13.2
30-OSA-1	1.5-3	SGT011	3.0	45.5	10.4
31-BK-1	1-3	SGT020	3.0	47.5	28.9
5-BK-1	1.5-3	SGT026	3.0	50.3	27.6
5-BK-2	1.5-3	SGT030	3.0	42.2	26.9
3-BK-1	0.5-1	SG094	3.0	38.5	24.5

TABLE IV
PERMEABILITY RESULTS

ENSERCH ENVIRONMENTAL, TOOELE ARMY DEPOT
Job No. 1 137 94
March 29, 1994

Hole No.	Depth (ft)	Sample No.	Initial Moisture Content (%)	Initial Dry Density (pcf)	Init. Wet Density (pcf)	B-Parameter After Saturation	Effective Consolidation Pressure (psi)	Final Moisture Content (%)	Final Dry Density (pcf)	Least Hydraulic Gradient	Greatest Hydraulic Gradient	Coefficient of Permeability (cm/sec)
9-BK-1	0.5	S8153	15.8	102	118	97	3.0	23.2	102	3.9	8.9	7.4×10^{-5}
3-BK-2	1-1.5	S8118	13.5	75	85	95	3.0	29.4	94	5.8	26.4	9.7×10^{-6}
3-BK-1	0.5-1	SG094	6.3	95	101	97	3.0	23.2	103	2.5	15.4	2.4×10^{-4}
8-BK-1	1-3	SGT004	8.5	91	99	96	3.0	36.4	85	7.6	9.0	2.6×10^{-5}
8-BK-2	2-3	SGT007	8.9	85	93	96	3.0	32.3	88	8.8	21.0	1.1×10^{-6}
30-OSA-1	1.5-3	SGT011	24.0	95	118	98	3.0	30.6	93	1.7	2.9	9.4×10^{-5}
30-OSA-2	2-3	SGT014	26.1	92	116	98	3.0	35.6	86	10.7	29.5	1.4×10^{-6}
31-BK-1	1-3	SGT020	8.1	81	88	97	3.0	33.7	88	3.9	13.0	2.5×10^{-5}
31-BK-2	1-2.5	SGT023	2.8	107	110	99	3.0	15.4	119	3.7	27.7	1.9×10^{-5}
5-BK-1	1.5-3	SGT026	13.9	78	88	96	3.0	37.8	83	0.8	1.9	5.3×10^{-4}
5-BK-2	1.5-3	SGT030	25.9	97	122	98	3.0	26.9	98	2.7	4.4	6.9×10^{-6}
5-BLD-17	2-3	SGT034	19.8	92	110	95	3.0	31.5	91	3.1	7.8	2.0×10^{-5}

A.4-6

TABLE V
GRADATION TEST RESULTS

ENSERCH ENVIRONMENTAL, TOOELE ARMY DEPOT
JOB NO. 1 678 93

March 29, 1994

Site Identification/ Depth (ft.)	% PASSING MECHANICAL SIEVE										HYDROMETER DATA													
	1 1/2"	3/4"	3/8"	No. 4	No. 10	No. 16	No. 30	No. 50	No. 100	No. 200	Part Diam (mm)	% Pass	Part Diam (mm)	% Pass	Part Diam (mm)	% Pass	Part Diam (mm)	% Pass	Part Diam (mm)	% Pass	Part Diam (mm)	% Pass	Part Diam (mm)	% Pass
8 BK 1 1 - 3								100	100	100	0.052	93	0.038	88	0.021	71	0.010	46	0.006	36	0.002	23	0.001	17
8 BK 2 1 - 3					100	100	100	99	95	95	0.054	85	0.041	73	0.022	58	0.011	38	0.006	30	0.002	19	0.001	15
30 OSA 1 1.5 - 3							100	100	100	100	0.051	97	0.037	95	0.017	93	0.009	86	0.005	73	0.002	54	0.001	41
30 OSA 2 2 - 3								100	100	99	0.052	97	0.038	93	0.017	88	0.008	78	0.005	69	0.002	46	0.001	34
31 BK 1 1 - 3						100	100	100	99	97	0.056	87	0.042	72	0.022	61	0.011	40	0.004	26	0.002	13	0.001	9
31 BK 2 1 - 2.5	100	88	75	56	46	44	42	40	37	34	0.060	30	0.044	24	0.023	16	0.011	10	0.006	7	0.003	4	0.001	3
5 BK 1 1.5 - 3				100	100	100	99	97	90	78	0.069	43	0.046	39			0.010	29	0.006	23	0.002	15	0.001	9
5 BK 2 1.5 - 3					100	100	99	99	94	83	0.055	82	0.042	65	0.022	55	0.010	49	0.006	41	0.002	33	0.001	24
5 BLD 17 2 - 3					100	100	100	100	99	95	0.054	88	0.040	80	0.021	65	0.010	51	0.006	40	0.002	24	0.001	15
MWS 109 93 69 - 70					100	100	100	100	100	97	0.054	88	0.039	82	0.021	63	0.010	53	0.006	39	0.002	26	0.001	15
MWS 109 93 70 - 71					100	100	99	98	98	96	0.053	90	0.039	80	0.020	72	0.009	60	0.006	55	0.002	38	0.001	25
MWS 111 93 70 - 70.5								100	100	97	0.055	84	0.040	79	0.017	68	0.010	59	0.006	49	0.002	32	0.001	26

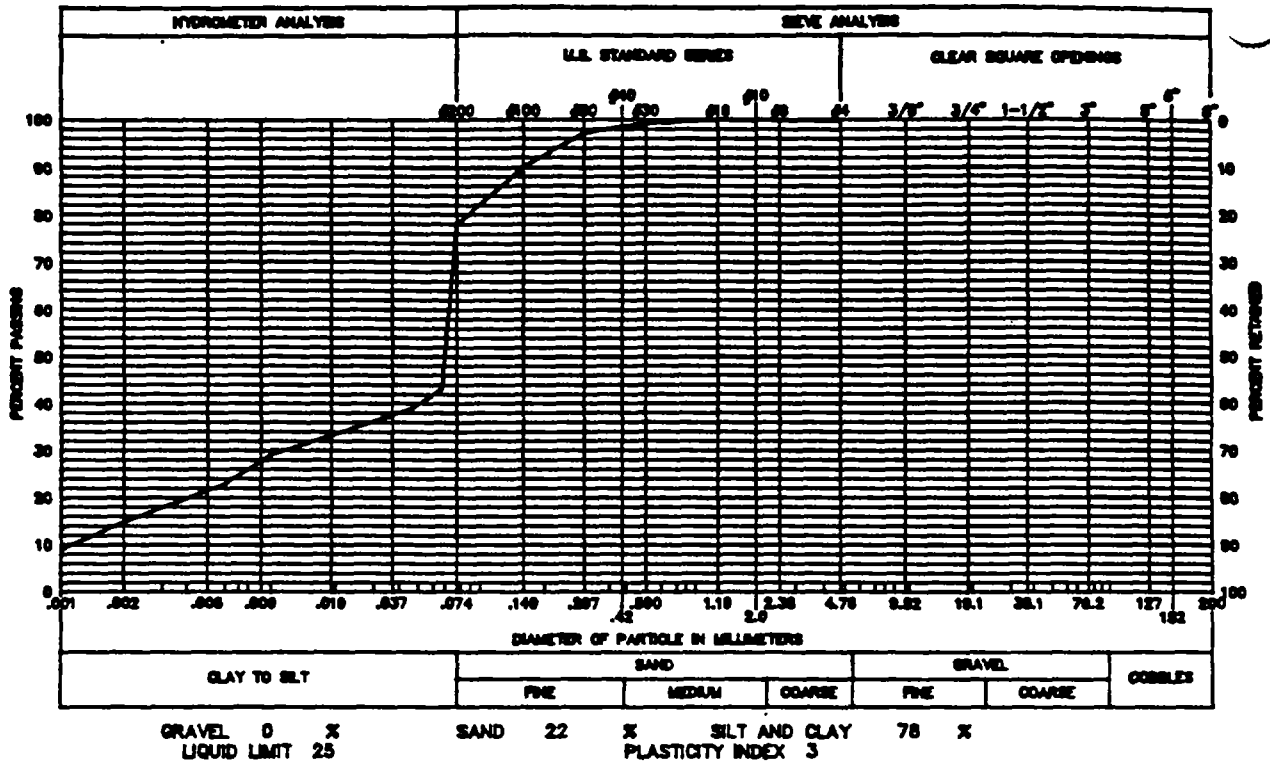
A.4-7

TABLE V
GRADATION TEST RESULTS
ENSERCH ENVIRONMENTAL, TOOELE ARMY DEPOT
JOB NO. 1 678 93

March 29, 1994

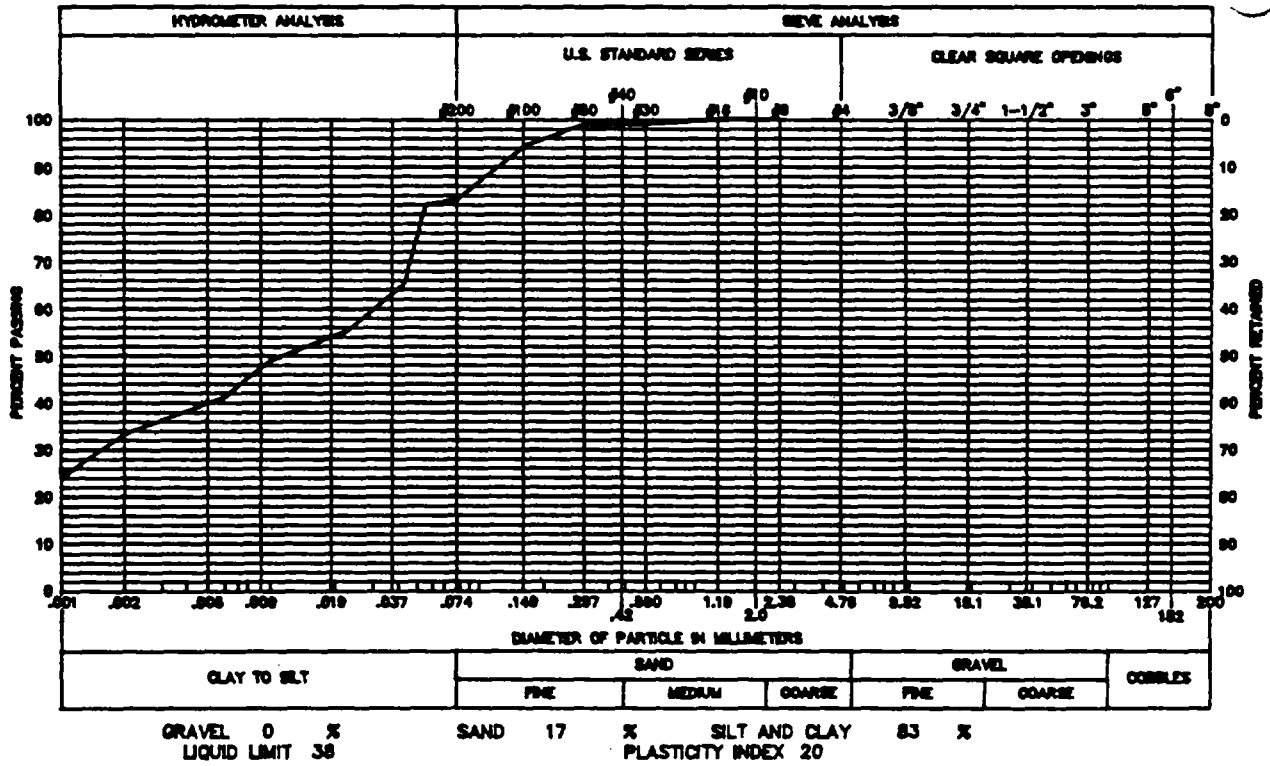
Site Identification/ Depth (ft.)	% PASSING MECHANICAL SIEVE										HYDROMETER DATA													
	1 1/2"	3/4"	3/8"	No. 4	No. 10	No. 16	No. 30	No. 50	No. 100	No. 200	Part Diam (mm)	% Pass	Part Diam (mm)	% Pass	Part Diam (mm)	% Pass	Part Diam (mm)	% Pass	Part Diam (mm)	% Pass	Part Diam (mm)	% Pass	Part Diam (mm)	% Pass
MWS 111 93 70.5 - 71						100	100	100	100	96	0.055	83	0.041	73	0.022	60	0.010	48	0.006	36	0.002	26	0.001	21
MWS 111 93 71 - 71.5						100	100	100	100	95	0.055	84	0.040	77	0.021	69	0.010	57	0.006	44	0.002	28	0.001	22
MWS 110 93 68 - 68.5						100	100	100	100	99	0.054	88	0.040	78	0.021	67	0.010	57	0.006	45	0.002	34	0.001	24
MWS 110 93 67.5 - 68						100	100	100	100	99			0.039	83	0.020	77	0.010	63	0.006	56	0.002	42	0.001	29
MWS 110 93 67 - 67.5						100	100	100	100	99	0.053	92	0.040	77	0.021	66	0.010	60	0.006	51	0.002	38	0.001	26
3 BK 1 0 - 1.5						100	100	100	99	97	0.059	70	0.043	62	0.023	47	0.011	37	0.006	29	0.003	17	0.001	11
3 BK 2 0.5 - 2						100	100	100	100	98	0.054	86	0.040	78	0.021	67	0.010	56	0.006	48	0.002	36	0.001	29
9 BK 1 0.5 - 2	100	85	81	80	67	63	62	60	55	49	0.062	37	0.045	31	0.021	22	0.011	15	0.006	14	0.003	6	0.001	4
05 MWS 108 93 69 - 71						100	100	100	99	96	0.056	81	0.040	75	0.021	67	0.010	52	0.006	37	0.002	22	0.001	15

A.4-8



SAMPLE OF SANDY SILT

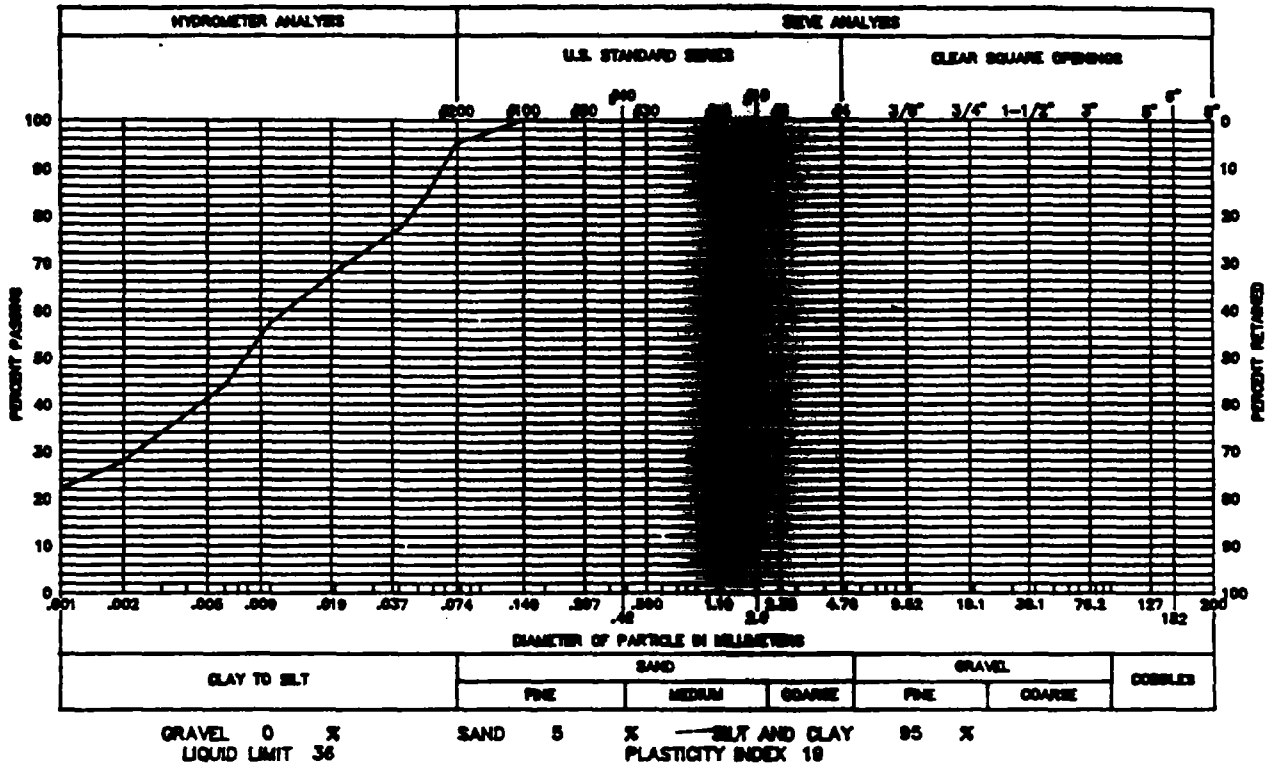
FROM HOLE 5-BK-1 AT DEPTH 1.5-3 ft.



SAMPLE OF SANDY CLAY

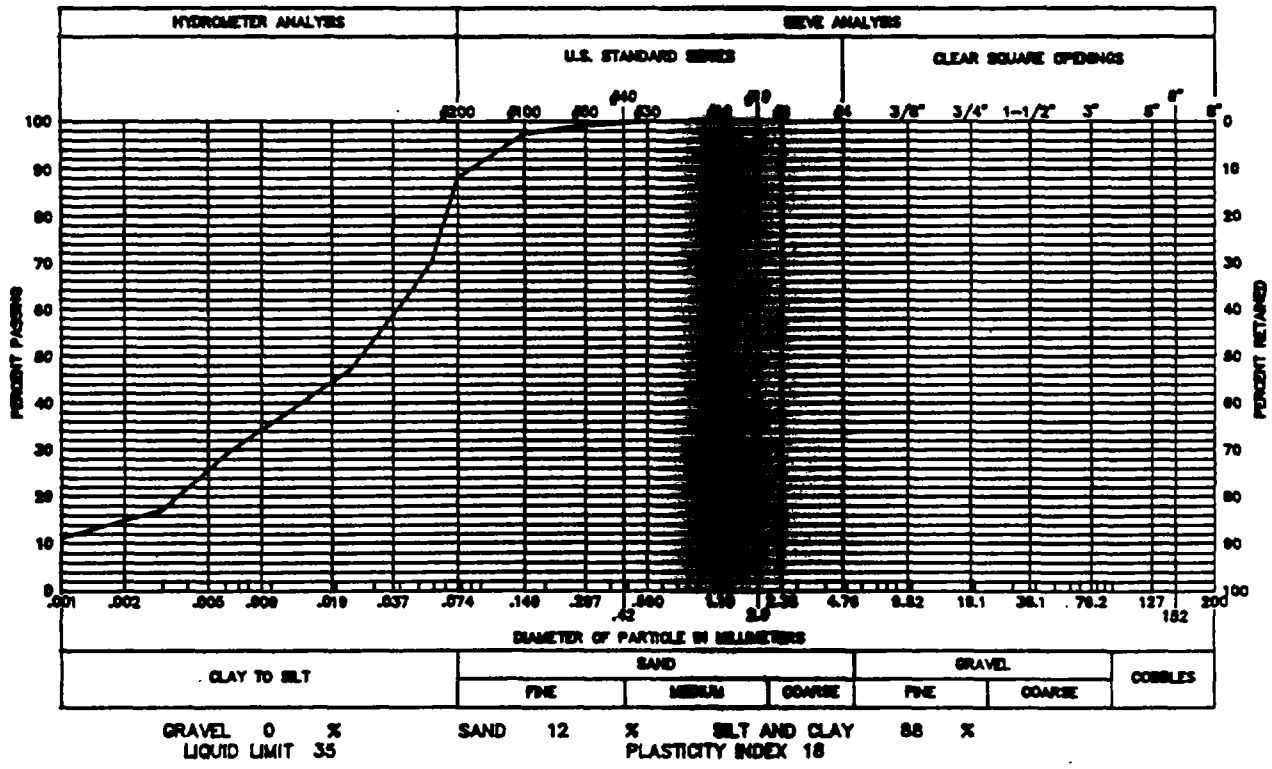
A.4-12

FROM HOLE 5-BK-2 AT DEPTH 1.5-3 ft.



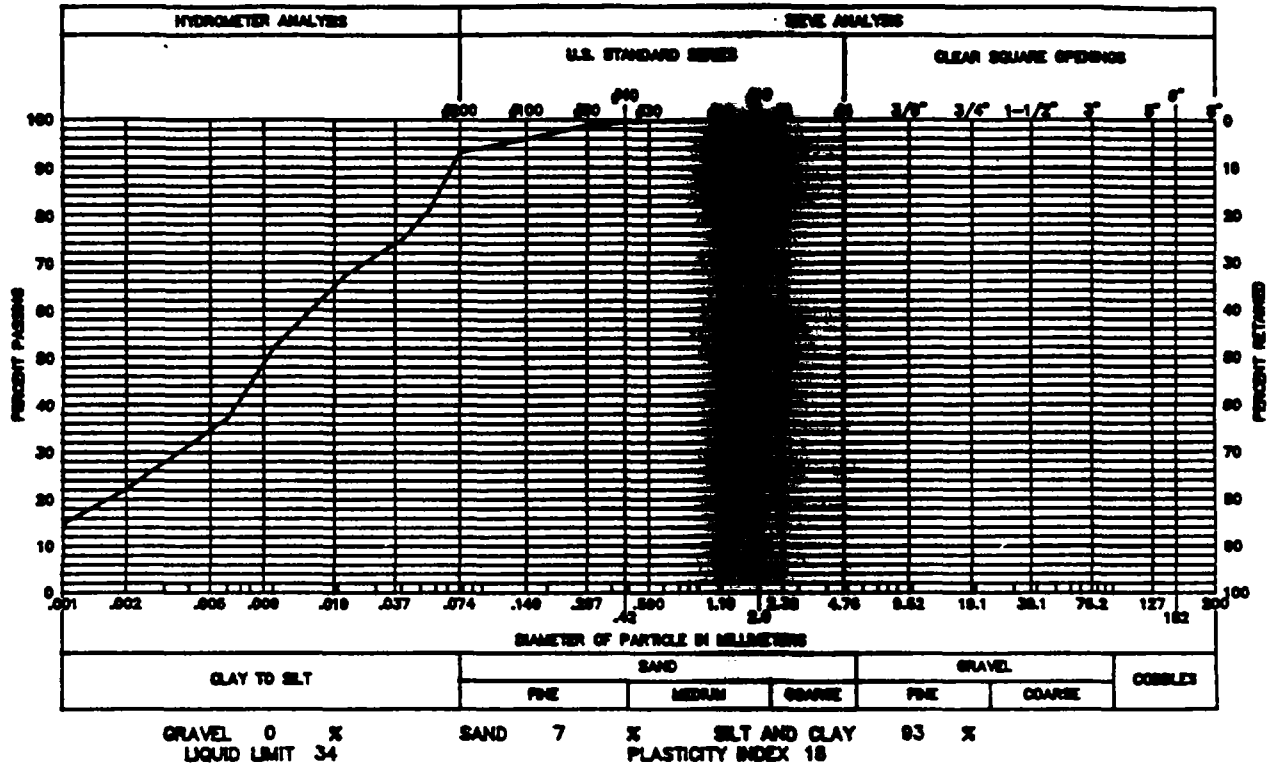
SAMPLE OF SLIGHTLY SANDY CLAY

FROM HOLE 111-83 AT DEPTH 71-71.5 ft.



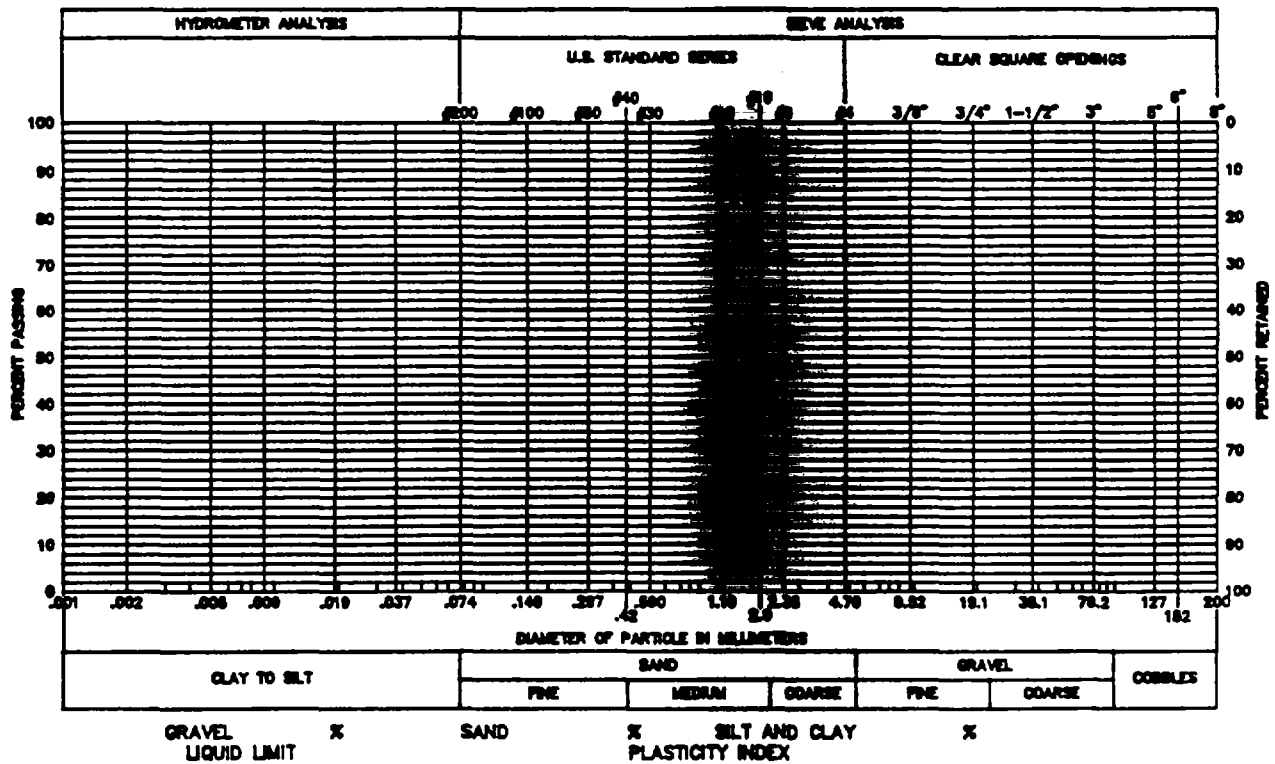
SAMPLE OF SLIGHTLY SANDY CLAY

FROM HOLE 3-BK-1 AT DEPTH 0-1.5 ft.



SAMPLE OF SLIGHTLY SANDY CLAY

FROM HOLE 06-MWS-108-93 AT DEPTH 69-71 ft.



SAMPLE OF

FROM

CENTRAL POLYMER, INC.
TRIAxIAL SATURATION
 WORKSHEET

JOB NO. 113794 PART NO. _____ RUN BY F.D DATE _____
 JOB NAME EPASCO, TOOLE CKED. BY SU

HOLE NO. 31-BK-1 DEPTH 1-3 SAMPLE NO. 5972 STAGE NO. N/A
 CELL NO. 11
 EFFECTIVE CONSOLIDATION STRESS, 3.0 psi

DATE	TIME	REMARKS	CHAMBER BURETTE			SAMPLE BURETTE				
			PRES. psi	BURETTE READING cm	SAMP. VOL. Δ cm ³	CAP		PEDESTAL		SAM VOL Δ cm ³
						PRES. psi	READ. cm	PRES. psi	READ. cm	
2-3	11:20	Set; CP+B.D. R	5.5	70.0		5.0	74.0	5.0	72.0	
	15:10	R	-	74.0		"	75.0	"	71.0	
2-4	8:10	R	10.5	61.0		15.0	57.0	15.0	61.0	
	8:10	R	"	68.0		"	57.0	"	63.0	
		Raise CP+B.D. P+R	15.5	68.0		15.0	57.0	15.0	61.0	
	13:20	R	"	77.0		"	60.0	"	61.0	
		Raise CP+B.D. P+R	20.5	70.0		20.0	57.0	20.0	61.0	
	9:30	R	"	70.0		"	57.0	"	69.0	
2-7		B: 22.2 → 32.2 ; 21.0 → 26.7		B = 52						
	9:05	Raise CP+B.D. B+R	25.5	118		25.0	57.0	25.0	67.0	
	10:30	R	"	185		"	56.0	"	63.5	
	10:30	Raise CP+B.D. B+R	30.5	78.0		30.0	56.0	30.0	63.0	
5-8	8:10	R	"	62.7		"	54.0	"	65.0	
		B: 33.0 → 43.0 ; 31.0 → 31.0		B = 58						
	9:20	Raise CP+B.D. B+R	35.5	63.0		35.0	63.0	35.0	65.0	
	9:20	R	"	53.0		"	51.0	"	62.0	
		B: 38.1 → 48.1 ; 36.3 → 42.3		B = 66						
	8:50	Raise CP+B.D. P+R	40.5	52.5		40.0	53.0	40.0	49.0	
2-11	9:10	R	"	41.5		"	42.0	"	40.0	
	9:50	Raise CP+B.D. B+R	45.5	34.0		45.0	23.0	45.0	44.0	
2-11	1:00	R	"	27.2		27.0	27.5	27.0	26.0	
		B: 48.1 → 58.1 ; 47.0 → 46.7		B = 97						

FINAL 'B' PARAMETER: 97 CHAMBER BURETTE 'K' _____ cm³/cm
 TOTAL TIME TO SATURATE: _____ SAMPLE BURETTE 'K' _____ cm³/cm
 TOTAL SAMPLE VOLUME CHANGE FROM CHAMBER BURETTE _____ cm³
 TOTAL SAMPLE VOLUME CHANGE FROM SAMPLE BURETTE _____ cm³

JOB NO. 113794 PART NO. _____
 JOB NAME EBASCO, TONLE

Chen Northern, Inc.
TRIAxIAL PERMEABILITY

RUN BY F.D DATE _____
 CALC. BY SU/DG CKED. BY SU

HOLE NO. 31-BK-1 DEPTH 1-3 SAMPLE NO. 24 T020 SAMPLE TYPE 1.1.1.1 CELL NO. 1/1 EFF. 0.2 2.0 psi
 SAMPLE AREA, "A" ln² = 25.748⁶³ cm² FINAL SAMPLE LENGTH, "L" ln = 6.147 cm BURET AREA, "a" .308 cm²

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD, cm				WATER HEAD ₂ PED-CAP = HEAD, cm				TOTAL HEAD, cm 1+2	Log $\frac{h_1}{h_2}$ $\frac{\log}{\Delta t}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \log \frac{h_1}{h_2} = k, \frac{cm}{sec}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ			
F.D	2-15	13:39	—	48.0		44.5	45.5	1.0	70.32	3.2	/	71.0	/		—	
"	"	14:04	—	"		"	"	"	"	46.5	/	71.0	/		—	
"	"	14:07	—	"		"	"	"	"	47.7	/	70.0	/			
"	"	14:36	—	"		"	"	"	"	47.6	/	71.2	/			
"	"	14:48	—	"		"	"	"	"	5.0	/	71.0	/			
"	"	15:11	—	"		"	"	"	"	39.8	/	35.7	/			
A.4.22	"	15:12	—	"		"	"	"	"	10.0	/	11.0	/			
"	"	15:40	—	"		"	"	"	"	48.0	/	33.5	/			
"	"	15:41	—	"		"	"	"	"	3.0	/	71.0	/			
"	"	16:11	—	"		"	"	"	"	3.0	/	71.0	/			
CW	2-16	11:36	—	"	16.8	"	"	"	"	2.9	/	86.4	/	83.5	153.8	—
"	"	11:46	600	"	16.8	"	"	"	"	22.1	19.2	67.0	19.4	44.9	115.2	2.09×10^{-5} 1.8^2 1.7 $E-5$
"	"	11:56	600	"	16.8	"	"	"	"	39.7	17.0	49.5	17.5	9.8	80.1	2.63×10^{-5} 2.2^2 2.1 $E-5$
"	"	12:06	600	"	16.9	"	"	"	"	52.9	13.2	36.4	13.1	-16.5	53.8	2.88×10^{-5} 2.51 2.4 $E-5$ } Avg. = 2.5×10^{-5}
"	"	12:16	600	"	16.9	"	"	"	"	61.7	8.8	27.7	8.7	-34.0	36.3	2.85×10^{-5} 2.48 2.3 $E-5$
"	"	12:26	600	"	16.9	"	"	"	"	68.1	6.4	21.6	6.3	-46.5	23.8	3.06×10^{-5} 2.66 2.5 $E-5$
"	"	12:36	600	"	16.9	"	"	"	"							

$k = \frac{(1.181 \text{ cm})}{A} = \frac{58.27}{46.322} = 1.258 \times 10^{-5}$

Huntingdon Engineering & Environmental, Inc.

EFFECTIVE POROSITY WORK SHEET

JOB NO. 113794 PART NO. 2
 JOB NAME Ensearch, Toole

PREP. BY SU CALC. BY SU DATE 3-08-94
 CHKD. BY _____ SHEET 1 OF 1

Hole Number <u>31-BK-1</u>	Depth <u>1-3'</u>	Sample Number <u>SGT 020</u>	Cell Number <u>11 (M)</u>
Initial Height		<u>2.42"</u>	
Initial Diameter		<u>2.35"</u>	
Initial Volume		<u>172.0</u>	
Volume Loss During Consolidation		<u>1.0</u>	
Initial Weight		<u>241.34g</u>	
Initial Moisture (Estimate/Approximate)		<u>10%</u>	
Weight of Dry Soil (Approximate)		<u>219.4g</u>	
Specific Gravity (Estimate/Actual)		<u>2.69</u>	
Volume of Dry Soil (Approximate)		<u>81.6 cm³</u>	
Pore Volume (Approximate)		<u>89.4</u>	
log (h _t /h ₀) / t (Average of 4)		<u>2.86 x 10⁻⁴</u> ($Q = h \times 2 \pi r \times 151 \times 308$)	
Coefficient of Permeability, k (Approximate)			
Time for 0.1 Pore Volumes (Approximate)		<u>679 sec (14 min 39 sec)</u> (h = 100cm)	

Time of Reading	Estimated Pore Volume	BSE Reading	Bromide Concentration	Effluent Burette	Volume E.B. x .309
<u>1347^s</u>	<u>0.1</u>	<u>118.1</u>	<u>1.5 mg/l (10:1)</u>	<u>30.7</u>	<u>9.52</u>
<u>1415</u>	<u>0.2</u>	<u>112.3</u>	<u>1.6 mg/l (10:1)</u>	<u>21.0</u>	<u>6.49</u>
	<u>0.3</u>	<u>78.9</u>	<u>2.7 mg/l (10:1)</u>	<u>39.2</u>	<u>12.28</u>
<u>1527</u>	<u>0.4</u>	<u>76.5</u>	<u>6.7 mg/l (10:1)</u>	<u>26.7</u>	<u>8.23</u>
	<u>0.5</u>	<u>105.7</u>	<u>2.5 mg/l (10:1)</u>	<u>30.7</u>	<u>9.52</u>
	<u>0.6</u>	<u>64.6</u>	<u>9.9 mg/l (10:1)</u>	<u>29.7</u>	<u>9.10</u>
	<u>0.7</u>	<u>54.8</u>	<u>15.8 mg/l (10:1)</u>	<u>27.1</u>	<u>8.47</u>
	<u>0.8</u>	<u>34.2</u>	<u>35.9 mg/l (10:1)</u>	<u>52.4</u>	<u>16.30</u>
	<u>0.9</u>	<u>43.4</u>	<u>34.9 mg/l (10:1)</u>	<u>26.1</u>	<u>8.06</u>
	<u>1.0</u>	<u>35.6</u>	<u>32.1 mg/l (10:1)</u>	<u>25.8</u>	<u>7.94</u>

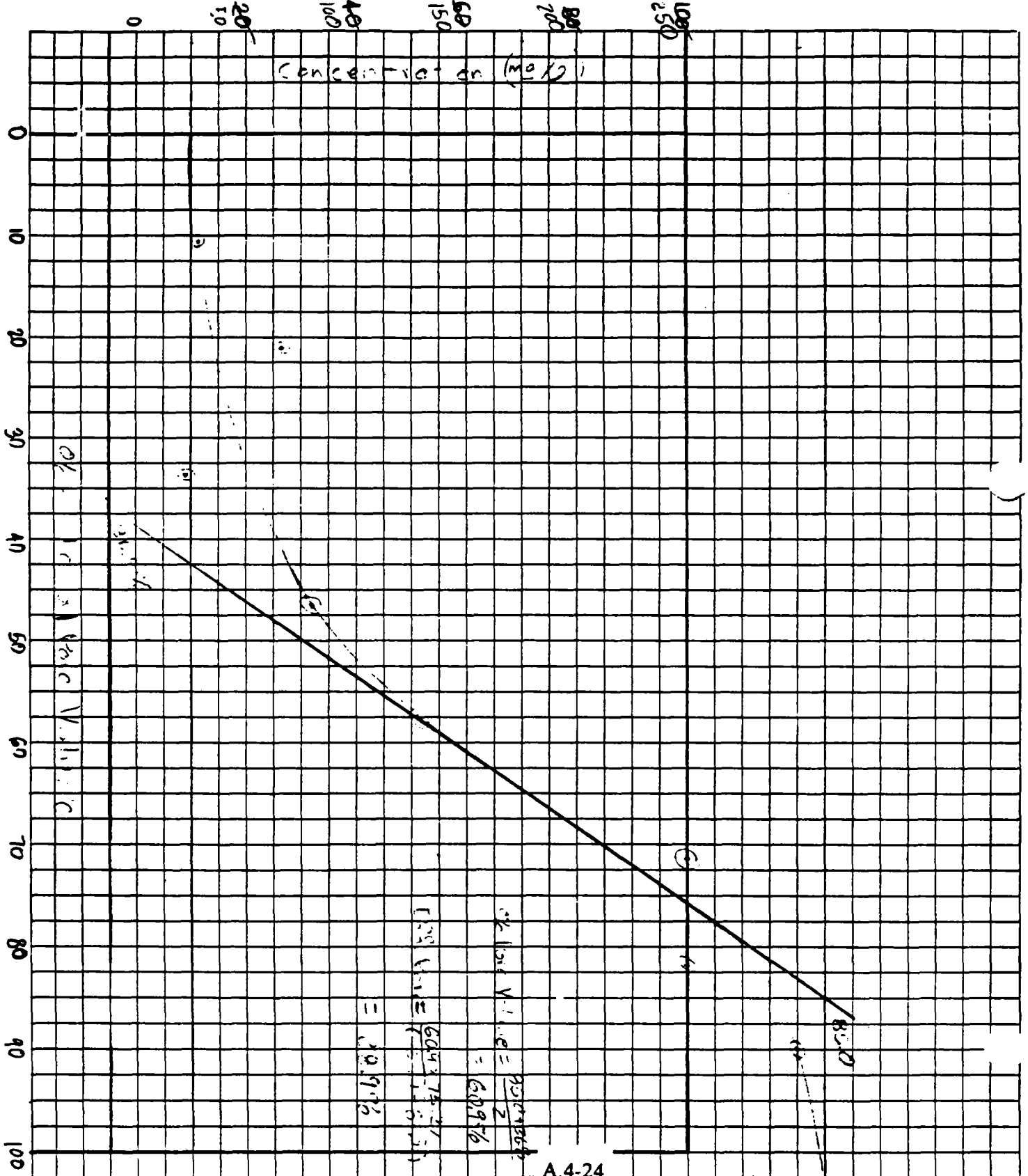
100 mg/l minimum concentration (to dilute to 10 mg/l @ 10:1)
 Total Volume = 150 cm x .308 cm² = 46.2 ml, mix with 773.3 mg/l solution
 100 mg/l = (V x 773.3 mg/l) / (V + 46.2 ml) A.4-23

Huntingdon

Consulting Engineers Environmental Scientists

JOB NO. 113794 JOB TITLE Ensearch, Tooele DATE 3-28-94 BY S. J. [unclear]

SUBJECT Effective Porosity Results CHECKED _____ SHEET _____ BY _____



JOB NO. <u>113794</u>	PART NO. _____	Chen Northern, Inc.	PREP. BY <u>FD</u>
JOB NAME <u>Ebasco, Tooele</u>		SPECIFIC GRAVITY TEST	DATE _____
		WORKSHEET	CALC. BY _____
			CKED. BY _____

SPECIFIC GRAVITY OF SOILS (G _s) ASTM D-854		TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2
RUN BY							
HOLE AND DEPTH / SAMPLE NO. <u>31AK-1 / 59 T020</u>							
DESCRIPTION <u>silt</u>							
PREP. DISH							
FLASK NO.		<u>D</u>	<u>K</u>				
TEMPERATURE OF WATER AND SOIL, T, °C		<u>24.0</u>	<u>24.5</u>				
DISH NO.		<u>H00 D</u>	<u>Body</u>				
DISH + DRY SOIL, g		<u>295.66</u>	<u>300.86</u>				
DISH, g		<u>270.85</u>	<u>275.85</u>				
DRY SOIL, g	A	<u>24.81</u>	<u>25.01</u>				
FLASK + WATER @ T, °C, g	B	<u>348.511</u>	<u>352.304</u>				
A + B, g		<u>373.321</u>	<u>377.314</u>				
FLASK + WATER + SOIL, g	C	<u>364.07</u>	<u>368.10</u>				
DISPLACED WATER, (A + B) - C, g		<u>9.311</u>	<u>9.214</u>				
CORRECTION FACTOR FOR TEMP. T, °C	K	<u>0.999711</u>	<u>0.998214</u>				
G _s = (A*K) / (A + B - C)		<u>2.6672</u>	<u>2.7116</u>				
G _s , TRIAL 1 - G _s , TRIAL 2*		<u>0.0444</u>					
AVERAGE G _s		<u>2.667</u>					

A.4-25

REMARKS

*The difference between G_s values for the two trials should be ≤ 0.050.

CHEN & NORRICH, INC.
TRIAxIAL PREPARATION
 WORKSHEET

113794

F.D

JOB NO. 113794 PART NO. _____ PREP. BY CH DATE 12-02-73
 JOB NAME Edocco Tool Leaning Gravel CALC. BY AL CKED. BY SU

HOLE NO. 31-BK-2 DEPTH 1-2.5 SAMPLE NO. 54708 STAGE NO. 11
 CELL NO. 0 TYPE OF TEST Per EFFECTIVE CONSOLIDATION STRESS 3.0 psi
 SAMPLE DESCRIPTION: lean - Not.

MOISTURE CONTENT				
	BEFORE TEST		AFTER TEST	
	SPECIMEN	TRIMMINGS	SPECIMEN	TRIMMINGS
DISH NO.	<u>cap</u>		<u>60069</u>	<u>17000</u>
WT. OF WET SOIL & DISH	<u>778.0g</u>		<u>529.52g</u>	—
WT. OF DRY SOIL & DISH			<u>490.85</u>	<u>245.46g</u>
WT. OF DISH	<u>516.4</u>		<u>239.83</u>	<u>742.01</u>
WT. OF WATER	<u>7.13</u>		<u>28.67</u>	
WT. OF WET SOIL	<u>261.6</u>		<u>289.69</u>	
WT. OF DRY SOIL w_s	<u>254.47</u>		<u>251.02</u>	<u>3.45</u>
% MOISTURE %	<u>2.8</u>		<u>15.4</u>	

VOL. OF SOLIDS $V_s = \frac{W_s}{G_s} = \frac{98.00}{2.707} \text{ cm}^3$		SAMPLE DATA			
		INITIAL	SATURATED	CONSOLIDATED	FINAL
DIAMETER D	2.4 in. cm				
HEIGHT CHANGE ΔH	DIAL INITIAL in.	0			0
HEIGHT H	2.0 in. cm				<u>2.00</u> <u>cm</u>
AREA A					<u>26.22</u> <u>cm</u> ²
VOLUME CHANGE ΔV_T					<u>-15.06</u> <u>cm</u> ³
TOTAL VOLUME V_T	<u>149.27</u> <u>cm</u> ³				<u>33.20</u> <u>cm</u> ³
VOL. OF WATER V_W	<u>7.13</u> <u>cm</u> ³				<u>39.18</u> <u>cm</u> ³
VOL. OF AIR V_A					<u>20</u>

VOID RATIO e	<u>0.40</u> <u>0.1577</u>		<u>0.27</u>
SATURATION S%	<u>16.70</u> <u>13.1</u> %		<u>100</u>
MOISTURE CONTENT w%	<u>2.8</u> %		<u>15.4</u>
WET DENSITY γ	<u>110.14</u> <u>pcf</u>		<u>126.62</u>
DRY DENSITY γ_d	<u>107.17</u> <u>pcf</u>	<u>g/cc</u>	<u>1.938</u>

REMARKS 'B'

Sample Failure Diagram

$\text{cm}^3 = 16.39 \cdot \text{in}^3$; $\text{cm}^2 \times .001076 = \text{in}^2$; $\text{kg} = 2.205 \cdot \text{lb}$; $\text{g} = .001 \cdot \text{kg}$

TRIAxIAL CONSOLIDATION WORKSHEET

F. D

JOB NO. 1678 93 PART NO. _____ RUN BY S. J. [unclear] DATE 12-04-95
 JOB NAME Ebasco ^{Towel} ~~Drum~~ ^{Provia} ~~Gravels~~ CKED. BY SU

HOLE NO. 1-BK-2 DEPTH 1-2.5 ~~±~~ SAMPLE NO. 24703(D) STAGE NO. N/A
 CELL NO. 0 TYPE OF TEST Perm
 (CELL PRESS. 13.0 psi - BACK PRESS. 10.0 psi) - EFFECTIVE CONSOLIDATION PRESSURE 3.0 psi

DATE	CLOCK TIME HR:MIN:SEC	ELAPSED TIME MIN.	PORE WATER BURETTE		CELL BURETTE		PORE PRESSURE psi
			READ. k=____cc/div	VOLUME CHANGE -cm ³	READ. k=____cc/div	VOLUME CHANGE -cm ³	
12-04		INITIAL	<u>crp</u>	<u>per</u>			
	<u>13:30</u>	0	<u>29.0</u>	<u>72.0</u>		<u>0</u>	
		.10(6sec.)	<u>43.0</u>	<u>77.0</u>			
		.25(15sec.)	<u>70.0</u>	<u>48.0</u>			
		.50(30sec.)	<u>74.0</u>	<u>50.0</u>			
		1	<u>74.5</u>	<u>51.2</u>			
	<u>13:32</u>	2	<u>74.2</u>	<u>52.0</u>			
	<u>13:34</u>	4	<u>73.2</u>	<u>53.7</u>			
		9					
		16					
		30					
	<u>14:30</u>	60	<u>72.4</u>	<u>56.2</u>			
	<u>15:30</u>	120	<u>72.0</u>	<u>57.0</u>			
		240					
		480					
	1440						
	<u>18:30</u>			<u>57.0</u>			
			TOTAL VOL. Δ = _____ cm ³	TOTAL VOL. Δ = _____ cm ³			

REMARKS: _____

113794

1/2

JOB NO. 167893 PART NO. _____ **Chen Northern, Inc.** RUN BY S. Urton DATE 12-06-93
 JOB NAME Ebasco, Dogway - Frontage **TRIAXIAL PERMEABILITY** CALC. BY F. L. AL CKED. BY EU

HOLE NO. F-1K 2 DEPTH _____ SAMPLE NO. 96T023 SAMPLE TYPE Undisturbed CELL NO. 0 EFF. σ_v 3.0
 SAMPLE AREA, "A" _____ in² = _____ cm² FINAL SAMPLE LENGTH, "L" _____ in = _____ cm BURET AREA, "a" .297 cm²

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD ₁ cm				WATER HEAD ₂ PED-CAP = HEAD ₂ cm				TOTAL HEAD, cm 1+2	Log $\frac{h_1}{h_2}$ $\frac{h_1}{\Delta t}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log} \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ			
	12-6	00:00:00	—	13.0	N/A	10.0	10.0	0.0	0.0	21.0		15.35		132.5		
			213							8.0		15.7		19.4	3.917	2.39×10^{-4}
			27							30.0		16.0		132.0		
			272							9.0		16.3		15.0	3.972	2.12×10^{-4}
			277							17.5		15.7		137.5		
A-4-29			277							10.0		16.8		21.8	3.374	2.06×10^{-4}
			260							22.0		15.5		133.0		
			260							8.0		16.0		24.0	2.860	1.74×10^{-4}
			470							26		15.4		12.8		
			470							8.0		16.4		22.4	1.6106	9.82×10^{-5}
			613							28		16.5		116.5		
			613							11.0		17.0		21.0	1.2187	7.40×10^{-5}
			597							25.0		15.0		130.0		
			597							8.0		16.1		23.7	1.3818	7.55×10^{-5}
			587							21.0		15.0		132.0		
			806							16.0		16.0		25.0	1.2310	7.51×10^{-5}
			806							20.0		15.7		137.0		
										80.0		10.7		20.7	1.215	6.21×10^{-5}

$k = \frac{(1.181 \text{ cm})}{A} = 0.0610$

JOB NO. 113194 PART NO. _____
 JOB NAME FRASCO, Tene/0

Chen Northern, Inc.
TRIAxIAL PERMEABILITY

2/27

RUN BY FD DATE 12-11-93
 CALC. BY ED'AL CKED. BY SU

HOLE NO. 1-PK 2 DEPTH _____ SAMPLE NO. SQT 023 SAMPLE TYPE _____ CELL NO. 0 EFF. σ_3 3.0
 SAMPLE AREA, "A" _____ $\text{in}^2 =$ _____ cm^2 FINAL SAMPLE LENGTH, "L" _____ $\text{in} =$ _____ cm BURET AREA, "a" 2.99 cm^2

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD, cm				WATER HEAD ₂ PED-CAP = HEAD, cm				TOTAL HEAD, cm 142	Log $\frac{h_1}{h_2}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log} \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ			
	1993	00:00.00		13.0		10.0	10.0	0.0	0.0	77.1		15.5		132.0		
			946							79.0		100.4		21.4	8.25727	5.39 x 10 ⁻⁵
			782							80		121.0		71.0	8.22006	5.07 x 10 ⁻⁵
A-4-30			1174							80.0		157.0		139.0		
			1380							80		102.3		22.3	6.7697	4.13 x 10 ⁻⁵
			1694							80.0		160.0		140.0		
			1730							80.0		102.0		22.0	5.82197	3.55 x 10 ⁻⁵
			1810							20.0		158.0		138.0		
			2014							80.0		102.3		21.3	4.7904	2.92 x 10 ⁻⁵
			2240							20.0		160.0		140.0		
										80.0		103.4		23.4	4.5707	2.79 x 10 ⁻⁵
										21.0		157.0		136.0		
										80.0		102.3		22.5	4.34086	2.05 x 10 ⁻⁵
										20.0		158.3		138.3		
										80.0		102.3		22.3	3.93104	2.40 x 10 ⁻⁵
										20		154.6		134.0		
										79.0		128.5		17.5	3.57722	2.18 x 10 ⁻⁵

$k = \frac{(1.181 \text{ cm})}{A} = 0.0610$

JOB NO. 112294 PART NO. _____
 JOB NAME EPASCO, Tour 12

Chen Northern, Inc.
TRIAxIAL PERMEABILITY

RUN BY F. D DATE _____
 CALC. BY EDIAL CKED. BY CU

HOLE NO. 1-BK-2 DEPTH _____ SAMPLE NO. 24T 023 SAMPLE TYPE Undist. CELL NO. 0 EFF. 3.0 psi
 SAMPLE AREA, "A" _____ $\text{in}^2 = \frac{2221}{25.4^2} \text{cm}^2$ FINAL SAMPLE LENGTH, "L" _____ $\text{in} = 508 \text{cm}$ BURET AREA, "a" _____ $\text{cm}^2 = \frac{27.29}{25.4^2} \text{cm}^2$

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD, cm				WATER HEAD ₂ PED-CAP = HEAD, cm				TOTAL HEAD, cm 1+2	$\frac{\log \frac{h_1}{h_2}}{\Delta t}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \log \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ			
		00:00.00	0	13.0	101 10 10	10.0	11.0	1.0	1.0	20.0	158.0	138.0	138.0			
		1030	3030							81.0	61.0	102.0	58.0	19.0	2.24197×10^{-4}	
		1								80.0	166.8	140.8	140.8			
		2553	2553							77.5	57.5	107.5	53.3	30.0	2.63016×10^{-4}	
		0								20.0	153.1	136.4	136.4			
A-4-31		2178	2178							24.0	54.0	113.1	53.3	39.1	3.01204×10^{-4}	
		0								11.0	153.1	137.4	137.4			
		1928	1928							74.0	51.0	108.0	49.4	34.0	3.14578×10^{-4}	

$k = \frac{(1.181 \text{ cm})}{A} = \frac{66228}{0.0616} = 1.09 \times 10^{-5}$

JOB NO. 1137-94 PART NO. **Chem Northern, Inc.** PREP. BY TD DATE 11-6-92
 JOB NAME EBASCO, Tooele **SPECIFIC GRAVITY TEST** CALC. BY AL CKED. BY SU
WORKSHEET

SPECIFIC GRAVITY OF SOILS (G _s) ASTM D-854		TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2
RUN BY							
HOLE AND DEPTH / SAMPLE NO. <u>1-BK-2@1-2.5'</u>		<u>- 114</u>				<u>+ # 4</u>	
DESCRIPTION <u>SGT 023</u>						<u>pot dry soil: 146.80/146.23</u>	
PREP. DISH							
FLASK NO.		<u>J</u>	<u>M</u>			<u>Blank</u>	<u>Blank</u>
TEMPERATURE OF WATER AND SOIL, T, °C		<u>24.5</u>	<u>24.5</u>			<u>22.8</u>	<u>26.0</u>
DISH NO.		<u>GNB</u>	<u>Dog</u>			<u>pancrease</u>	<u>After</u>
DISH + DRY SOIL, g		<u>300.28</u>	<u>302.15</u>			<u>273.21</u>	<u>309.85</u>
DISH, g		<u>274.24</u>	<u>275.92</u>			<u>195.58</u>	<u>168.67</u>
DRY SOIL, g		A <u>26.04</u>	<u>26.23</u>			<u>137.63</u>	<u>141.18</u>
FLASK + WATER @ T, °C, g		B <u>0.721</u> <u>353.23</u>	<u>49.316</u> <u>352.66</u>			<u>670.1/20</u>	<u>670.1/20</u>
A + B, g		<u>6.761</u> <u>370.23</u>	<u>5.546</u> <u>378.240</u>			<u>807.73</u>	<u>811.79</u>
FLASK + WATER + SOIL, g		C <u>367.20</u>	<u>365.52</u>			<u>759.3</u>	<u>757.3</u>
DISPLACED WATER, (A + B) - C, g		<u>0.561</u> <u>12.673</u>	<u>0.126</u> <u>13.26</u>			<u>48.43</u>	<u>52.78</u>
CORRECTION FACTOR FOR TEMP. T, °C		K <u>.999</u>	<u>.999</u>			<u>.996</u>	<u>.996</u>
G _s = (A*K) + (A + B - C)		<u>2.754</u> <u>7200</u>	<u>2.754</u> <u>6941</u>			<u>2.641</u>	<u>2.641</u>
G _s , TRIAL 1 - G _s , TRIAL 2*			<u>.027</u>			<u>.216</u>	<u>.118</u>
AVERAGE G _s			<u>.027</u>			<u>.118</u>	<u>.118</u>

A.4-32

REMARKS J .091317 M .06934 350 g 251.02
 *The difference between G_s values for the two trials should be ≤ 0.050.
 1-26-1 (8/85)

Test Perfor.
in wide M.
base of. Vdn
measurement
not occur

Chen Northern, Inc.
TRIAxIAL PREPARATION
WORKSHEET

JOB NO. 1137-94 PART NO. _____ PREP. BY PK DATE 1-15-94
 JOB NAME INSECTON T-285 CALC. BY DG CKED. BY SII

HOLE NO. 567 CR6 DEPTH 15-3 SAMPLE NO. S-BK-1 STAGE NO. N/A
 CELL NO. M TYPE OF TEST Per EFFECTIVE CONSOLIDATION STRESS 3.0 psi
 SAMPLE DESCRIPTION: Red. - 801

MOISTURE CONTENT				
	BEFORE TEST		AFTER TEST	
	SPECIMEN	TRIMMINGS	SPECIMEN	TRIMMINGS
DISH NO.		<u>CORN</u>	<u>POPEYE</u>	<u>GM</u>
WT. OF WET SOIL & DISH	<u>511.98 g</u>	<u>210.35 g</u>	<u>357.92 g</u>	<u>42.90 g</u>
WT. OF DRY SOIL & DISH		<u>288.54 g</u>	<u>311.21 g</u>	<u>113.90 g</u>
WT. OF DISH	<u>278.31</u>	<u>205.44</u>	<u>108.26</u>	<u>111.64</u>
WT. OF WATER	<u>28.46</u>		<u>76.71</u>	
WT. OF WET SOIL	<u>233.67</u>		<u>279.66</u>	
WT. OF DRY SOIL W_s	<u>205.21</u>		<u>202.95</u>	<u>2.26</u>
% MOISTURE	<u>17.87</u>	<u>14.7</u>	<u>37.8</u>	

VOL. OF SOLIDS $V_s = \frac{W_s}{G_s} = 26.54 \text{ cm}^3$		SAMPLE DATA			
		INITIAL	SATURATED	CONSOLIDATED	FINAL
DIAMETER	D	<u>2.3 in. 5.8 cm</u>			<u>2.218"</u>
HEIGHT CHANGE	ΔH	DIAL INITIAL _____ in.	<u>0</u>	<u>0</u>	<u>0</u>
HEIGHT	H	<u>2.42 in. 6.197 cm</u>			<u>2.42" 6.147 cm</u>
AREA	A	<u>21.80</u>			<u>25.019 cm²</u> <u>24.93</u>
VOLUME CHANGE	ΔV_T				<u>-1.51066</u>
TOTAL VOLUME	V_T	<u>164.76</u>			<u>153.25 cm³</u>
VOL. OF WATER	V_W	<u>28.46</u>			<u>77.1</u>
VOL. OF AIR	V_A				

VOID RATIO	e	<u>1.153</u>			<u>1.10713</u>
SATURATION	S%	<u>32.24 3%</u>			<u>100%</u>
MOISTURE CONTENT	w%	<u>13.859 %</u>			<u>37.8%</u>
WET DENSITY	γ	<u>1.416</u>			<u>1.575</u>
DRY DENSITY	γ_d	<u>1.246 g/cc 77.2 pcf</u>			<u>1.33 / 82.5 pcf</u>

REMARKS 'B'
Initial Volume = 29.7 cm³
Final Volume = 28.5 cm³ Pcf = 152.7 pcf $\Delta V = 1.2 \text{ cm}^3$
Initial Volume = 27.7 cm³ Pcf = 16.0 pcf $\Delta V = 89.3 \text{ cm}^3$
 $\Delta V = 71.9 \text{ cm}^3 \times 3.09 = 22.2 \text{ cm}^3$

Sample Failure Diagram

$\text{cm}^3 = 16.39 \text{ in}^3$; $\text{cm}^2 \times .001076 = \text{in}^2$; $\text{g} = 0.035 \text{ oz}$; $\text{pcf} = \frac{\text{g}}{\text{cm}^3} \times 1.94$

Chen Northern, Inc.
TRIAxIAL CONSOLIDATION
WORKSHEET

JOB NO. 1-137-94 PART NO. _____ RUN BY TC DATE 5-14-54
 JOB NAME SEARCH T-CK CKED. BY SU

HOLE NO. S-26-1 DEPTH 15-3 SAMPLE NO. 257-026 STAGE NO. N/E
 CELL NO. 11 TYPE OF TEST PCM
 (CELL PRESS. 50 psi - BACK PRESS. 50 psi) - EFFECTIVE CONSOLIDATION PRESSURE 50 psi

DATE	CLOCK TIME HR:MIN:SEC	ELAPSED TIME MIN.	PORE WATER BURETTE		CELL BURETTE		PORE PRESSURE psi
			READ. k=____cc/div	VOLUME CHANGE -cm ³	READ. k=____cc/div	VOLUME CHANGE -cm ³	
<u>5-14</u>		INITIAL	<u>94.5</u> <u>94.9</u>				
	<u>1152</u>	0		0		0	
		.10(6sec.)	<u>112</u> <u>112</u>	<u>34.3</u>			
		.25(15sec.)	<u>113.5</u> <u>115</u>	<u>38.8</u>			
		.50(30sec.)	<u>115.3</u> <u>115.1</u>	<u>43.7</u>			
	<u>1153</u>	1	<u>115.4</u> <u>115.7</u>	<u>44.5</u>			
	<u>1154</u>	2	<u>115.4</u> <u>119.3</u>	<u>45.0</u>			
	<u>1156</u>	4	<u>116.0</u> <u>119.2</u>	<u>45.5</u>			
	<u>1201</u>	9	<u>117.9</u> <u>117.8</u>	<u>46.0</u>			
	<u>1208</u>	16	<u>118.1</u> <u>118.1</u>	<u>46.5</u>			
	<u>1233</u>	<u>41 30</u>	<u>118.2</u> <u>118.6</u>	<u>47.1</u>			
	<u>1252</u>	60	<u>118.2</u> <u>118.8</u>	<u>47.3</u>			
	<u>1352</u>	120	<u>118.2</u> <u>119.1</u>	<u>47.6</u>			
<u>3-21</u>	<u>1259</u>	240	<u>117.9</u> <u>119.6</u>	<u>47.9</u>			
		480					
		1440					
			TOTAL VOL. Δ = _____ cm ³	TOTAL VOL. Δ = _____ cm ³			

REMARKS: _____

JOB NO. 1-137-74 PART NO. _____
 JOB NAME Injection Tank

Chen Northern, Inc.
TRIAxIAL PERMEABILITY

RUN BY JK DATE 3-18-74
 CALC. BY DG CKED. BY SU

HOLE NO. C-2A-1 DEPTH 153 SAMPLE NO. SGT-226 SAMPLE TYPE Undisturbed CELL NO. 11 EFF. 0.30
 SAMPLE AREA, "A" _____ in² = 25.070 cm² FINAL SAMPLE LENGTH, "L" _____ in = 6.47 cm BURET AREA, "a" _____ cm²

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD ₁ cm				WATER HEAD ₂ PED-CAP = HEAD ₂ cm				TOTAL HEAD, cm 1+2	Log $\frac{h_1}{h_2}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log} \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$			
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ				HEAD ₂		
	3-21	13:40	—	8.0	N/A	5.0	5.0					27.0	—						
		:2	20	"	"	"	"					27.5	30	2.3	3.2	20.7	2.28	5.27E-3	
		:4	20	"	"	"	"					94.5	2.1	11.4	2.9	15.8	15.8	5.91E-3	
		13:42	20	"	"	"	"					96.7	2.1	10.5	1.9	11.8	11.8	4.34E-3	
		:20	20	"	"	"	"					98.1	1.9	7.0	1.5	8.9	8.9	4.2E-3	
		:4	20	"	"	"	"					97.3	1.2	15.9	1.1	6.6	6.6	5.9E-3	
A.4-36	3-22	0:00	—	"	"	"	"					104.6	/	133.3	/	28.7	—	—	
		0:15	15	"	"	"	"					107.4	2.8	12.8	3.5	22.4	22.4	7.18E-3	6.26 x 10 ⁻⁴
		0:30	15	"	"	"	"					109.5	2.1	27.6	2.0	15.1	15.1	6.42E-3	5.38 x 10 ⁻⁴
		:45	15	"	"	"	"					111.3	0.8	25.8	1.8	10.5	10.5	6.42E-3	5.60 x 10 ⁻³
		1:00	15	"	"	"	"					112.6	1.3	24.5	1.3	11.1	11.1	5.72E-3	4.99
		1:15	15	"	"	"	"					113.1	1.2	23.4	1.1	9.6	9.6	5.22E-3	5.42
		1:30	15	"	"	"	"					114.7	0.9	22.5	0.9	7.4	7.4	5.01E-3	5.24
		2:00	30	"	"	"	"					116.1	1.4	21.1	1.4	5.0	5.0	4.74E-3	5.61

$k = \frac{(1.181 \text{ cm})}{A} = \dots = 72013$

Huntingdon Engineering & Environmental, Inc.

EFFECTIVE POROSITY WORK SHEET

JOB NO. 1-77-94 PART NO. _____
 JOB NAME BRIDGE 2-10

PREP. BY D.G. CALC. BY D.G. DATE _____
 CHKD. BY _____ SHEET 1 OF 1

Hole Number <u>5-BK-1</u>	Depth <u>1.5 . 3</u>	Sample Number <u>SGT-026</u>	Cell Number <u>11^{bu.} M</u>
		Estimate/Approximate	Actual
Initial Height		-----	<u>6.147</u>
Initial Diameter		-----	<u>2.30</u>
Initial Volume		-----	<u>164.76</u>
Initial Weight		-----	<u>233.67</u>
Volume Loss During Consolidation		<u>14.8</u>	<u>11.51</u>
Final Total Volume	<u>cm³</u>	<u>149</u>	<u>153.25</u> <u>4.10</u>
Initial Moisture Content		<u>13.87</u>	
Weight of Dry Soil		<u>203.7</u>	<u>205.21</u>
Specific Gravity (Estimate/Actual)		<u>2.7</u>	<u>2.681</u>
Volume of Dry Soil		<u>75.5</u>	<u>76.54</u>
Pore Volume		<u>73</u>	<u>74.91</u> <u>75</u>

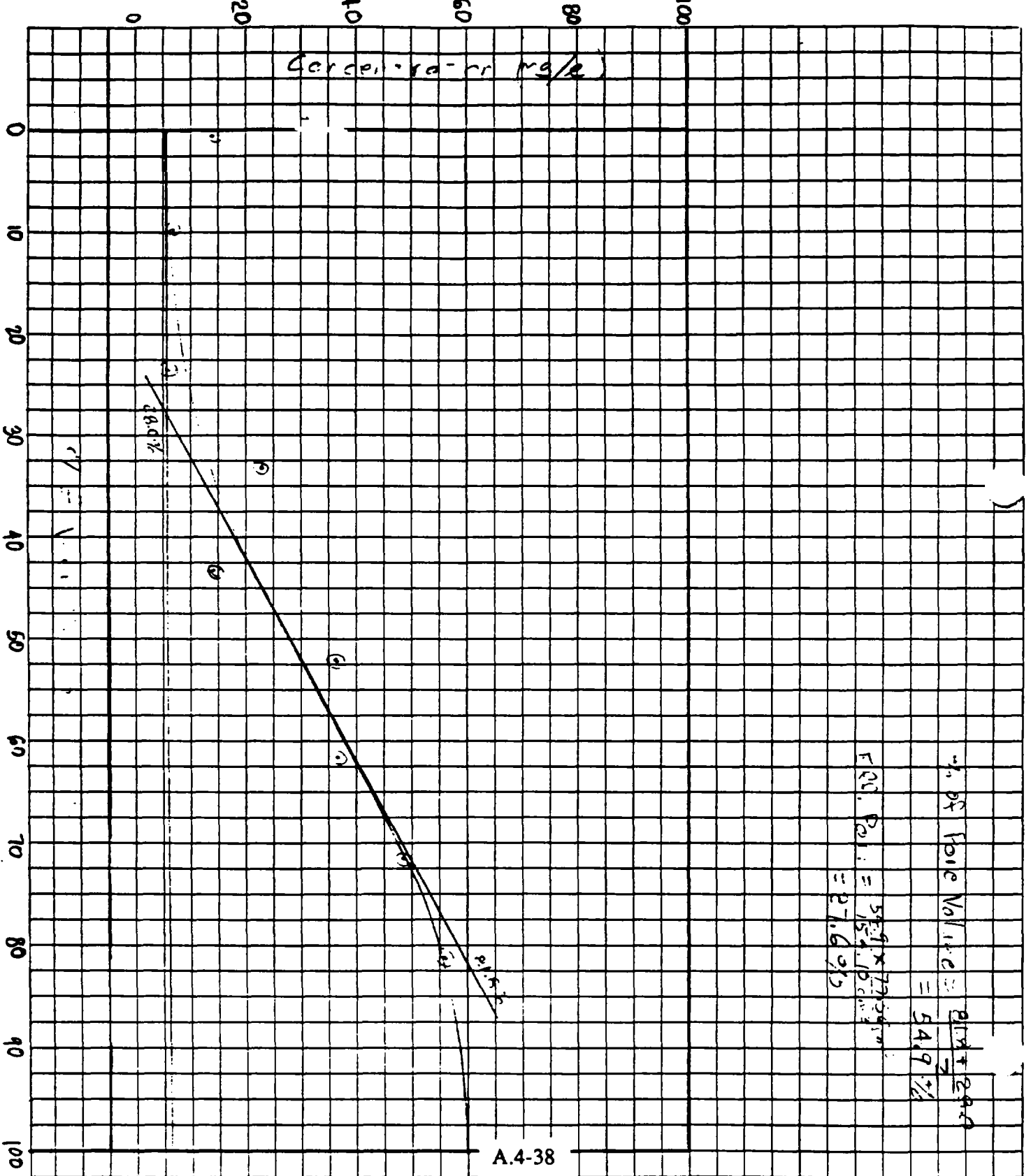
Estimated Pore Volume	BSE Reading	Bromide Concentration	Effluent Burette	Volume E.B. x .309	% of Total Volume
0.1	<u>114.8</u>	<u>1.58</u> ^(1.1)	<u>23.6</u>	<u>7.3</u>	<u>9.5</u> <u>LE</u>
0.2	<u>114.8</u>	<u>1.44</u> ^(1.1)	<u>24.1</u>	<u>14.7</u>	<u>19.2</u> <u>LO</u>
0.3	<u>97.3</u>	<u>2.9</u> "	<u>24.3</u>	<u>22.2</u>	<u>28.9</u> <u>LO</u>
0.4	<u>115.0</u>	<u>1.84</u> "	<u>25.0</u>	<u>30.0</u>	<u>37.7</u> <u>0.4</u>
0.5	<u>155.1</u>	<u>0.7</u> <u>4.5</u> "	<u>24.0</u>	<u>27.4</u>	<u>48.8</u> <u>0.0</u>
0.6	<u>139.1</u>	<u>0.5</u> <u>5.8</u> "	<u>34.4</u>	<u>48.0</u>	<u>62.6</u> <u>23.6</u>
0.7	<u>103.6</u>	<u>2.3</u> "	<u>25.9</u>	<u>55.4</u>	<u>72.2</u> <u>25.1</u>
0.8	<u>115.2</u>	<u>1.4</u> "	<u>25.1</u>	<u>63.2</u>	<u>82.4</u> <u>45.1</u>
0.9	<u>91.5</u>	<u>5.7</u> "	<u>23.0</u>	<u>70.3</u>	<u>91.6</u> <u>50</u>
1.0	<u>91.6</u>	<u>5.7</u> "	<u>24.0</u>	<u>77.7</u>	<u>101.3</u> <u>61.9</u>
	<u>84.7</u>	<u>4.8</u> "	<u>24.0</u>	<u>85.1</u>	<u>110.9</u> <u>71.4</u>
	<u>81.0</u>	<u>5.6</u> "	<u>24.0</u>	<u>92.5</u>	<u>120.6</u> <u>81.0</u>

Huntingdon

Consulting Engineers Environmental Scientists

JOB NO. 113794 JOB TITLE Ensearch, Tooe DATE 3-28-94 BY J. J. ...

SUBJECT Effective Porosity Results CHECKED _____ SHEET _____ BY _____



CHEN & NORRICH, INC.
TRIAxIAL PREPARATION
WORKSHEET

JOB NO. 1-137-94 PART NO. _____ PREP. BY PK DATE 2-15-95
 JOB NAME inspach TRUCK CALC. BY SV CHECKED BY _____

HOLE NO. 87030 DEPTH 1.53 SAMPLE NO. 5-2K2 STAGE NO. 1.4
 CELL NO. 9 TYPE OF TEST Fail EFFECTIVE CONSOLIDATION STRESS 3.0 psi
 SAMPLE DESCRIPTION: Red. Mat.

MOISTURE CONTENT				
	BEFORE TEST		AFTER TEST	
	SPECIMEN	TRIMMINGS	SPECIMEN	TRIMMINGS
DISH NO.		<u>HOB</u>	<u>WORLD</u>	<u>NEEDS</u>
WT. OF WET SOIL & DISH		<u>298.12 g</u>	<u>419.11 g</u>	<u>108.60</u>
WT. OF DRY SOIL & DISH		<u>287.06 g</u>	<u>352.77 g</u>	<u>108.60 g</u>
WT. OF DISH		<u>240.94</u>	<u>126.53</u>	<u>107.95</u>
WT. OF WATER	<u>64.01 g</u>		<u>66.34</u>	
WT. OF WET SOIL	<u>310.90 g</u>		<u>312.58</u>	
WT. OF DRY SOIL	W_s <u>246.89</u>		<u>246.24</u>	<u>265</u>
% MOISTURE	% <u>25.93</u>	<u>24.0</u>	<u>26.94</u>	

SAMPLE DATA					
VOL. OF SOLIDS $V_s = \frac{W_s}{G_s} = \underline{91.24} \text{ cm}^3$		$G_s = \underline{2.706}$			
		INITIAL	SATURATED	CONSOLIDATED	FINAL
DIAMETER	D	<u>2.429 in. 6.176 cm</u>			<u>6.150</u>
HEIGHT CHANGE	ΔH	DIAL INITIAL _____ in.			<u>0</u>
HEIGHT	H	<u>2.078 in. 5.34 cm</u>			<u>5.304</u>
AREA	A	<u>29.596</u>			<u>29.7846</u>
VOLUME CHANGE	ΔV_T				<u>-0.977</u>
TOTAL VOLUME	V_T	<u>158.55</u>			<u>157.573</u>
VOL. OF WATER	V_W	<u>64.01</u>			<u>66.345</u>
VOL. OF AIR	V_A	<u>3.30</u>			<u>0</u>

VOID RATIO	e	<u>0.734</u>			<u>0.7279</u>
SATURATION	S_x	<u>95.011 %</u>			<u>100 %</u>
MOISTURE CONTENT	w_x	<u>25.97 %</u>			<u>26.54</u>
WET DENSITY	ρ	<u>1.961</u>			<u>1.973</u>
DRY DENSITY	ρ_d	<u>1.557 g/cc 97.47 pcf</u>		<u>g/cc</u>	<u>pcf 1.567 / 97.77</u>

REMARKS 'B'
Volume of pore system = 25.0 cm³
Initial: $V_s = 91.5 \text{ cm}^3$ $V_w = 160.7 \text{ cm}^3$ $V_T = 112.6 \text{ cm}^3$
Final: $V_s = 91.5 \text{ cm}^3$ $V_w = 166.345 \text{ cm}^3$ $V_T = 157.573 \text{ cm}^3$
 $\Delta V_T = 45.973 \text{ cm}^3$ $\Delta V_w = 5.645 \text{ cm}^3$ $\Delta V_a = -0.977 \text{ cm}^3$

Sample Failure Diagram

JOB NO. 1-17-79 PART NO. _____
 JOB NAME 1-17-79

Chen Northern, Inc.
TRIAxIAL PERMEABILITY

RUN BY DG DATE 3-17-79
 CALC. BY SL CKED. BY SL

HOLE NO. 5-20-2 DEPTH 153 SAMPLE NO. 100 SAMPLE TYPE 111 CELL NO. 9 EFF. 0.30
 SAMPLE AREA, "A" $\frac{29.746}{29.746} \text{ in}^2 = 1.0 \text{ cm}^2$ FINAL SAMPLE LENGTH, "L" 2.089 in = 5.301 cm BURET AREA, "a" 31.7 cm²

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD, cm				WATER HEAD ₂ PED-CAP = HEAD, cm					TOTAL HEAD, cm 1+2	$\text{Log} \frac{h_1}{h_2}$ AT	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log} \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ	HEAD ₂			
	3-17	1353		18.0	N/A	15.0	15.0	5	15	46.3		16.55		59.2	59.2	—	
		1428	2100	"	1	"	"	"	"	57.3	11.0	75.0	11.0	57.7	57.7	9.37E-5	
		1445	1680	"	"	"	"	"	"	52.3	3.0	71.9	3.1	31.6	31.6	7.1E-5	
		1112		"	"	"	"	"	"	57.9		75.0		61.1	61.1	—	Reset
		1127	900	"	"	"	"	"	"	39.8	5.1	76.1	5.1	48.3	48.3	1.1E-4	
		1141	840	"	"	"	"	"	"	44.2	1.7	73.6	1.7	71.7	57.7	1.05E-4	
		1155	840	"	"	"	"	"	"	41.5	1.3	73.1	1.3	72.6	32.6	9.8E-5	
		1235	2400	"	"	"	"	"	"	53.7	5.7	73.9	5.2	20.5	20.5	3.37E-5	
		1257		"	"	"	"	"	"	53.7		116.0		57.7	57.7	—	Reset
		1253	960	"	"	"	"	"	"	62.0	6.1	75.1	6.5	75.1	75.1	1.12E-4	
		1314	1260	"	"	"	"	"	"	65.8	5.7	77.2	5.7	33.4	33.4	1.04E-4	
		1346	1920	"	"	"	"	"	"	71.1	1.3	73.3	5.9	22.2	22.2	9.24E-5	
	3-21	1343	—	"	"	"	"	"	"	49.7		75.0		35.8	35.8	—	Reset
		1351	480	"	"	"	"	"	"	51.5	2.3	72.8	2.2	71.3	31.3	1.22E-4	7.84E-6
		1400	540	"	"	"	"	"	"	53.7	2.2	70.7	2.1	27.0	27.0	1.19E-4	7.6E-6
		1409	540	"	"	"	"	"	"	55.4	1.7	78.9	1.8	23.5	23.5	1.12E-4	7.17E-6
		1422	780	"	"	"	"	"	"	57.4	2.0	76.8	2.1	19.4	19.4	1.07E-4	6.77E-6
		1431	540	"	"	"	"	"	"	58.7	1.3	75.6	1.2	16.9	16.9	1.11E-4	7.11E-6
		1443	720	"	"	"	"	"	"	62.0	1.3	74.3	1.3	14.3	14.3	1.04E-4	6.47E-6

$k = \frac{(1.181 \text{ cm})}{A} = \frac{0.6405}{3764}$

Huntingdon Engineering & Environmental, Inc.

EFFECTIVE POROSITY WORK SHEET

JOB NO. 1-137-74 PART NO. _____
 JOB NAME 1-137-74

PREP. BY CALC. BY DATE
 CHKD. BY SHEET 1 OF 2

Hole Number <u>1A-2</u>	Depth <u>1.5-3</u>	Sample Number <u> </u>	Cell Number <u>9-C</u>
		Estimate/Approximate	Actual
Initial Height		-----	<u>5.304 cm</u>
Initial Diameter		-----	<u>6.170 cm</u>
Initial Volume		-----	<u>158.55 cm³</u>
Initial Weight		-----	<u>310.90 g</u>
Volume Loss During Consolidation		<u>8.02 cm³</u>	<u>2.97 cm³</u>
Final Total Volume		<u>150.5</u>	<u>157.5876</u>
Initial Moisture Content		<u>24.0</u>	<u>25.9.5</u>
Weight of Dry Soil		<u>250.7</u>	<u>246.89</u>
Specific Gravity (Estimate/Actual)		<u>2.7</u>	<u>2.706</u>
Volume of Dry Soil		<u>92.9</u>	<u>91.24</u>
Pore Volume	<u>cm³</u>	<u>57.6</u>	<u>66.3452</u>

Estimated Pore Volume	BSE Reading	Bromide Concentration	Effluent Burette	Volume E.B. x .257	% of Total Volume
0.1	<u>74.5</u>	<u>2.39 mg/L</u> (15:1)	<u>22.8</u>	<u>7.20</u>	<u>12.9</u> 10
0.2	<u>106.7</u>	<u>2.0</u> "	<u>26.0</u>	<u>15.7</u>	<u>23.2</u> 15
0.3	<u>113.4</u>	<u>1.3</u> "	<u>25.2</u>	<u>23.4</u>	<u>27.5</u> 10
0.4	<u>123.6</u>	<u>1.0</u> (15:1)	<u>19.8</u>	<u>29.6</u>	<u>44.6</u> 6.9
0.5	<u>112.8</u>	<u>1.6</u> (10:1)	<u>28.5</u>	<u>38.6</u>	<u>59.2</u> 15.5
0.6	<u>125.1</u>	<u>1.0</u> (15:1)	<u>19.1</u>	<u>44.6</u>	<u>67.2</u> 20.5
0.7	<u>177.9</u>	<u>2.9</u> (7:1)	<u>43.9</u>	<u>58.5</u>	<u>94.2</u> 50.4
0.8	<u>155.0</u>	<u>4.4</u> (10:1)	<u>18.5</u>	<u>64.3</u>	<u>97.7</u> 50
0.9	<u>155.2</u>	<u>4.7</u> (13:1)	<u>24.8</u>	<u>72.2</u>	<u>118.8</u> 7.9
1.0	<u>84.2</u>	<u>4.9</u> (15:1)	<u>21.5</u>	<u>79.0</u>	<u>119.7</u> 6.1
	<u>81.7</u>	<u>5.6</u> (14:1)	<u>22.9</u>	<u>86.2</u>	<u>129.7</u> 32.0
	<u>75.5</u>	<u>6.9</u> (12:1)	<u>26.4</u>	<u>97.5</u>	<u>172.9</u> 103.5

Huntingdon Engineering & Environmental, Inc.

EFFECTIVE POROSITY WORK SHEET

JOB NO. 115702 PART NO. _____
 JOB NAME F. DEPT. 008

PREP. BY DG CALC. BY DG DATE _____
 CHKD. BY _____ SHEET 2 OF 2

Hole Number <u>5-8X-2</u>	Depth <u>1.5-3</u>	Sample Number <u>567-030</u>	Cell Number <u>9-C</u>
		Estimate/Approximate	Actual
Initial Height		_____	
Initial Diameter		_____	
Initial Volume		_____	
Initial Weight		_____	
Volume Loss During Consolidation			
Final Total Volume			
Initial Moisture Content			
Weight of Dry Soil			
Specific Gravity (Estimate/Actual)			
Volume of Dry Soil			
Pore Volume			

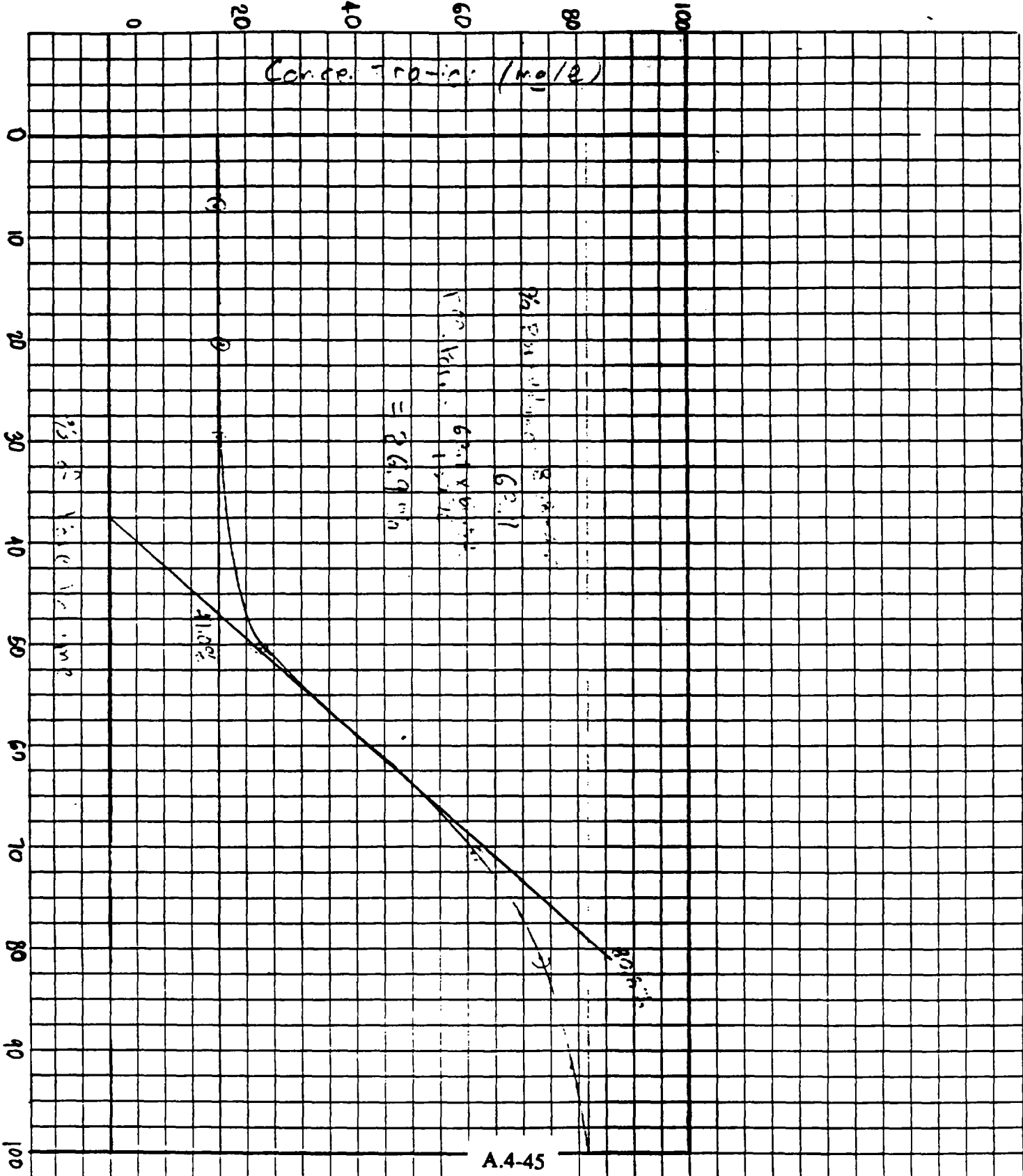
Estimated Pore Volume	BSE Reading	Bromide Concentration	Effluent Burette	Volume E.B. x. = 1.7	% of Total Volume
0.1	74.8	7.1 mg/l ^(14:1)	23.7	102.0	153.8
0.2	71.6	8.1 ^(12:1)	25.9	110.2	166.1
0.3	70.6	8.4 ^(12:1)	25.6	118.3	178.3
0.4					
0.5					
0.6					
0.7					
0.8					
0.9					
1.0					

Huntingdon

Consulting Engineers Environmental Sciences

JOB NO. 113794 JOB TITLE Ensearch, Tooele DATE 3-28-94 BY J. J. ...

SUBJECT Effective Porosity Results CHECKED _____ SHEET _____ BY _____



Chen & Northern, Inc.
TRIAXIAL PREPARATION
WORKSHEET

JOB NO. 1-137-97 PART NO. _____ PREP. BY DC DATE 2-15-66
 JOB NAME Exp. on Soil CALC. BY _____ CKED. BY _____

HOLE NO. 5-1-34 DEPTH 2-3 SAMPLE NO. 5-1-2-1 STAGE NO. 1
 CELL NO. 14 TYPE OF TEST Tri EFFECTIVE CONSOLIDATION STRESS 3.0 psi
 SAMPLE DESCRIPTION: Rem.-Nat.

MOISTURE CONTENT				
	BEFORE TEST		AFTER TEST	
	SPECIMEN	TRIMMINGS	SPECIMEN	TRIMMINGS
DISH NO.		<u>AL</u>	<u>100E</u>	<u>JACK</u>
WT. OF WET SOIL & DISH		<u>73.71 g</u>	<u>456.75 g</u>	<u>42.18</u>
WT. OF DRY SOIL & DISH		<u>315.65</u>	<u>758.26</u>	<u>112.18 g</u>
WT. OF DISH		<u>210.47</u>	<u>129.42</u>	<u>165.15</u>
WT. OF WATER		<u>50.75 g</u>	<u>74.49</u>	
WT. OF WET SOIL		<u>366.62</u>	<u>327.33</u>	
WT. OF DRY SOIL	w_s	<u>255.87</u>	<u>248.94</u>	<u>7.03</u>
% MOISTURE	%	<u>19.83</u>	<u>20.0</u>	<u>31.54</u>

SAMPLE DATA					
VOL. OF SOLIDS $V_s = \frac{w_s}{G_s} = 2.62 \text{ cm}^3$		$G_s = 2.676$			
		INITIAL	SATURATED	CONSOLIDATED	FINAL
DIAMETER	D	<u>2.41 in. 6.12 cm</u>			<u>2.41 / 6.12</u>
HEIGHT CHANGE	ΔH	DIAL INITIAL _____ in.	<u>0</u>	<u>0</u>	<u>0</u>
HEIGHT	H	<u>2.371 in. 5.921 cm</u>			<u>5.921</u>
AREA	A	<u>14.7</u>			<u>29.4</u>
VOLUME CHANGE	ΔV_T				<u>1.80</u>
TOTAL VOLUME	V_T	<u>11.582</u>			<u>7.7763</u>
VOL. OF WATER	V_W	<u>50.75</u>			<u>80.712849</u>
VOL. OF AIR	V_A				

VOID RATIO	e	<u>0.815</u>			<u>0.8244</u>
SATURATION	S%	<u>65.28</u> %			<u>100</u>
MOISTURE CONTENT	w%	<u>19.83</u> %			<u>31.54</u>
WET DENSITY	ρ	<u>112.31</u>			<u>1.933</u>
DRY DENSITY	ρ_d	<u>1.470 / cc</u>			<u>1.970 / 1.35</u>

REMARKS 'B' _____

Sample Failure Diagram

Chen Northern, Inc.
TRIAxIAL CONSOLIDATION
WORKSHEET

JOB NO. 1-137-99 PART NO. _____ RUN BY RG DATE 7-1-94
 JOB NAME Consolidation Test CKED. BY _____

HOLE NO. S-T-274 DEPTH 2.3 SAMPLE NO. S-P-7 STAGE NO. _____
 CELL NO. 14 TYPE OF TEST Tx pccm
 (CELL PRESS. 13.0 psi - BACK PRESS. 1.0 psi) - EFFECTIVE CONSOLIDATION PRESSURE 3.0 psi

DATE	CLOCK TIME HR:MIN:SEC	ELAPSED TIME MIN.	PORE WATER BURETTE		CELL BURETTE		PORE PRESSURE psi
			READ. kcc/div	VOLUME CHANGE -cm ³	READ. kcc/div	VOLUME CHANGE -cm ³	
7-16	14:58	INITIAL	14.4	15.1	12.0	0	11.1
		0			0		
		.10(6sec.)	27	18		15.5	
		.25(15sec.)	47	21		38.5	
		.50(30sec.)	51	23		44.5	
		1	31	25.1		48.7	
		2	53.2	27.0		50.7	
		4	56.6	31.2		58.3	11.0
		9					
		26+8	50.3	37.7		59.5	11.1
30							
60	47.5	40.5		59.5			
120	46.9	42.6		59.9	9.1		
240							
480							
1440							
7-17	1417	1038	45.9	42.3		58.7	
		1402	46.2	42.3		59.0	
			TOTAL VOL. Δ = _____ cm ³		TOTAL VOL. Δ = _____ cm ³		

REMARKS: _____

JOB NO. _____ PART NO. _____
 JOB NAME _____

Chen Northern, Inc.
TRIAxIAL PERMEABILITY

RUN BY DATE 11-17-74
 CALC. BY CKED. BY

HOLE NO. _____ DEPTH _____ SAMPLE NO. _____ SAMPLE TYPE Undr. 2. CELL NO. 16 EFF. 0.3
 SAMPLE AREA, "A" $\text{in}^2 = \overset{780}{27.45} \text{cm}^2$ FINAL SAMPLE LENGTH, "L" $\text{in} = 5.921 \text{cm}$ BURET AREA, "a" $\text{cm}^2 = 3.1$

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD ₁ cm				WATER HEAD ₂ PED-CAP = HEAD ₂ cm				TOTAL HEAD, cm 1+2	Log $\frac{h_1}{h_2}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log} \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ			
	11-17	1426	—	15.0	N/A	12.0	1.0	1.0	1.0	1.3	—	—	57.9	—		
	"	1454	1610	"	"	"	"	"	"	29.0	16.7	48.7	18.7	19.7	2.77E-4	
	3-18	1115	—	"	"	"	"	"	"	2.5	—	68.6	62.1	—	Rect	
	"	1123	480	"	"	"	"	"	"	14.5	9.0	40.6	9.0	46.1	2.22E-4	} Avg. = 2.0 x 10 ⁻⁵
	"	1131	480	"	"	"	"	"	"	20.7	6.2	54.5	6.1	25.4	2.1E-4	
	"	1139	480	"	"	"	"	"	"	25.2	4.5	52.1	4.4	24.9	2.77E-4	
	"	1147	480	"	"	"	"	"	"	21.5	3.3	46.8	2.9	18.3	2.79E-4	

$k = \left(\frac{1.181 \text{ gL}}{A} \right) = \frac{.0726}{071055}$

Chen Northern, Inc.
TRIAxIAL PREPARATION
 WORKSHEET

JOB NO. 113794 PART NO. _____ PREP. BY FD DATE _____
 JOB NAME EBASCO, TOOLE CALC. BY CU CKED. BY S

HOLE NO. 3-BK-1 DEPTH 0.5-1 SAMPLE NO. 56-94 STAGE NO. N/A
 CELL NO. M TYPE OF TEST Pen EFFECTIVE CONSOLIDATION STRESS 3.0 psi
 SAMPLE DESCRIPTION: Low. Nat.

MOISTURE CONTENT				
	BEFORE TEST		AFTER TEST	
	SPECIMEN	TRIMMINGS	SPECIMEN	TRIMMINGS
<i>dry clay</i>				
DISH NO.	<i>Plot - et</i>		<i>KALSTNG</i>	<i>LIDO</i>
WT. OF WET SOIL & DISH	<i>656.20</i>		<i>484.50</i>	
WT. OF DRY SOIL & DISH			<i>418.20</i>	<i>249.96</i>
WT. OF DISH			<i>121.71</i>	<i>241.98</i>
WT. OF WATER	<i>18.39</i>			
WT. OF WET SOIL	<i>311.86</i>			
WT. OF DRY SOIL w_s	<i>293.47</i>		<i>286.49</i>	<i>6.98</i>
% MOISTURE	<i>6.27</i>		<i>23.247</i>	

VOL. OF SOLIDS $V_s = \frac{w_s}{G_s} = \frac{109.16}{2.688} \text{ cm}^3$		SAMPLE DATA			
		INITIAL	SATURATED	CONSOLIDATED	FINAL
DIAMETER	D <i>2.6</i> in. cm				
HEIGHT CHANGE	ΔH DIAL INITIAL _____ in.	<i>0</i>		<i>0</i>	<i>0</i>
HEIGHT	H <i>2.6</i> in. cm				<i>2.60</i> 6.604 cm
AREA	A				<i>26.862</i> cm ²
VOLUME CHANGE	ΔV_T				<i>-15.34</i> cm ³
TOTAL VOLUME	V_T <i>192.74</i> cm ³				<i>177.40</i> cm ³
VOL. OF WATER	V_W <i>18.39</i> cm ³				<i>68.22</i> cm ³
VOL. OF AIR	V_A				

VOID RATIO	e	<i>0.765</i>		<i>0.625</i>
SATURATION	S%	<i>220</i> %		<i>100</i> %
MOISTURE CONTENT	w%	<i>6.3</i> %		<i>23.2</i> %
WET DENSITY	γ			
DRY DENSITY	γ_d	<i>g/cc 95.1</i> Pci	<i>g/cc</i>	<i>Pci 103.38</i>

REMARKS 'B'	Sample Failure Diagram

JOB NO. 113794 PART NO. _____
 JOB NAME Ebasco, Toole
 Chem Northern, Inc.
SPECIFIC GRAVITY TEST
 WORKSHEET
 PREP. BY F.D DATE _____
 CALC. BY SU CKED. BY SU

SPECIFIC GRAVITY OF SOILS (G _s) ASTM D-854		TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2
MUD BY							
HOLE AND DEPTH / SAMPLE NO. <u>3-BK-1 / 59094</u>							
DESCRIPTION							
MIEP. DISH							
FLASK NO.		<u>D</u>	<u>5E</u>				
TEMPERATURE OF WATER AND SOIL, T, °C		<u>26.0</u>	<u>24.5</u>				
DISH NO.		<u>Forgarty</u>	<u>Jefferson</u>				
DISH + DRY SOIL, g		<u>301.42</u>	<u>298.98</u>				
DISH, g		<u>275.95</u>	<u>273.83</u>				
DRY SOIL, g	A	<u>25.47</u>	<u>25.15</u>				
FLASK + WATER @ T, °C, g	B	<u>348.159</u>	<u>354.929</u>				
A + B, g		<u>573.829</u>	<u>380.079</u>				
FLASK + WATER + SOIL, g	C	<u>364.43</u>	<u>370.68</u>				
DISPLACED WATER, (A + B) - C, g		<u>9.409</u>	<u>9.399</u>				
CORRECTION FACTOR FOR TEMP. T, °C	K	<u>0.99377</u>	<u>0.99377</u>				
G _s = (A*K) / (A + B - C)		<u>2.7031</u>	<u>2.6731</u>				
G _s , TRIAL 1 - G _s , TRIAL 2*			<u>0.030</u>				
AVERAGE G _s			<u>2.688</u>				

A.4-S1

REMARKS

*The difference between G_s values for the two trials should be ≤ 0.050.

CENTRO INVESTIGACIONES
TRIAxIAL SATURATION
 WORKSHEET

JOB NO. 113794 PART NO. _____ RUN BY F.D DATE _____
 JOB NAME ERASCO, TOOLE CKED. BY S.I

HOLE NO. 3-BK-1 DEPTH 0.51 SAMPLE NO. SA094 STAGE NO. N/A
 CELL NO. M
 EFFECTIVE CONSOLIDATION STRESS, 30 psi

DATE	TIME	REMARKS	CHAMBER BURETTE			SAMPLE BURETTE				
			PRES. PSI	BURETTE READING cm	SAMP. VOL. Δ cm ³	CAP		PEDESTAL		SAMP. VOL. Δ cm ³
						PRES. PSI	READ. cm	PRES. PSI	READ. cm	
2-2	11:00	SL. CP+BP	5.5	1.0		5.0	76.0	5.0	27.0	
	15:00	R	"			"	77.0	"	27.0	
		Raise CP+BP, B+R	10.5			10.0	90.0	10.0	76.0	
2-4	8:20	R	"			"	93.5	"	74.5	
		Raise CP+BP, B+R	15.5			15.0	92.5	15.0	93.5	
	17:10	R	"			"	93.4	"	77.0	
		Raise CD+BP, B+R	20.5			20.0	97.0	20.0	76.5	
2-7	8:55	R	"			"	97.0	"	65.3	
		B. 21.0 → 31.0; 20.7 → 30.4 B=97								

FINAL 'B' PARAMETER: 97 CHAMBER BURETTE 'K' _____ cm³/cm
 TOTAL TIME TO SATURATE: _____ SAMPLE BURETTE 'K' _____ cm³/cm
 TOTAL SAMPLE VOLUME CHANGE FROM CHAMBER BURETTE _____ cm³
 TOTAL SAMPLE VOLUME CHANGE FROM SAMPLE BURETTE _____ cm³

JOB NO. 113794 PART NO. _____
 JOB NAME EBASCO, TONBLE

Chen Northern, Inc.
TRIAxIAL PERMEABILITY

RUN BY F.D DATE 3-8-84
 CALC. BY FD/SU CKED. BY SU

HOLE NO. 3-BK 1 DEPTH 0.51 SAMPLE NO. 24094 SAMPLE TYPE Und'g. CELL NO. M EFF. σ_v 3.0
 SAMPLE AREA, "A" _____ $\text{in}^2 = 26.862 \text{ cm}^2$ FINAL SAMPLE LENGTH, "L" _____ $\text{in} = 6.604 \text{ cm}$ BURET AREA, "a" 309 cm^2

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD, cm				WATER HEAD ₂ PED-CAP = HEAD, cm					TOTAL HEAD, cm 1+2	$\text{Log} \frac{h_1}{h_2}$ $\frac{\Delta t}{h_1}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log} \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ	HEAD ₂			
	1974	00:00.00	—	23.0		20.0	20.0	0.0	0.0	30	/	125.5	/	95.5	—		
			180							70	40.0	87.0	32.0	17.0	4.1642	$\times 10^{-3}$	
			—							30	/	126.7	/	96.7	—		
			182							70	50.0	88.0	38.0	18.0	4.0118	$\times 10^{-3}$	
			—							30	/	131.0	/	101.0	—		
A.4-54			168							30	40.0	82.0	39.0	22.0	3.7425	$\times 10^{-3}$	
			—							30	/	126	/	96.0	—		
			191							70	40.0	87.5	38.5	17.5	3.8703	$\times 10^{-3}$	
			—							30	/	126.5	/	96.5	—		
			191							70	40.0	88.0	38.5	18.0	3.8181	$\times 10^{-3}$	
			—							30	/	124.1	/	94.1	—		
			217							70	40.0	85.0	39.1	15.0	3.6751	$\times 10^{-3}$	
			—							30	/	128.7	/	98.7	—		
			204							70	40.0	89.5	39.2	19.5	3.4524	$\times 10^{-3}$	
			—							30	/	126.0	/	96.0	96.0	—	
			237							70	40.0	87.0	39.0	17.0	3.1722	$\times 10^{-3}$	2.77×10^{-4}
			—							30	/	119.0	/	99.0	99.0	—	
			271							70	40.0	90.2	38.8	22.2	2.5471	$\times 10^{-3}$	2.23×10^{-4}

$k = \frac{(1.181 \text{ cm})}{A} = 0.087438$

JOB NO. 113794 PART NO. _____
 JOB NAME Research, Terele

Chen Northern, Inc.
TRIAxIAL PERMEABILITY

RUN BY FD DATE _____
 CALC. BY FD/SU CKED. BY SU

HOLE NO. 3-EK-1 DEPTH 0.5-1 SAMPLE NO. SG 094 SAMPLE TYPE Dr. A.S. CELL NO. M EFF. σ_3 2.0 psi
 SAMPLE AREA, "A" _____ $\text{in}^2 = 26.862 \text{ cm}^2$ FINAL SAMPLE LENGTH, "L" _____ $\text{in} = 6.604 \text{ cm}$ BURET AREA, "B" _____ cm^2

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD, cm				WATER HEAD ₂ PED-CAP = HEAD, cm					TOTAL HEAD, cm 1+2	$\text{Log } \frac{h_1}{h_2}$ $\frac{1}{\Delta t}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log } \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ	HEAD ₂			
		00:00.00	—	23.0		200	220	0.0	0.0	30.0	/	125.0	/	95.0	95.0	2.6125	$\times 10^{-3}$
			291							70	40.0	80.5	38.5	16.5	16.5	↓	2.28×10^{-4}
			—							70	/	120.0	/	102.0	—		
			226							70	40.0	93.0	33.0	23.0	23.0	2.6222	$\times 10^{-3}$
A.4-55															Value from Page 1		2.50×10^{-4}
																	2.77×10^{-4}
																	2.23×10^{-4}

$k = \frac{(1.181 \text{ cm})}{A} = 0.087438$

Huntingdon Engineering & Environmental, Inc.

EFFECTIVE POROSITY WORK SHEET

JOB NO. 113794 PART NO. 2
 JOB NAME En search, Toole

PREP. BY SU CALC. BY SU DATE 3-0
 CHKD. BY _____ SHEET 1 OF 2

Hole Number <u>3-BK-1</u>		Depth <u>0.5-1</u>		Sample Number <u>SG 094</u>		Cell Number <u>M</u>	
Initial Height <u>2.60"</u>		2.60"					
Initial Diameter <u>2.40"</u>		2.40"					
Initial Volume		192.7 cm ³					
Volume Loss During Consolidation		15.4 cm ³					
Initial Weight		311.86 g					
Initial Moisture (Estimate/Approximate)		10%					
Weight of Dry Soil (Approximate)		283.5 g					
Specific Gravity (Estimate/Actual)		2.688					
Volume of Dry Soil (Approximate)		105.5		(109.18 cm ³)			
Pore Volume (Approximate)		71.9		(68.22 cm ³)			
log (h _r /h _i) / t (Average of 4)		2.225 ⁻² (Q = 1.78 x 10 ⁻³ x 1.5 x 3.0)					
Coefficient of Permeability, k (Approximate)							
Time for 0.1 Pore Volumes (Approximate)		72 sec (1 min 12 sec) @ v = 100 cm					
Time of Reading	Estimated Pore Volume	BSE Reading	Bromide Concentration	Effluent Burette	Volume E.B. x .309		
1 min	0.1	182.6 ^(10:1)	— 0 —	2.4 cm	0.74 cm ³	L	
2 min	0.2	153.8 ^(10:1)	0.3 mg/l	14.8 cm	5.21 cm ³	L	
3 min	0.3	140.9 ^(10:1)	— 0 —	6.2 cm	7.23 cm ³	L	
4 min	0.4	182.0 ^(10:1)	— 0 —	6.1 cm	9.12 cm ³	L	
5 min	0.5	145.7 ^(10:1)	0.4 mg/l	14.6 cm	13.63 cm ³	L	
6 min	0.6	154.4 ^(20:1)	0.3 mg/l	8.6 cm	16.29 cm ³	L	
7 min	0.7	154.8 ^(20:1)	0.2 mg/l	8.4 cm	8.22 cm ³	L	
8 min	0.8	141.4 ^(10:1)	0.5 mg/l	14.8 cm	23.46 cm ³	1.	
9 min	0.9	139.1 ^(10:1)	0.6 mg/l	18.1 cm	29.05 cm ³	4.	
10 min	1.0	137.5 ^(10:1)	0.6 mg/l	17.8 cm	34.55 cm ³	7.	

Porosity = 38.5%

96 To Vol

100 mg / 2 min max concentration (to 2 buret @ 10:1 to 10 mg/l)
 Total Volume = 150 cm³ (300 cm³ = 46.35 ml), mixture 773.3 mg/l solution
 100 mg/l = (1 x 773.3 mg/l) / (1 + 46.35 ml)
 A.4-56

Huntingdon Engineering & Environmental, Inc.

EFFECTIVE POROSITY WORK SHEET

JOB NO. 113794 PART NO. 2 PREP. BY SU CALC. BY SU DATE 3-08-2
 JOB NAME Enclosure soil CHKD. BY _____ SHEET 2 OF 2

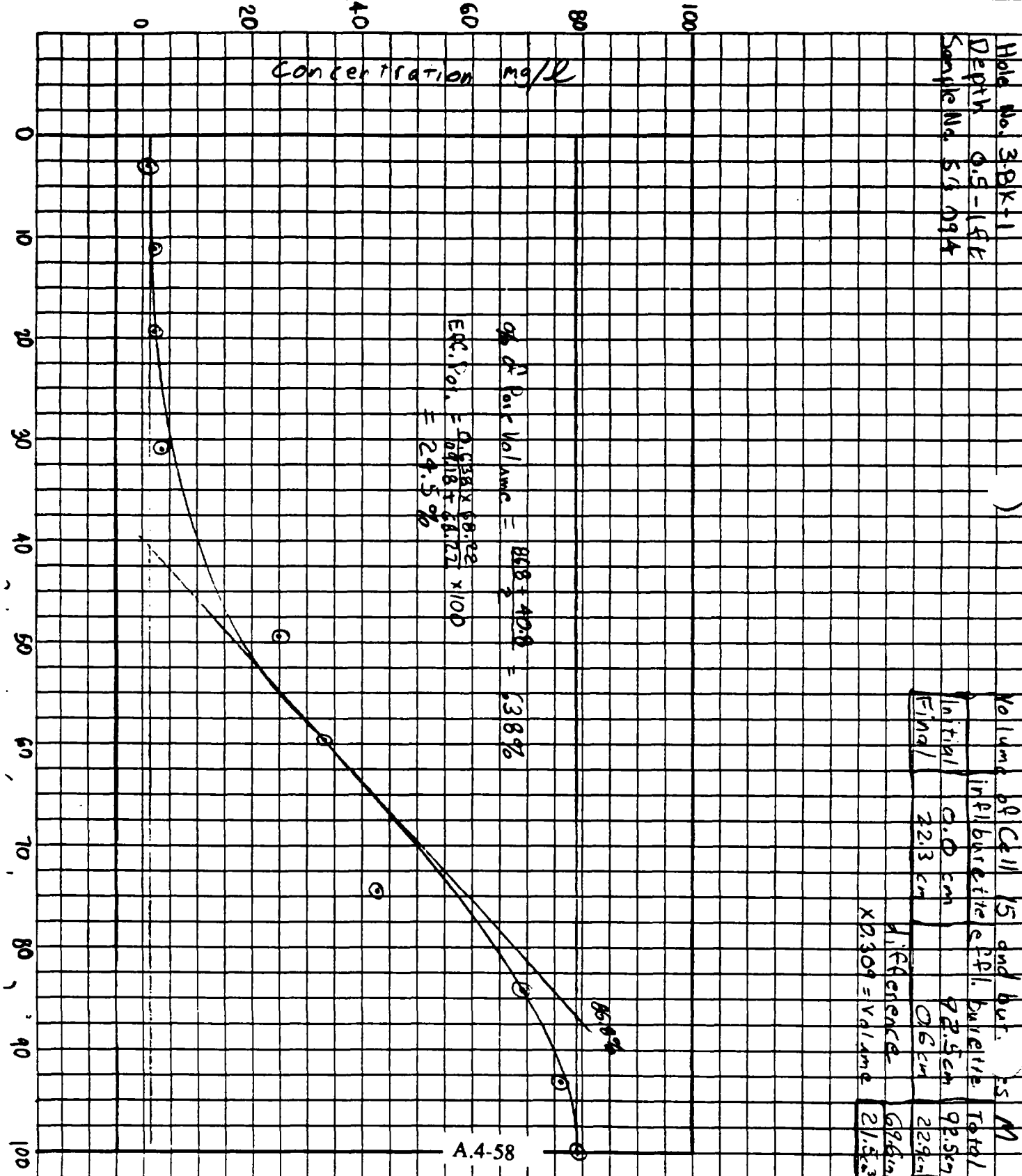
Hole Number <u>2-BK-1</u>	Depth <u>0.5-1'</u>	Sample Number <u>SG094</u>	Cell Number <u>M</u>		
Initial Height					
Initial Diameter					
Initial Volume					
Volume Loss During Consolidation					
Initial Weight					
Initial Moisture (Estimate/Approximate)					
Weight of Dry Soil (Approximate)					
Specific Gravity (Estimate/Actual)					
Volume of Dry Soil (Approximate)					
Pore Volume (Approximate)					
log (h _r /h _i) / t (Average of 4)					
Coefficient of Permeability, k (Approximate)					
Time for 0.1 Pore Volumes (Approximate)					
Time of Reading	Estimated Pore Volume	BSE Reading	Bromide Concentration	Effluent Burette	Volume E.B. x .309
	0.1	133.2 ^(e^{10.1})	0.7 mg/l	26.7 cm	42.75 cm ³
	0.2	101.2 ^(e^{10.1})	2.5 mg/l	40.2 cm	55.17 cm ³
	0.3	94.5 ^(e^{10.1})	3.3 mg/l	24.4 cm	62.71 cm ³
	0.4	87.4 ^(e^{10.1})	4.3 mg/l	30.8 cm	72.23 cm ³
	0.5	75.9 ^(e^{10.1})	6.9 mg/l	20.4 cm	78.53 cm ³
	0.6	73.3 ^(e^{10.1})	7.6 mg/l	20.4 cm	84.95 cm ³
	0.7	72.2 ^(e^{10.1})	7.9 mg/l	15.3 cm	89.56
	0.8				
	0.9				
	1.0				

Huntingdon

Consulting Engineers Environmental Scientists

JOB NO. 113794 JOB TITLE Ensearch, Tooele DATE 3-13-94 BY Sam. Utter

SUBJECT Effective Porosity Results CHECKED _____ SHEET _____ BY _____



JOB NO. 11773 PART NO. _____
 JOB NAME Ebasco Tooele Army Depot

Chen Northern, Inc.
MOISTURE & DENSITY
WORKSHEET

PREP. BY T.C. CALC. BY TC DATE 11-20
 CKED. BY SU SHEET 07

A.4-59

IDENTIFICATION				TEST RESULTS			MOISTURE DETERMINATION			DENSITY DETERMINATION						
HOLE NO.	SAMPLE NO.	DEPTH FEET	SAMPLE TYPE	% MOISTURE	DRY DENSITY PCF	UNIF. CLASS	DESCRIPTION	DISH NO.	WT. OF WET SOIL AND DISH	WT. OF DRY SOIL AND DISH	WT. OF DISH	SAMPLE LENGTH IN.	SAMPLE DIAMETER IN.	WT. OF WET SOIL AND TARE	WT. OF TARE	WT. OF WET DISH
BK1		1-3	SAT 002	7.13	83	CL	Silt, yellowish brown, SE.	R152	394.09	377.64	197.48	6.00	2.43	252.3	203.14	659.66
BK2		2-3	SAT 006	10.21	91	CL	Silt, sandy, light brown, SE.	AL	403.84	386.07	210.48	6.00	2.37	1100.3	401.95	698.35
30 SA		1.5-3	009	25.2	81	CL	clay, yellowish brown, SE.	BAR	431.42	393.33	242.32	5.40	2.40	-	-	553.7
30 SA		2-3	SAT 013	23.1	92	CL	clay, yellowish brown, SE.	SLIM	409.26	376.08	241.85	5.37	2.40	-	-	723.6
31 BK		1-3	SAT 008	7.6	74.5	CL	Silt, yellowish brown, SE.	FLOT	357.38	298.26	129.48	5.60	2.40	1025.1	504.33	507.7
31 BK		1-2.5	SAT 011	4.3	91.5	GC	Silt, sandy, light brown, SE.	MUKT	403.95	397.22	242.37	5.00	2.40	1300.5	719.7	528.6
MHS III 13		2.5-2.5	013	35.6	87	CL	Clay, yellowish brown, SE.	RULE	387.10	291.50	179.90	5.85	2.40	1555.9	714.5	841.4
MHS III 13		2.0-2.0	012	38.5	86	CL	Clay, yellowish brown, SE.	L11	347.25	291.87	129.74	5.90	2.40	1550.0	715.4	834.6
MHS III 13		2.1-2.1	013	31.7	93	CL	Clay, yellowish brown, SE.	L10	454.19	403.16	241.92	6.00	2.40	1076.6	208.79	867.81
MSX		0-1.5	SAT 012	5.2	92	CL	Silt, yellowish brown, SE.	CX2	434.52	424.04	242.83	6.00	2.36	1078.1	403.47	674.6

JOB NO. 1-13794 PART NO. _____
 JOB NAME KILSEARCH TOWER

Chen Northern, Inc.
MOISTURE & DENSITY
WORKSHEET

PREP. BY KDC CALC. BY T.C. DATE 3-9-94
 OKED. BY SU SHEET 07

A.4-60

IDENTIFICATION				TEST RESULTS			MOISTURE DETERMINATION			DENSITY DETERMINATION						
HOLE NO.	SAMPLE NO.	DEPTH FEET	SAMPLE TYPE	% MOISTURE	DRY DENSITY PCF	UNIF. CLASS	DESCRIPTION	DISH NO.	WT. OF WET SOIL AND DISH	WT. OF DRY SOIL AND DISH	WT. OF DISH	SAMPLE LENGTH IN.	SAMPLE DIAMETER IN.	WT. OF WET SOIL AND DISH	WT. OF DRY SOIL AND DISH	WT. OF DISH
5	BT1	1.5-2	025	20.1	81	ML	SILT, SANDY CLAY, LIGHT BROWN, VE. MEDIUM MOISTURE	HAND	571.85	331.69	131.96	5.49	2.40	—	—	651.7
5	BL2	1.5-3	029	13.8	98	CL	SILT SANDY CLAY, LIGHT BROWN, GRAYISH BROWN, LIGHT MOISTURE VE.	HAND	456.10	422.53	175.00	4.72	2.40	—	—	626.10
5	BL D17	2-3	030	17.4	79	ML-CL	SILT, SANDY CLAY, LIGHT BROWN, LIGHT MOISTURE, VE.	HAND	445.64	415.24	211.00	5.42	2.40	—	—	573.62
MHS 0973		69-70	037	33.9	92	CL	SILTY CLAY, LIGHT BROWN, M. MOISTURE, VE.	HAND	386.54	338.43	176.12	5.39	2.40	—	—	790.10
"		70-71	037	46.6	76	CL	SILTY CLAY, LIGHT BROWN, M. MOISTURE, VE.	HAND	410.81	342.36	195.37	5.64	2.40	—	—	747.71
MHS 110-93		77.0-77.5	041	26.5	83	CL	SILTY CLAY, LIGHT BROWN, MOISTURE, VE.	HAND	430.84	382.47	200.09	5.49	2.40	—	—	710.12
"		77.5-78.0	041	30.0	96	CL	SILTY CLAY, LIGHT BROWN, MOISTURE, VE.	HICKS	473.60	425.16	177.01	5.62	2.40	—	—	836.70
"		80.0-80.5	041	24.4	103	CL	SILT, SANDY CLAY, LIGHT BROWN, M. MOISTURE, VE.	HAND	528.94	473.41	241.42	5.68	2.40	—	—	867.51

JOB NO. 147393 PART NO. _____

Chen Northern, Inc.
MOISTURE & DENSITY
WORKSHEET

PREP. BY T.C CALC. BY TC DATE 11/27/93

JOB NAME Ebacco Toodle Army Corp.

CKED. BY SU SHEET 07

IDENTIFICATION				TEST RESULTS			MOISTURE DETERMINATION			DENSITY DETERMINATION						
HOLE NO.	SAMPLE NO.	DEPTH FEET	SAMPLE TYPE	% MOISTURE	DRY DENSITY PCF	UNIF. CLASS	DESCRIPTION	DISH NO.	WT. OF WET SOIL AND DISH	WT. OF DRY SOIL AND DISH	WT. OF DISH	SAMPLE LENGTH IN.	SAMPLE DIAMETER IN.	WT. OF WET SOIL AND DISH	WT. OF DISH	WT. OF WET SOIL
		1.5-2	S 007	8.5	92	CL	Clay sandy silt gray, light moist blow count, components, color, moisture consistency, structure, other	P-T	380.48	365.91	194.08	6.00	2.37	1096.0	423.52	692.78
		0.5-2	S 9151	14.1	144		Silty sand with gravel fine, light moist, SE	4th	270.90	253.55	190.18	5.65	2.44	1352.4	217.18	1140.22
		72.5-73	S 954	20.7	103	CL	silt, sand with gravel, moist v.e.	HAND	673.9	581.12	131.91	5.33	1.94	885.3	322.55	835.3
		05-2	S 9151	12.7	85	SC- SM	Clayey silt with gravel brown, light moist, SE	DANISH	585.80	547.04	241.74	4.85	2.37	828.5	242.57	535.93

A.4-61

JOB NO. 147393 PART NO. _____

chen and associates, Inc.

PREP. BY T. CALG. BY TC DATE 11-20-73

JOB NAME Etasco Tooele Army Depot

**ATTERBERG LIMITS
WORKSHEET**

OKED. BY SU SHEET _____ OF _____

HOLE / DEPTH	8-BK-1 / 1-3				8-BK-2 / 1-3				30-05A-1 / 1.5-3				30-05A-2 / 2-3				31-SK-1 / 1-3			
SAMPLE NO. / RUN BY	SGT 0021				SGT 0061				SGT 0091				SGT 0131				SGT 0181			
PREP. DISH / TRAY LOCAT.	Kidney				PENICREAS				ALT 1				SODA 1				SAM. 1			
NO. OF BLOWS	P.L. 26		28		P.L. 25		21		P.L. 28		24		P.L. 26		30		P.L. 25		23	
DISH NO.	76	66	29	64	14	15	408	71	121	408	62	49	64	76	04	17	47	26	81	54
WT. WET SOIL & DISH	22.47	39.24	21.22	40.06	21.78	41.78	20.79	38.89	20.95	40.01	20.73	39.54	20.60	37.69	20.36	37.33	21.54	39.12	21.27	37.42
WT. DRY SOIL & DISH	21.33	32.30	20.31	33.73	20.80	36.02	19.94	33.81	20.05	32.78	19.85	32.56	19.73	31.15	19.49	30.77	20.54	34.10	20.31	32.76
WT. OF DISH	15.71	15.51	15.92	15.60	15.18	15.34	15.09	15.91	15.70	15.09	15.61	15.85	15.60	15.71	15.27	15.08	15.67	15.80	15.64	15.94
WT. OF WATER	1.14	6.94	0.91	7.13	0.98	5.76	0.85	5.08	0.96	7.23	0.88	6.98	0.87	6.54	0.87	6.56	1.00	5.02	0.96	4.46
WT. OF DRY SOIL	5.42	16.79	4.39	18.13	5.52	20.68	4.35	17.90	4.35	17.69	4.24	16.71	4.13	15.44	4.22	15.69	4.82	18.30	4.63	16.82
WATER CONTENT Wn	20.28	41.33	20.72	37.32	17.43	32.85	17.52	28.38	20.69	40.87	20.25	41.77	21.06	42.35	20.61	41.81	20.53	27.43	20.55	27.70
LIQUID LIMIT LL	41.53	41	39.87	27.85	28	27.78	41.44	42	41.56	42.56	43	42.73	27.43	27	27.42					
PLASTIC INDEX PI	21.25	70	19.15	10.42	10	10.26	20.76	21	21.81	21.50	22	22.12	5.20	7	6.87					
CLASSIFICATION	CL				CL				CL				MLCL							

A.4-62

HOLE / DEPTH	31-SK-2 / 1-1.5				MWS 11193 / 70-70.5				MWS 11193 / 71-70.5				MWS 11193 / 71-71.5				3-BK-1 / 0-1.5			
SAMPLE NO. / RUN BY	SGT 0221				SGT 0431				SGT 0431				SGT 0431				S 80731			
PREP. DISH / TRAY LOCAT.	CX61				RIVER 1				ARMI 1				SUN 1				KAG 1			
NO. OF BLOWS	P.L. 24		26		P.L. 27		24		P.L. 27		25		P.L. 27		28		P.L. 23		28	
DISH NO.	04	17	07	55	81	65	07	29	65	26	14	55	03	41	71	12	68	54	67	13
WT. WET SOIL & DISH	21.29	36.88	21.11	40.83	23.28	41.25	22.18	39.89	21.99	38.24	22.79	40.42	21.78	36.96	24.24	38.73	22.04	38.47	21.13	39.85
WT. DRY SOIL & DISH	20.19	31.33	20.03	34.61	22.17	34.33	21.16	33.77	21.04	32.15	21.69	33.86	20.89	31.99	23.05	32.55	21.13	32.52	20.28	33.50
WT. OF DISH	15.27	15.07	15.21	16.00	15.64	15.89	15.21	18.92	15.52	15.79	15.17	16.01	15.60	15.25	15.91	15.06	15.92	15.74	15.48	15.21
WT. OF WATER	1.10	5.55	1.38	6.22	1.11	7.92	1.02	7.02	0.95	6.09	1.10	6.56	0.89	5.77	1.19	6.13	1.01	5.95	0.85	6.35
WT. OF DRY SOIL	4.32	16.76	4.82	18.61	6.53	18.44	5.95	17.35	5.52	16.36	6.52	17.83	5.29	15.94	7.14	17.49	5.11	16.58	4.80	18.29
WATER CONTENT Wn	22.35	31.13	22.24	33.42	17.00	37.57	17.14	35.22	17.71	37.22	16.77	36.73	17.32	34.19	16.66	35.33	17.16	35.22	17.70	34.71
LIQUID L. LL	33.75	34	33.88	37.85	?	35	37.55	37	36.73	31.51	36	35.82	35.52	?	35.19					
PLASTIC INDEX PI	11.11	11	11.12	20.65	?	17.95	19.20	21	19.86	10.9	10	17.11	12.10	10	12.10	12.10				

JOB NO. 1137-71 PART NO. _____

chen and associates, Inc.

PREP. BY T.C. CALC. BY T.C. DATE 2.3.74

JOB NAME CHS. H. H. 100110

**ATTERBERG LIMITS
WORKSHEET**

OKED. BY _____ SHEET _____ OF _____

HOLE / DEPTH	5 BK 1 11.0-3				5 BK 2 11.0-2				2 BD-111 2-3				11.7 11.1 17-10				11.7 93 170-71			
SAMPLE NO. / RUN BY	035 1				039 1				033 1				031 1							
PREP. DISH / TRAY LOCAT.	PIZZA 1				GCKTY 1				ZIP 1				PICKLE 1							
NO. OF BLOWS	P.L.26		23		P.L.26		21		P.L.29		25		P.L.30		23		P.L.24		20	
DISH NO.	12	40	53	61	34	52	45	47	80	31	76	13	68	29	09	35	44	21	71	77
WT. WET SOIL & DISH	21.50	37.78	22.08	40.18	21.67	39.57	20.65	38.25	21.82	39.57	21.60	40.21	22.88	37.77	23.68	39.56	21.67	38.31	22.01	37.29
WT. DRY SOIL & DISH	20.35	33.21	20.97	35.28	20.70	33.18	19.83	32.00	20.74	34.30	20.54	34.72	21.79	31.82	22.43	32.82	20.72	31.59	21.04	30.70
WT. OF DISH	15.06	15.08	15.82	15.61	15.09	16.14	15.08	15.67	15.75	15.31	15.71	15.20	15.92	15.91	15.77	15.01	15.57	15.17	15.91	15.43
WT. OF WATER	1.15	4.57	1.11	4.90	0.97	6.39	0.82	6.25	1.08	5.27	1.06	5.09	1.17	5.95	1.25	4.74	0.95	6.72	0.97	6.59
WT. OF DRY SOIL	5.29	18.13	5.15	19.37	5.61	17.04	4.75	16.33	4.99	18.79	4.83	19.52	5.87	15.91	6.66	17.81	5.15	15.90	5.13	15.27
WATER CONTENT W _n	21.74	25.20	21.55	24.91	17.29	37.50	17.26	38.27	21.64	27.25	22.0	29.12	19.56	37.39	18.76	37.84	18.44	42.26	18.90	43.15
LIQUID LIMIT LL	25.32	25	24.66	37.68	38	37.47	28.24	28	28.12	38.21	38	37.46	42.11	42	42.03					
PLASTIC INDEX PI	3.58	3	3.11	20.39	20	20.21	6.61	6	6.12	19.65	19	18.70	23.61	23	23.13					
CLASSIFICATION	ML				CL				ML-CL				CL							

A-4-63

HOLE / DEPTH	11.7 11.0-93 141-67.5				11.7 11.0-93 141-67.5				11.7 11.0-93 141-67.5				1				1			
SAMPLE NO. / RUN BY	041 1				041 1				041 1				1				1			
PREP. DISH / TRAY LOCAT.	Jack 1				ORANGE 1				1				1				1			
NO. OF BLOWS	P.L.25		21		P.L.25		22		P.L.25		23		P.L.				P.L.			
DISH NO.	32	15	57	07	57	39	62	41	26	66	27	58								
WT. WET SOIL & DISH	23.43	38.45	22.68	36.66	22.19	35.58	22.84	38.11	22.20	39.39	22.74	38.72								
WT. DRY SOIL & DISH	22.23	31.79	21.62	30.38	21.35	29.99	21.92	31.73	21.30	32.59	21.71	33.17								
WT. OF DISH	15.08	15.33	15.29	15.22	15.76	15.23	15.62	15.24	15.79	15.52	16.07	16.13								
WT. OF WATER	1.20	6.66	1.06	6.28	0.84	5.60	0.92	6.38	1.00	5.80	1.93	5.55								
WT. OF DRY SOIL	7.15	16.46	6.33	15.16	5.59	14.73	6.30	16.49	5.51	18.07	5.74	17.04								
WATER CONTENT W _n	17.78	40.46	16.74	41.42	15.02	37.91	14.60	39.76	15.23	32.09	16.20	32.57								
LIQUID LIMIT LL	40.46	41	40.55	37.96	33	32.27	32.09	32	32.24											

CHEMUNORIENTAL INC
ATTERBERG, -200, MOISTURE & DENSITY
WORKSHEET

LAB NO. _____

JOB NO. 147393 PART NO. _____ PREP. BY: TC DATE 12-1-93
 JOB NAME Elkscro Tangle Lumpy Deposit CALC. BY: TC CKED. BY: SU

HOLE NO. MKS 11193 DEPTH 70-70.5 SAMPLE NO. SAT 043
 SAMPLE DESCRIPTION _____ COLOR _____

<u>ATTERBERG LIMITS</u>		<u>PL</u>	<u>LL</u>
PREP. DISH <u>RIVER</u>		RUN BY _____	
NO. OF BLOWS	_____	23	
DISH NO.	29	L21	
WT. OF WET SOIL & DISH	21.22	39.91	
WT. OF DRY SOIL & DISH	20.52	33.07	
WT. OF DISH	15.91	15.71	
WT. OF WATER	5.70	8.4	
WT. OF DRY SOIL	4.61	17.36	
WATER CONTENT	15.18	39.41	

<u>ATTERBERG LIMITS</u>		<u>PL</u>	<u>LL</u>
PREP. DISH _____		RUN BY _____	
NO. OF BLOWS	_____	24	
DISH NO.	68	51	
WT. OF WET SOIL & DISH	21.71	40.53	
WT. OF DRY SOIL & DISH	20.95	33.52	
WT. OF DISH	15.92	15.36	
WT. OF WATER	2.76	7.01	
WT. OF DRY SOIL	5.03	18.12	
WATER CONTENT	15.11	38.20	

LIQUID LIMIT, LL 39.01
 PLASTIC INDEX, PI 23.83

LIQUID LIMIT, LL 38.40
 PLASTIC INDEX, PI 23.29

LL = 38
 PI = 24

<u>MOISTURE CONTENT</u>	
RUN BY _____	
DISH NO.	_____
WT. OF DISH & WET SOIL	_____
WT. OF DISH & DRY SOIL	_____
WT. OF DISH	_____
WT. OF WATER	_____
WT. OF DRY SOIL	_____

<u>-200</u>	
RUN BY _____	
DISH NO.	_____
WT. OF DISH & DRY SOIL	_____
WT. OF DISH & WASHED SOIL	_____
WT. OF DISH	_____
WT. OF -200	_____
WT. OF TOTAL SOIL DRY	_____
PERCENT -200	_____%

MOISTURE CONTENT _____ %

DATE IN: _____ SUPERVISOR: _____
 LOCATION: _____
 REMARKS: _____

GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 127393 PART NO. _____ PREP. BY SV DATE 11-20-93
 JOB NAME Ebasco Tonalc Arroyo Road CALC. BY SV CKED BY _____

HOLE B-5K-1 DEPTH 1-3 SAMPLE NO. SGT 002
 VISUAL DESCRIPTION: Clay

SAMPLE PREPERATION							SIEVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO.4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE		
DRY WT. RETAINED						RETAINED ON NO. 4		
DRY WT. PASSING						PASSING NO. 4		
% OF TOTAL PASSING								
W% = _____								

SIEVE AND HYDROMETER ANALYSIS				SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W\%}{W} = \frac{2.0025}{1} = 2.0025$			
8 (10)	0			MOISTURE DETERMINATION			
16	0			+4 MATERIAL	-4 MATERIAL	HYDRO. MOISTURE	HYDRO. SAMPLE
30 (40)	0			DISH NO.	ATLAS		
50	0		100	WT. WET SOIL AND DISH	384.13	321.22	51
100	0.04		100	WT. DRY SOIL AND DISH	372.16	318.42	
200	0.24		100	WT. DISH	200.32	" "	0
PAN	0.26		—	WT. OF DRY SOIL	167.826 w		49.780
TOTAL			—	% MOISTURE		2.321	→

HYDROMETER ANALYSIS									
CYLINDER NO. <u>5</u>		SPECIFIC GRAVITY <u>2.7 (Est.)</u>		DISPERSING AGENT <u>4% NaPO₃</u>					
DISH NO. _____		DATE <u>11-20-93</u>		AMOUNT <u>125</u> ml		DATE CALIB _____			
CLOCK TIME	TEST TIME	TEMP. °C	HYD. READ	HYD. CORR.	CORR. READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER	
9:14	START MIX	—	—	—	—				
9:15	STOP MIX	—	—	—	—				
9:15.5	0.5 min.	21	52	5.0	47.0			93	0.05 $\frac{1}{2}$ mm
9:16	1.0 min	21	49	5.0	44.0			85	0.03 $\frac{1}{8}$ mm
9:19	4.0 min	21	40.5	5.0	35.5			71	0.01 $\frac{1}{2}$ mm
9:36	21 $\frac{1}{2}$ min	21	28	5.0	23.0			46	0.00 $\frac{1}{16}$ mm
10:15	60 min	21.2	23	4.9	18.1			36	0.00 $\frac{1}{32}$ mm
4:20	7h 05min	22.6	16	4.3	11.7			23	0.002 mm
10:05	24h 45 min	20	14	5.4	8.6			17	0.001 mm
GRAVEL <u>0%</u>		SAND <u>0%</u>		CLAY-SILT <u>100%</u>		STORAGE LOCATION _____			

* CORRECTION INCLUDES TEMP., MENISCUS, AND DISELUCENT

DATE IN: _____ SUPERVISOR: _____

L-4 (5-85)

LOCATION: _____ A.4-66 _____

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CL

GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 47303 PART NO. _____ PREP. BY --- DATE 11-20-53
 JOB NAME Ebasco Toole Army Depot CALC. BY SU CKED BY SU

HOLE B-BK-2 DEPTH 1-3' SAMPLE NO. 56T 006
 VISUAL DESCRIPTION: Slightlv Sandy Clay

SAMPLE PREPARATION							SIEVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO. 4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE	_____	
DRY WT. RETAINED						RETAINED ON NO. 4	_____	
DRY WT. PASSING						PASSING NO. 4	_____	
% OF TOTAL PASSING						WS = _____		

SIEVE AND HYDROMETER ANALYSIS					SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_2}{W}$ = _____ = <u>2.003366</u>				
8 (10)	0		100	MOISTURE DETERMINATION				
16	0.02		100	MATERIAL	MATERIAL	HYGRO. MOISTURE	HYDRO. SAMPLE	
30 (40)	0.04		100	DISH NO.	POST			
50	0.49		99	WT. WET SOL AND DISH	418.33	354.60	50.90	
100	2.46		95	WT. DRY SOL AND DISH	405.50	351.80		
200	2.55		95	WT. DISH	209.70		0	
PAN			---	WT. OF DRY SOIL	192.06 = W		49.916	
TOTAL			---	% MOISTURE		21.970		

HYDROMETER ANALYSIS										
CYLINDER NO. <u>4</u>		SPECIFIC GRAVITY <u>2.703</u>		DISPERSING AGENT <u>4% NaPO₃</u>						
DISH NO. _____		DATE <u>11-24-53</u>		AMOUNT <u>1.25</u> ml		DATE CALIB. _____				
CLOCK TIME	TEST TIME	TEMP. °C	HYD. READ	HYD. CORR.	CORR. READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER		
9:32	START MIX	---	---	---	---					
9:33	STOP MIX	---	---	---	---					
9:33.5	0.5 min.	21	48	5.0	43.0		85	0.054 mm		
9:34	1.0 min	21	42	5.0	37.0		73	0.064 mm		
9:37	4.0 min	21	34	5.0	29.0		58	0.074 mm		
9:52	18 min	21	24	5.0	19.0		38	0.084 mm		
10:33	60 min	21.4	20	4.8	15.2		30	0.096 mm		
10:33	7h 0min	22.7	14	4.3	9.7		19	0.002 mm		
10:11	2h 38 min	20	13	4.5	7.6		15	0.001 mm		
GRAVEL _____% SAND <u>5%</u> CLAY-SILT <u>95%</u>							STORAGE LOCATION _____			

* CORRECTION INCLUDES TEMP., MENISCUS, AND BUBBLEMENT

DATE IN: _____ SUPERVISOR: _____

L-4 (5-55) LOCATION: _____ A.4-67 _____

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10
CL

GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 1473-93 PART NO. _____ PREP. BY _____ DATE _____
 JOB NAME Ebasco CALC. BY SU CKED BY U

HOLE 30-05A-1 DEPTH 1.5-3 SAMPLE NO. SGT009

VISUAL DESCRIPTION: Clay

SAMPLE PREPERATION							SIEVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO.4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE		
DRY WT. RETAINED						RETAINED ON NO. 4		
DRY WT. PASSING						PASSING NO. 4		
% OF TOTAL PASSING						WX = _____		

SIEVE AND HYDROMETER ANALYSIS							SIEVING TIME	
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{WX}{W} = \underline{\quad\quad\quad} = \underline{2.0656}$				
8 (10)	0			MOISTURE DETERMINATION				
16	0				*4 MATERIAL	-4 MATERIAL	HYDRO. MOUNTING	HYDRO. SAMPLE
30 (40)	0		100	DISH NO.		DOBSON	"	
50	0.02		100	WT. WET SOIL AND DISH		334.04	247.22	5.3
100	0.06		100	WT. DRY SOIL AND DISH	Air dry	298.05	244.52	
200	0.15		100	WT. DISH		137.28	"	0
PAN	0.16		—	WT. OF DRY SOIL		156.922 w	252	A9.582
TOTAL			—	% MOISTURE			2.518	→

HYDROMETER ANALYSIS										
CYLINDER NO. <u>12</u>		SPECIFIC GRAVITY <u>2.7 (Est.)</u>		DISPERSING AGENT <u>4% NaPO₃</u>						
DISH NO. _____		DATE <u>11-24-93</u>		AMOUNT <u>125</u> ml		DATE CALIB _____				
CLOCK TIME	TEST TIME	TEMP. °C	HYD. READ	HYD. CORR.	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER		
10:23	START MIX	—	—	—	—					
10:24	STOP MIX	—	—	—	—					
10:24.5	0.5 min.	21.5	53.5	4.8	48.7		97	0.050 mm		
10:25	1.0 min	21.5	52.5	4.8	47.7		95	0.037 mm		
10:29	5.0 min	21.5	51.5	4.8	46.7		93	0.015 mm		
10:44	20.0 min	21.5	48	4.8	43.2		86	0.009 mm		
11:26	60.2 min	21.7	41.5	4.7	36.8		73	0.005 mm		
4:48	213.84 min	23	31	4.1	26.9		54	0.002 mm		
10:24	240.45 min	30.1	26	5.4	20.6		41	0.001 mm		
GRAVEL _____ %		SAND _____ %		CLAY-SILT _____ %		100 %				
STORAGE LOCATION _____										

* CORRECTION INCLUDES TEMP, MENISCUS, AND BULK DENSITY

DATE IN: _____ SUPERVISOR: _____
 LOCATION: _____ A.4-68 _____

A2
21
CL

GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 1473 03 PART NO. _____ PREP. BY _____ DATE 7-5-52
 JOB NAME Ebasco Toledo Army Depot CALC. BY SU CKED BY _____

HOLE 3025H-2 DEPTH 2-3 SAMPLE NO. 55T013
 VISUAL DESCRIPTION: Clay

SAMPLE PREPARATION							SIEVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO. 4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE	_____	
DRY WT. RETAINED						RETAINED ON NO. 4	_____	
DRY WT. PASSING						PASSING NO. 4	_____	
% OF TOTAL PASSING								
					W% = _____			

SIEVE AND HYDROMETER ANALYSIS					SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_2}{W_1} = \frac{2.08459}{1} = 2.08459$				
10 (20)	0			MOISTURE DETERMINATION				
16	0			MATERIAL	MATERIAL	HYGRO. MOISTURE	HYDRO. SAMPLE	
30 (40)	0			DISH NO.	AFTER	"	"	
50	0		100	WT. WET SOIL AND DISH	380.33	292.00	51.90	
100	0.25		100	WT. DRY SOIL AND DISH	342.90	292.26		
200	0.25		99	WT. DISH	131.43	"	0	
PAN	0.26		—	WT. OF DRY SOIL	199.30	9.24	47.971	
TOTAL			—	% MOISTURE		6.06	→	

HYDROMETER ANALYSIS						SIEVING TIME			
CYLINDER NO. <u>11</u>		SPECIFIC GRAVITY <u>2.7 (Est.)</u>		DISPERSING AGENT <u>4% NaPO₃</u>					
DISH NO. _____		DATE _____		AMOUNT <u>125</u> ml		DATE CALIB _____			
CLOCK TIME	TEST TIME	TEMP. C	HYD. READ	HYD. CORR	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER	
10:03	START MIX	—	—	—	—				
10:04	STOP MIX	—	—	—	—				
10:04.5	0.5 min.	21.5	52	4.9	47.1		97	0.050 ₂ mm	
10:05	1.0 min	21.3	50	4.9	45.1		93	0.037 ₈ mm	
10:09	5.0 min	21.3	47.5	4.9	42.6		88	0.018 ₇ mm	
10:31	27.0 min	21.3	42.5	4.9	37.6		78	0.008 ₈ mm	
11:04	60 min	21.5	38	4.8	33.2		69	0.005 mm	
4:45	2h 40 min	22.6	26.5	4.3	22.2		46	0.002 mm	
10:18	2h 45 min	22.0	22	5.4	16.6		34	0.001 mm	
GRAVEL _____ SAND _____ CLAY-SILT _____						STORAGE LOCATION _____			

* CORRECTION INCLUDES TEMP., MENISCUS, AND SEDIMENT

DATE IN: _____ SUPERVISOR: _____
 LOCATION: _____ A.4-69

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22
CL

GRADATION ANALYSIS

WORKSHEET

LAB NO _____

JOB NO. 147393 PART NO. _____ PREP. BY _____ DATE _____
 JOB NAME Ebasco Tackle Army - etc CALC. BY SU CKED. BY _____

HOLE 31-BK DEPTH 1-3 SAMPLE NO. 5-0-3
 VISUAL DESCRIPTION: Silt and Clay

SAMPLE PREPERATION							SIEVING TIME _____	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO.4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE		
DRY WT. RETAINED						RETAINED ON NO. 4		
DRY WT. PASSING						PASSING NO. 4		
% OF TOTAL PASSING						W% = _____		

SIEVE AND HYDROMETER ANALYSIS					SIEVING TIME _____			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_2}{W} = \text{_____} = 2.1440$				
8 (10)				MOISTURE DETERMINATION				
16	0		100		+4 MATERIAL	-4 MATERIAL	HYGRO. MOISTURE	HYDRO. SAMPLE
30 (40)	9.02		100	DISH NO.		LHPSA	"	"
50	0.07		100	WT. WET SOIL AND DISH		304.25	255.00	5.15
100	0.52		99	WT. DRY SOIL AND DISH	Dividing	276.17	242.74	
200	1.28		97	WT. DISH		128.58	"	"
PAN	1.36		---	WT. OF DRY SOIL		153.297 W	"	46.233
TOTAL			---	% MOISTURE			9.258	"

HYDROMETER ANALYSIS						SIEVING TIME _____		
CYLINDER NO. <u>13</u>		SPECIFIC GRAVITY <u>2.7 (Est.)</u>		DISPERSING AGENT <u>4% NaPO₃</u>				
DISH NO. _____		DATE <u>11-24-93</u>		AMOUNT <u>105</u> ml		DATE CALIB _____		
CLOCK TIME	TEST TIME	TEMP. °C	HYD. READ	HYD. CORR.	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER
9:42	START MIX	---	---	---	---			
9:43	STOP MIX	---	---	---	---			
9:43.5	0.5 min.	21	46	5.0	41.0		87	0.05 ϕ mm
9:44	1.0 min	21	39	5.0	34.0		72	0.08 ϕ mm
9:47	4.0 min	21	33.5	5.0	28.5		61	0.0+ ϕ mm
10:02	19 min	21	24	5.0	19.0		40	0.08 ϕ mm
10:43	60 min	21.4	17	4.9	12.2		26	0.00 ϕ mm
4:40	2h 47 min	22.5	10.5	4.4	6.1		13	0.002 mm
10:13	2h 48 min	20	9.5	5.4	4.1		9	0.001 mm
GRAVEL <u>0%</u> SAND <u>3%</u> CLAY-SILT <u>97%</u>						STORAGE LOCATION _____		

* CORRECTION INCLUDES TEMP., MENISCUS, AND SEDIMENT

DATE IN: _____ SUPERVISOR: _____
 L-4 (5-85) LOCATION: _____ A.4-70 _____

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7
ML-CL

GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 147393 PART NO. _____ PREP. BY _____ DATE 11-24-93
 JOB NAME EBASCO Trench & Area 4 Dept CALC. BY SU CKED. BY SU

HOLE 31-BK-2 DEPTH 1-2.5 SAMPLE NO. 551322
 VISUAL DESCRIPTION: Clayey Sandy Gravel

SAMPLE PREPERATION							SIEVING TIME	
SIEVE SIZE	OF PAN AND SAMPLE	3"	1 1/2"	3/4"	3/8"	NO.4	WET	DRY
WT. OF PAN								
DRY WT. RETAINED		0	23.72	51.47	91.02		TOTAL SAMPLE	206246
DRY WT. PASSING							RETAINED ON NO. 4	
% OF TOTAL PASSING		100	68	75	56		PASSING NO. 4	
W% = _____								

SIEVE AND HYDROMETER ANALYSIS				SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_x}{W}$ = _____ = <u>0.9652</u>			
8(10)	10.53		46	MOISTURE DETERMINATION			
16	2.08		44	MATERIAL	MATERIAL	HYGRO. MOISTURE	HYDRO. SAMPLE
30(40)	4.57		42	DISH NO.	SHANANA	" "	" "
50	6.98		40	WT. WET SOIL AND DISH	51.37	191.54	50.89
100	9.66		37	WT. DRY SOIL AND DISH	342.95	178.96	
200	12.49		34	WT. DISH	131.51	" "	0
PAN	12.49		—	WT. OF DRY SOIL	95716 = W	2.58	48.266
TOTAL			—	% MOISTURE		5.437	

HYDROMETER ANALYSIS										
CYLINDER NO. <u>2</u>		SPECIFIC GRAVITY <u>2.707</u>		DISPERSING AGENT <u>4% NaPO₃</u>						
DISH NO. _____		DATE <u>11-24-93</u>		AMOUNT <u>1.25</u> ml		DATE CALIB _____				
CLOCK TIME	TEST TIME	TEMP. C	HYD. READ	HYD. CORR.	CORR. READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER		
10:16	START MIX	—	—	—	—					
10:17	STOP MIX	—	—	—	—					
10:17.5	0.8 min.	21.4	36	4.8	31.2			30	0.050 ₂₀ mm	
10:18	1.0 min	21.4	30	4.8	25.2			24	0.060 ₁₄ mm	
10:21	4.0 min	21.4	22	4.8	17.2			16	0.075 ₁₀ mm	
10:36	19 min	21.4	15.5	4.8	10.7			10	0.088 ₁₁ mm	
11:17	60 min	21.7	12	4.7	7.3			7	0.098 ₁₆ mm	
4:46	7h 38.9 min	22.6	9	4.3	4.7			4	0.0073 mm	
10:21	20h 48 min	20	8.5	5.4	3.1			3	0.001 mm	
GRAVEL <u>45</u>		SAND <u>22</u>		CLAY-SILT <u>33</u>		STORAGE LOCATION _____				

* CORRECTION INCLUDES TEMP, MENISCUS, AND BUBBLES

DATE IN: _____ SUPERVISOR: _____
 L-4 (5-85) LOCATION: _____ A.4-71 _____

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11
CL

HYDROMETER

GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 1-17-74 PART NO. _____ PREP. BY SV DATE _____
 JOB NAME ROADSIDE SHOULDER CALC. BY SV CHECKED BY SI

HOLE NO. 1 DEPTH 0.5 SAMPLE NO. 1st cut
 VISUAL DESCRIPTION: Sandy Silt

SAMPLE PREPARATION							SIEVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO. 4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE		
DRY WT. RETAINED					0	RETAINED ON NO. 4		
DRY WT. PASSING						PASSING NO. 4		
% OF TOTAL PASSING					100			
W% = _____								

SIEVE AND HYDROMETER ANALYSIS				SIEVING TIME	
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_2}{W_1} = \frac{2.03021}{1} = 2.03021$	

MOISTURE DETERMINATION							
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	MOISTURE MATERIAL	HYDRO. MOISTURE	HYDRO. SAMPLE	
16	0.06		100				
30	4.36		99	DISH NO.	TIBC+		
50	1.50		97	WT. WET SOIL AND DISH		219.45	50.1
100	5.00		90	WT. DRY SOIL AND DISH	130.73	217.80	
200	10.74		78	WT. DISH			
PAN	11.05		—	WT. OF DRY SOIL			49.178
TOTAL			—	% MOISTURE		1.995	

RUN BY _____ **HYDROMETER ANALYSIS**
 CYLINDER NO. 1 SPECIFIC GRAVITY 2.7 (Est.) DISPERSING AGENT 4% NaPO3
 DISH NO. _____ DATE 3.14.94 AMOUNT 125 ml DATE CALIB 3-22-73

CLOCK TIME	TEST TIME	TEMP. C	HYD. READ	HYD. CORR.	CORR. READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER
9:37	START MIX	—	—	—	—			
9:28	STOP MIX	—	—	—	—			
9:55	0.5 min.	21.8	26.5	A.8	21.2		43	0.075 mm
9:59	1.0 min	21.5	24.0	A.8	19.2		39	0.075 mm
—	4.0 min	21.2	24.5	A.8	19.7			0.075 mm
9:52	24 min	22	19.0	A.7	14.3		29	0.0075 mm
10:00	60 min	22	16.0	A.7	11.3		23	0.0075 mm
10:07	74 min	23.2	11.5	A.2	7.3		15	0.002 mm
10:00	2 1/2 hr	17.8	10.4	6.1	4.3		9	0.001 mm
GRAVEL <u>0%</u> SAND <u>22%</u> CLAY-SILT <u>78%</u>			STORAGE LOCATION _____					

* CORRECTION INCLUDES TEMP., MENISCUS, AND BUBBLES

DATE IN: _____ SUPERVISOR: _____
 LOCATION: _____ A.4-72 _____

25
3
100

HYDROMETER

GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 1127-94 PART NO. _____ PREP. BY SV DATE _____
 JOB NAME Gravel CALC. BY SV CKED. BY SV

HOLE 31-2 DEPTH 1.5-3 SAMPLE NO. 617 034

VISUAL DESCRIPTION: Sandy Clay

RUN BY _____		SAMPLE PREPERATION					SIEVING TIME _____	
SIEVE SIZE		3"	1 1/2"	3/4"	3/8"	NO.4	SAMPLE WEIGHTS	
OF PAN AND SAMPLE							WET	DRY
WT. OF PAN							TOTAL SAMPLE	_____
DRY WT. RETAINED							RETAINED ON NO. 4	_____
DRY WT. PASSING							PASSING NO. 4	_____
% OF TOTAL PASSING							W% = _____	

RUN BY _____		SIEVE AND HYDROMETER ANALYSIS				SIEVING TIME _____			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{Wx}{W} = 2.02957$					
8 (10)	0		100	MOISTURE DETERMINATION					
16	0.14		100	MATERIAL	-4 MATERIAL	HYDRO. MOISTURE	HYDRO. SAMPLE		
30 (40)	0.34		99	DISH NO.					
50	0.60		99	WT. WET SOIL AND DISH		212.16		50.04	
100	2.79		94	WT. DRY SOIL AND DISH		262.47		310.77	
200	8.30		83	WT. DISH					
PAN	8.53		—	WT. OF DRY SOIL		= W		49.296	
TOTAL			—	% MOISTURE				1.510	→

RUN BY _____		HYDROMETER ANALYSIS				SIEVING TIME _____				
CYLINDER NO. <u>2</u>		SPECIFIC GRAVITY <u>2.7 (2.65)</u>		DISPERSING AGENT <u>4% NaPO3</u>						
DISH NO. _____		DATE <u>3-11-94</u>		AMOUNT <u>125 ml</u>		DATE CALIB <u>3-08-93</u>				
CLOCK TIME	TEST TIME	TEMP. °C	HYD. READ	HYD. CORR.	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER		
9:31	START MIX	—	—	—	—		—	—	—	—
9:35	STOP MIX	—	—	—	—		—	—	—	—
9:35.5	0.5 min.	22	45.0	4.7	40.3		82	0.05 mm		
10:30	1.0 min	22	37.0	4.7	32.3		65	0.025 mm		
10:35	4.0 min	22	32.0	4.7	27.3		55	0.015 mm		
10:51	18 min	22	24.0	4.7	24.3		49	0.0075 mm		
10:32	60 min	22	25.0	4.7	20.3		41	0.004 mm		
4:37	417 min	23.5	20.5	4.2	16.3		33	0.002 mm		
10:04	241 min	17.8	18.1	6.1	12.0		24	0.001 mm		
GRAVEL <u>0%</u>		SAND <u>17%</u>		CLAY-SILT <u>83%</u>		STORAGE LOCATION _____				

* CORRECTION INCLUDES TEMP., MENISCUS, AND SEDIMENT

DATE IN: _____ SUPERVISOR: _____

L-4 (5-85) LOCATION: _____ A.4-73 _____

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HYDROMETER

GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 1-137-9d PART NO. _____ PREP. BY KL DATE _____

JOB NAME for 2.6 CALC. BY GV CKED BY SV

HOLE 2-10-17 DEPTH _____ SAMPLE NO. 217-003

VISUAL DESCRIPTION: Slightly Sandy Silt and Clay

SAMPLE PREPARATION							SIEVING TIME	
SIEVE SIZE		3"	1 1/2"	3/4"	3/8"	NO. 4	SAMPLE WEIGHTS	
OF PAN AND SAMPLE							WET	DRY
WT. OF PAN							TOTAL SAMPLE	_____
DRY WT. RETAINED							RETAINED ON NO. 4	_____
DRY WT. PASSING							PASSING NO. 4	_____
% OF TOTAL PASSING								
W% = _____								

SIEVE AND HYDROMETER ANALYSIS				SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_2}{W} = \frac{203.402}{100} = 2.03402$			
8 (10)	0		100	MOISTURE DETERMINATION			
16	0		100	MATERIAL	MATERIAL	HYGRO. MOISTURE	HYDRO. SAMPLE
30 (40)	0		100	DISH NO.	6068	"	
50	0.05		100	WT. WET SOIL AND DISH		229.58	50.1
100	0.52		99	WT. DRY SOIL AND DISH	679.30	277.61	
200	2.31		95	WT. DISH	131.35	131.35	8
PAN	2.39		—	WT. OF DRY SOIL		W	49.164
TOTAL			—	% MOISTURE		2.047	→

HYDROMETER ANALYSIS										
CYLINDER NO. <u>4</u>		SPECIFIC GRAVITY <u>2.7 (Est.)</u>			DISPERSING AGENT <u>4% NaPO₃</u>					
DISH NO. _____		DATE <u>2-11-9d</u>		AMOUNT <u>125 ml</u> DATE CALIB <u>3-08-93</u>						
CLOCK TIME	TEST TIME	TEMP. C	HYD. READ	HYD. CORR	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER		
9:37	START MIX	—	—	—	—		—	—	—	
9:39	STOP MIX	—	—	—	—		—	—	—	
9:39.5	0.5 min.	22	48.0	4.7	433		88	0.054 mm		
9:40	1.0 min	22	44.0	4.7	393		80	0.025 mm		
9:43	4.0 min	22	36.5	4.7	31.8		65	0.015 mm		
9:58	19 min	22	30.0	4.7	253		51	0.0075 mm		
10:19	60 min	22.1	21.5	4.7	19.8		40	0.004 mm		
10:29	7h 0 min	23.5	16.0	4.3	11.7		7.4	0.002 mm		
10:07	2h 45 min	17.8	13.5	6.1	7.4		15.1	0.001 mm		
GRAVEL _____		SAND _____		CLAY-SILT _____		STORAGE LOCATION _____				

* CORRECTION INCLUDES TEMP., MENISCUS, AND BULB COEFFICIENT

DATE IN: _____ SUPERVISOR: _____

L-4 (5-85) LOCATION: _____ A.4-74 _____

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L.C.
M.L.C.

GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 137-24 PART NO. _____ PREP. BY SS DATE _____
 JOB NAME EMERALD TRUCK CALC. BY SU CKED. BY SU

HOLE NO. 137-24 DEPTH 1.0 SAMPLE NO. 137-24

VISUAL DESCRIPTION: Clay

SAMPLE PREPARATION							SIEVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO. 4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE		
DRY WT. RETAINED						RETAINED ON NO. 4		
DRY WT. PASSING						PASSING NO. 4		
% OF TOTAL PASSING								
W% = _____								

SIEVE AND HYDROMETER ANALYSIS				SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_s}{W} =$ _____ = <u>2.04241</u>			
8 (10)	0		100	MOISTURE DETERMINATION			
16	0		100	MATERIAL	-4 MATERIAL	HYDRO. MOISTURE	HYDRO. SAMPLE
30 (40)	0.05		100	DISH NO.	5111		
50	0.05		100	WT. WET SOIL AND DISH		274.87	50.14
100	0.13		100	WT. DRY SOIL AND DISH	325.14	271.28	
200	1.57		97	WT. DISH	125.00		0
PAN	1.62		—	WT. OF DRY SOIL	= W		48.962
TOTAL			—	% MOISTURE		2.407	→

HYDROMETER ANALYSIS						
CYLINDER NO. <u>5</u>		SPECIFIC GRAVITY <u>2.7 (Est.)</u>		DISPERSING AGENT <u>4% NaPO₃</u>		
DISH NO. _____		DATE <u>3.14.94</u>		AMOUNT <u>125</u> ml		DATE CALIB <u>3-08-93</u>
CLOCK TIME	TEST TIME	TEMP. °C	HYD. READ	HYD. CORR	CORR READ	% OF TOTAL PASSING
9:46	START MIX	—	—	—	—	—
9:47	STOP MIX	—	—	—	—	—
9:47.5	0.5 min.	22	48.0	4.7	43.3	88
9:48	1.0 min	22	45.0	4.7	40.3	82
9:51	4.0 min	22	35.5	4.7	30.8	63
10:05	15 min	22	30.5	4.7	25.8	53
10:47	60 min	22.1	21.0	4.7	19.3	39
11:32	1h 40 min	22.5	17.0	4.3	12.7	26
11:41	2h 40 min	17.8	13.2	6.1	7.1	15
GRAVEL <u>0%</u> SAND <u>3%</u> CLAY-SILT <u>97%</u>						STORAGE LOCATION _____

* CORRECTION INCLUDES TEMP., MENISCUS, AND DISPLACEMENT

DATE IN: _____ SUPERVISOR: _____
 LOCATION: _____ A.4-75 _____

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GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 1-137-911 PART NO. _____ PREP. BY _____ DATE _____
 JOB NAME EMULSION CALC. BY SU CKED BY SI

HOLE 5109-93 DEPTH 70-11 SAMPLE NO. 55-027

VISUAL DESCRIPTION: Clay

SAMPLE PREPERATION							SIEVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO.4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE	_____	
DRY WT. RETAINED						RETAINED ON NO. 4	_____	
DRY WT. PASSING						PASSING NO. 4	_____	
% OF TOTAL PASSING								
						W% = _____		

SIEVE AND HYDROMETER ANALYSIS				SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_s}{W} = 2.07613$			
8 (10)	0		100	MOISTURE DETERMINATION			
16	0.21		100	MATERIAL	MATERIAL	HYDRO. MOISTURE	HYDRO. SAMPLE
30 (40)	6.60		99	DISH NO.	N/A		
50	0.76		98	WT. WET SOIL AND DISH		245.72	50.32
100	2.74		98	WT. DRY SOIL AND DISH	296.31	240.77	
200	1.85		96	WT. DISH	132.12	32.12	
PAN	1.89			WT. OF DRY SOIL	= W		49.120
TOTAL				% MOISTURE		9.592	

HYDROMETER ANALYSIS									
CYLINDER NO. <u>6</u>		SPECIFIC GRAVITY <u>2.7 (E.S.)</u>		DISPERSING AGENT <u>4% NaPO₃</u>					
DISH NO. _____		DATE <u>2-11-74</u>		AMOUNT <u>125</u> ml					
DATE CALIB <u>3-08-93</u>									
CLOCK TIME	TEST TIME	TEMP. C	HYD. READ	HYD. CORR.	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER	
9:54	START MIX	---	---	---	---				
7:55	STOP MIX	---	---	---	---				
8:59	0.5 min.	22.1	49.0	4.7	44.3		90	0.05 mm	
9:16	1.0 min	22.1	44.0	4.7	39.3		80	0.03 mm	
9:34	4.0 min	22.1	40.0	4.7	35.3		72	0.02 mm	
10:18	23+5 min	22.1	34.5	4.7	29.3		60	0.008 mm	
	60 min	22.2	31.5	4.7	26.8		55	0.006 mm	
11:33	7h 39 min	23.5	23.0	4.3	18.7		38	0.002 mm	
10:14	26h 45 min	17.8	18.2	6.1	12.1		25	0.001 mm	
GRAVEL _____		SAND <u>4%</u>		CLAY-SLT <u>96%</u>		STORAGE LOCATION _____			

* CORRECTION INCLUDES TEMP, MENISCUS, AND DISPLACEMENT

DATE IN: _____ SUPERVISOR: _____

L-4 (5-85) LOCATION: _____ A.4-76 _____

414
2-11-74
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HYDROMETER

GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 1137-94 PART NO. _____ PREP. BY _____ DATE _____
 JOB NAME CONCRETE TOWER CALC. BY SU CKED BY SU

MOLE MS-11-93 DEPTH 67.0-67.5 SAMPLE NO. SKT 111
 VISUAL DESCRIPTION: Slightly Sandy Clay

SAMPLE PREPARATION							SEIVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO.4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE		
DRY WT. RETAINED						RETAINED ON NO. 4		
DRY WT. PASSING						PASSING NO. 4		
% OF TOTAL PASSING								
					WS =			

SIEVE AND HYDROMETER ANALYSIS				SEIVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{Wx}{W} = \frac{100}{99} = 1.03194$			
8 (10)	0		100	MOISTURE DETERMINATION			
16	0		100	MO. MATERIAL	HYDRO. MATERIAL	HYDRO. MOISTURE	HYDRO. SAMPLE
30 (40)	0		100	DISH NO.	1156		
50	0		100	WT. WET SOIL AND DISH		297.25	50.38
100	0.26		99	WT. DRY SOIL AND DISH	348.56	293.7	
200	2.93		94	WT. DISH	189.61	189.61	0
PAN	3.05		—	WT. OF DRY SOIL		W	49.214
TOTAL			—	% MOISTURE			2.369 →

HYDROMETER ANALYSIS							
CYLINDER NO. <u>7</u>	SPECIFIC GRAVITY <u>2.7 (5.0)</u>		DISPERSING AGENT <u>4% NaPO₃</u>				
DISH NO. _____	DATE <u>3-14-94</u>	AMOUNT <u>125 ml</u>	DATE CALIB <u>3-02-93</u>				
CLOCK TIME	TEST TIME	TEMP. C	HYD. READ	HYD. CORR	CORR READ	% OF TOTAL PASSING	
10:07	START MIX	—	—	—	—	—	
10:08	STOP MIX	—	—	—	—	—	
10:15	0.5 min.	22.2	50.	4.7	45.3	92	
10:19	1.0 min	22.2	42.5	4.7	37.8	77	
10:21	4.0 min	22.2	37.0	4.7	32.3	66	
10:21	19 min	22.2	34.	4.7	29.3	60	
10:21	60 min	22.5	29.5	4.6	24.9	51	
10:35	1h 38 min	23.5	23.0	4.3	18.7	38	
10:15	2h 45 min	17.8	19.0	6.1	12.9	26	
GRAVEL	0%	SAND	6%	CLAY-SILT	94%	STORAGE LOCATION _____	

* CORRECTION INCLUDES TEMP., MENISCUS, AND BUBBLE/LIFT

DATE IN: _____ SUPERVISOR: _____

L-4 (5-85) LOCATION: _____ A.4-77 _____

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34
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FORM NO. 101

GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 101-10 PART NO. _____ PREP. BY SV DATE _____
 JOB NAME _____ CALC. BY SV CKED BY SV

HOLE MS-10-93 DEPTH 475-65.1 SAMPLE NO. 25-041
 VISUAL DESCRIPTION: Slightly Sandy Clay

SAMPLE PREPERATION							SIEVING TIME	
SIEVE SIZE		3"	1 1/2"	3/4"	3/8"	NO.4	SAMPLE WEIGHTS	
OF PAN AND SAMPLE							WET	DRY
WT. OF PAN							TOTAL SAMPLE	_____
DRY WT. RETAINED							RETAINED ON NO. 4	_____
DRY WT. PASSING							PASSING NO. 4	_____
% OF TOTAL PASSING							W% = _____	

SIEVE AND HYDROMETER ANALYSIS				SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_x}{W} = \frac{25}{22} = 1.136$			
8 (10)	0		100	MOISTURE DETERMINATION			
16	0		100	NO. 4 MATERIAL	NO. 2 MATERIAL	HYDRO. MOISTURE	HYDRO. SAMPLE
30 (40)	0		100	DISH NO.	5111		
50	0.02		100	WT. WET SOIL AND DISH		250.83	50.4
100	0.28		99	WT. DRY SOIL AND DISH	301.56	248.40	
200	2.35		95	WT. DISH			
PAN	2.43		—	WT. OF DRY SOIL			49.401
TOTAL			—	% MOISTURE		2062	→

RUN BY _____ **HYDROMETER ANALYSIS**
 CYLINDER NO. 9 SPECIFIC GRAVITY 2.71 Est. DISPERSING AGENT 4% NaPO₃
 DISH NO. _____ DATE 3-12-94 AMOUNT 125 ml DATE CALIB 3-08-93

CLOCK TIME	TEST TIME	TEMP. C	HYD. READ	HYD. CORR	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER
10:14	START MIX	—	—	—	—		—	—
10:15	STOP MIX	—	—	—	—		—	—
10:15.5	0.5 min.	22.2	52.0	A.7	47.3		96	0.05 ₂ mm
10:16	1.0 min	22.2	49.5	A.7	40.8		83	0.03 ₇₅ mm
10:17	4.0 min	22.2	42.5	A.7	37.8		77	0.01 ₅₀ mm
10:18	19 min	22.2	36.0	A.7	31.3		63	0.00 ₇₅ mm
10:19	60 min	22.5	32.5	A.6	27.9		56	0.00 ₆₀ mm
10:37	2h 38.2 min	23.5	25.0	A.3	20.7		42	0.002 mm
10:18	2h 45 min	17.8	20.3	6.1	14.2		29	0.001 mm

GRAVEL 0% SAND 5% CLAY-SILT 95% STORAGE LOCATION _____

* CORRECTION INCLUDES TEMP., MENISCUS, AND BUBBLES

DATE IN: _____ SUPERVISOR: _____

L-4 (5-85) LOCATION: _____ A.4-78 _____

Handwritten notes: CLAY

GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 1127-94 PART NO. _____ PREP. BY _____ DATE _____
 JOB NAME _____ CALC. BY SU CKED. BY SU

HOLE M-118-93 DEPTH _____ SAMPLE NO. _____
 VISUAL DESCRIPTION: Slightly Sandy Clay

SAMPLE PREPARATION							SIEVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO. 4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE	_____	
DRY WT. RETAINED						RETAINED ON NO. 4	_____	
DRY WT. PASSING						PASSING NO. 4	_____	
% OF TOTAL PASSING								
						W% = _____		

SIEVE AND HYDROMETER ANALYSIS					SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_2}{W}$ = _____				
8 (10)	0		100		MOISTURE DETERMINATION			
16	0		100		MATERIAL	-2 MATERIAL	HYGRO. MOISTURE	HYDRO. SAMPLE
30 (40)	0.04		100	DISH NO.	GID			
50	6.57		100	WT. WET SOIL AND DISH			297.01	50.38
100	6.34		99	WT. DRY SOIL AND DISH		349.08	294.07	
200	2.48		95	WT. DISH		130.64	150.64	-
PAN	2.55		---	WT. OF DRY SOIL		= W		49.490
TOTAL			---	% MOISTURE			1.799	→

HYDROMETER ANALYSIS										
CYLINDER NO. <u>11</u>		SPECIFIC GRAVITY <u>2.7 (Est.)</u>			DISPERSING AGENT <u>1% NaPO₃</u>					
DISH NO. _____		DATE <u>3-14-94</u>		AMOUNT <u>125ml</u>		DATE CALIB <u>3-08-93</u>				
CLOCK TIME	TEST TIME	TEMP. °C	HYD. READ	HYD. CORR.	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER		
10:21	START MIX	---	---	---	---					
10:27	STOP MIX	---	---	---	---					
10:29.5	0.5 min.	22.3	48.	4.7	43.3			88	0.05 ϕ mm	
10:33	1.0 min	22.3	43.5	4.7	38.8			78	0.037 ϕ mm	
10:36	4.0 min	22.3	38.0	4.7	33.3			67	0.015 ϕ mm	
10:41	19 min	22.3	33.0	4.7	28.3			57	0.007 ϕ mm	
10:43	60 min	22.6	27.0	4.6	22.4			45	0.004 ϕ mm	
10:39	27 min	23.5	21.0	4.3	16.7			34	0.002 mm	
10:19	24 45 min	17.8	18.1	6.1	12.0			24	0.001 mm	
GRAVEL _____		SAND <u>5%</u>		CLAY-SILT <u>95%</u>		STORAGE LOCATION _____				

* CORRECTION INCLUDES TEMP., MENISCUS, AND MENISCUS

DATE IN: _____ SUPERVISOR: _____

L-4 (5-85) LOCATION: _____ A.4-79 _____

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162
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GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 147393 PART NO. _____ PREP. BY _____ DATE _____
 JOB NAME Missoua Traffic Light Detest CALC. BY JK CKED BY _____

HOLE MWS III-93 DEPTH 20-20.5 SAMPLE NO. 55-043
 VISUAL DESCRIPTION: Clay

SAMPLE PREPERATION							SIEVING TIME _____	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO.4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE	_____	
DRY WT. RETAINED						RETAINED ON NO. 4	_____	
DRY WT. PASSING						PASSING NO. 4	_____	
% OF TOTAL PASSING						W% = _____		

SIEVE AND HYDROMETER ANALYSIS					SIEVING TIME _____			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_2}{W} = \frac{2.03998}{1} = 2.03998$				
8 (10)	0			MOISTURE DETERMINATION				
16	0			MATERIAL	MATERIAL	HYGRO. MOISTURE	HYDRO. SAMPLE	
30 (40)	0			DISH NO.		RADIO	"	
50	0		100	WT. WET SOIL AND DISH		523.97	406.46	
100	6.10		100	WT. DRY SOIL AND DISH		458.63	450.43	
200	1.43		97	WT. DISH		239.88	"	
PAN	1.55		—	WT. OF DRY SOIL		2107.2 W	49020	
TOTAL			—	% MOISTURE			3.814 →	

HYDROMETER ANALYSIS										
CYLINDER NO. <u>7</u>		SPECIFIC GRAVITY <u>2.7 (Est.)</u>			DISPERSING AGENT <u>4% Na PO3</u>					
DISH NO. _____		DATE <u>11-29-93</u>		AMOUNT <u>125</u> ml			DATE CALIB. _____			
CLOCK TIME	TEST TIME	TEMP. °C	HYD. READ	HYD. CORR.	CORR. READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER		
9:02	START MIX	—	—	—	—		—	—	—	—
9:03	STOP MIX	—	—	—	—		—	—	—	—
9:03.5	0.5 min.	21.4	46.5	4.8	41.7		84	0.0505 mm		
9:04	1.0 min	21.4	44	4.8	39.2		79	0.008 mm		
9:09	6.0 min	21.4	38.5	4.8	33.7		68	0.015 mm		
9:22	19 min	21.4	34	4.9	29.2		59	0.008 mm		
10:03	60 min	21.4	29	4.6	24.2		49	0.008 mm		
4:11	7h 8 min	23.1	20	4.1	15.9		32	0.002 mm		
9:45	2h 45 min	21.5	17.5	4.8	12.7		26	0.001 mm		
GRAVEL <u>0%</u> SAND <u>3%</u> CLAY-SILT <u>97%</u>							STORAGE LOCATION _____			

* CORRECTION INCLUDES TEMP., MENISCUS, AND BUBBLEMENT

DATE IN: _____ SUPERVISOR: _____
 LOCATION: _____ A.4-80 _____

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GRADATION ANALYSIS

WORKSHEET

LAB NO _____

JOB NO. 147393

PART NO. _____

PREP. BY _____ DATE _____

JOB NAME Ebasso Traffic Area

CALC. BY SU CKED BY SU

HOLE M111-93 DEPTH 20.5-71 SAMPLE NO. 3591022

VISUAL DESCRIPTION: Clay

RUN BY _____

SAMPLE PREPERATION

SIEVING TIME _____

SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO.4	SAMPLE WEIGHTS	
						WET	DRY
OF PAN AND SAMPLE							
WT. OF PAN						TOTAL SAMPLE	
DRY WT. RETAINED						RETAINED ON NO. 4	
DRY WT. PASSING						PASSING NO. 4	
% OF TOTAL PASSING							
							WS = _____

RUN BY _____

SIEVE AND HYDROMETER ANALYSIS

SIEVING TIME _____

SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{WS}{W} = \text{_____} = 2032644$			
8 (10)	0			MOISTURE DETERMINATION			
16	5		100	MATERIAL	MATERIAL	HYGRO. MOISTURE	HYDRO. SAMPLE
30 (40)	2.01		100	DISH NO.	490.71	381.40	50.93
50	0.01		100	WT. WET SOL AND DISH	433.41	376.43	
100	2.09		96	WT. DRY SOL AND DISH	241.18		
200	2.04			WT. DISH	185.91 = W		49.107
PAN	2.14			WT. OF DRY SOIL			
TOTAL				% MOISTURE		3.522	→

RUN BY _____

HYDROMETER ANALYSIS

CYLINDER NO. 4 SPECIFIC GRAVITY 2.7 (Eg+) DISPERSING AGENT 4% NaPO₃
 DISH NO. _____ DATE 11-29-93 AMOUNT 425 ml DATE CALIB _____

CLOCK TIME	TEST TIME	TEMP. C	HYD. READ	HYD. CORR	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER	
9:26	START MIX	—	—	—	—		—	—	—
9:27	STOP MIX	—	—	—	—		—	—	—
9:27.5	0.5 min.	21.5	46	A.8	41.2		83	0.0505 mm	
9:28	1.0 min	21.5	41	A.9	36.2		73	0.084 mm	
9:31	4.0 min	21.5	34.5	A.8	29.7		60	0.025 mm	
9:46	19 min	21.5	28.5	A.8	23.7		48	0.008 mm	
10:36	69.50 min	22	22.5	A.6	17.9		36	0.006 mm	
4:16	7h 40.9 min	23.3	17	A.0	13.0		26	0.002 mm	
9:50	2h 45 min	21.5	15	A.8	10.2		21	0.001 mm	

GRAVEL 0% SAND 4% CLAY-SLT 96% STORAGE LOCATION _____

* CORRECTION INCLUDES TEMP., MENISCUS, AND BURETTE

DATE IN: _____ SUPERVISOR: _____

L-4 (5-85) LOCATION: _____ A.4-81 _____

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GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 147393 PART NO. _____ PREP. BY T.C. DATE _____
 JOB NAME Ebasco CALC. BY SU CKED BY _____

HOLE W1511123 DEPTH 71.0-71.5 SAMPLE NO. SGT 243
 VISUAL DESCRIPTION: Slightly sandy clay

SAMPLE PREPERATION							SIEVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO.4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE	_____	
DRY WT. RETAINED						RETAINED ON NO. 4	_____	
DRY WT. PASSING						PASSING NO. 4	_____	
% OF TOTAL PASSING						W% = _____		

SIEVE AND HYDROMETER ANALYSIS					SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_2}{W} = \frac{2.03157}{1} = 2.03157$				
8 (10)	0			MOISTURE DETERMINATION				
16	0		100	*4 MATERIAL	-4 MATERIAL	HYGRO. MOISTURE	HYDRO. SAMPLE	
30 (40)	0.02		100	DISH NO.	KALSAN	"		
50	0.03		100	WT. WET SOIL AND DISH	398.07	286.02	50	
100	0.11		100	WT. DRY SOIL AND DISH	337.84	281.29		
200	2.25		95	WT. DISH	131.71	"	0	
PAN	2.41		—	WT. OF DRY SOIL	199.812 W		49.223	
TOTAL			—	% MOISTURE		3.162	0.3162	

HYDROMETER ANALYSIS										
CYLINDER NO. <u>9</u>		SPECIFIC GRAVITY <u>2.7 (Est.)</u>		DISPERSING AGENT <u>4% Na PO₃</u>						
DISH NO. _____		DATE <u>11-29-93</u>		AMOUNT <u>1/25</u> ml		DATE CALIB _____				
CLOCK TIME	TEST TIME	TEMP. C°	HYD. READ	HYD. CORR*	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER		
9:16	START MIX	—	—	—	—					
9:17	STOP MIX	—	—	—	—					
9:17.5	0.5 min.	21.3	46.5	A.9	41.6		84	0.05 5 mm		
9:18	1.0 min	21.3	43	A.9	38.1		77	0.00 4 mm		
9:21	4.0 min	21.3	39	A.9	34.1		69	0.0 5 mm		
9:36	19 min	21.3	33	A.9	28.1		57	0.00 10 mm		
10:17	60 min	21.7	26.5	A.7	21.8		44	0.00 6 mm		
4:15	48 min	23.4	18	A.0	14.0		29	0.002 mm		
9:48	2h 45 min	21.5	15.5	A.8	10.7		22	0.001 mm		
GRAVEL _____ %		SAND _____ %		CLAY-SILT _____ %		STORAGE LOCATION _____				

* CORRECTION INCLUDES TEMP., MENISCUS, AND DILUENT

DATE IN: _____ SUPERVISOR: _____
 LOCATION: _____ A.4-82 _____

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GRADATION ANALYSIS

WORKSHEET

LAB NO _____

JOB NO. 197393 PART NO. _____ PREP. BY _____ DATE _____
 JOB NAME ELASCO - sample test CALC. BY SU CKED BY SU

HOLE 3-BK-1 DEPTH 2-1.5 SAMPLE NO. 5 538
 VISUAL DESCRIPTION: 2 1/2" - 1 Sand, Clay

SAMPLE PREPERATION							SIEVING TIME	
SIEVE SIZE	OF PAN AND SAMPLE	3"	1 1/2"	3/4"	3/8"	NO. 4	WET	DRY
WT. OF PAN							TOTAL SAMPLE	17.872
DRY WT. RETAINED							RETAINED ON NO. 4	
DRY WT. PASSING							PASSING NO. 4	
% OF TOTAL PASSING							W% = _____	

SIEVE AND HYDROMETER ANALYSIS					SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_2}{W}$ = _____ = <u>2.0316</u>	MOISTURE DETERMINATION			
10 16	1.04		100		MATERIAL	-4 MATERIAL	HYGRO. MOISTURE	HYDRO. SAMPLE
30 100	2.10		100	DISH NO.		TIM	" "	
50	0.29		99	WT. WET SOL AND DISH		392.35	334.28	51.94
100	1.54		97	WT. DRY SOL AND DISH	Avoidry	385.26	329.72	
200	5.78		88	WT. DISH		199.11	" "	0
PAN	5.97		—	WT. OF DRY SOIL		179.82 w		49.222
TOTAL			—	% MOISTURE				3.5491 →

HYDROMETER ANALYSIS										
CYLINDER NO. <u>9</u>		SPECIFIC GRAVITY <u>2.7 (F. 2)</u>			DISPERSING AGENT <u>4% No 40</u>					
DISH NO. _____		DATE _____			AMOUNT <u>25</u> ml		DATE CALIB _____			
CLOCK TIME	TEST TIME	TEMP. C	HYD. READ	HYD. CORR	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER		
9:53	START MIX	—	—	—	—		—	—	—	
9:54	STOP MIX	—	—	—	—		—	—	—	
9:54.5	0.5 min.	21	40	5.0	35.0		70	0.0549 mm		
9:55	1.0 min	21	36	5.0	31.0		62	0.0293 mm		
9:58	4.0 min	21	28.5	5.0	23.5		47	0.0145 mm		
10:13	19 min	21	23.5	5.0	18.5		37	0.0091 mm		
10:54	60 min	21.5	19	4.8	14.2		29	0.0046 mm		
4:43	2H 349 min	22.5	13	4.4	8.6		17	0.0023 mm		
10:16	2H 45 min	20	11	5.4	5.4		11	0.001 mm		
GRAVEL _____		SAND <u>12%</u>		CLAY-SILT <u>88%</u>		STORAGE LOCATION _____				

* CORRECTION INCLUDES TEMP, MENISCUS, AND DILUENT

DATE IN: _____ SUPERVISOR: _____
 L-4 (5-85) LOCATION: _____ A.4-83 _____

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GRADATION ANALYSIS

WORKSHEET

LAB NO _____

JOB NO. 147393 PART NO. _____ PREP. BY T.L. DATE 11-24-53
 JOB NAME EL PASO TRAIL LANE 201st CALC. BY SU CKED BY _____

HOLE 3-BK-2 DEPTH 21.5-2 SAMPLE NO. S 8097
 VISUAL DESCRIPTION: Slightly Sandy Clay

SAMPLE PREPERATION							SIEVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO.4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE	225.643	
DRY WT. RETAINED						RETAINED ON NO. 4		
DRY WT. PASSING						PASSING NO. 4		
% OF TOTAL PASSING						W% = _____		

SIEVE AND HYDROMETER ANALYSIS					SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W\%}{W} = \underline{\quad\quad\quad} = 2.06794$				
5 (10)	0.16		100	MOISTURE DETERMINATION				
16	0.05		100	*4 MATERIAL	-4 MATERIAL	HYDRO. MOISTURE	HYDRO. SAMPLE	
30 (40)	0.10		100	DISH NO.	AR1	" "	" "	
50	0.17		100	WT. WET SOIL AND DISH	383.51	318.42	5.3	
100	0.91		98	WT. DRY SOIL AND DISH	369.56	308.68		
200	3.14		93	WT. DISH	131.52	" "	" "	
PAN	3.22		—	WT. OF DRY SOIL	225.483 - W		48.523	
TOTAL			—	% MOISTURE		5.84%		

HYDROMETER ANALYSIS										
CYLINDER NO. <u>7</u>		SPECIFIC GRAVITY <u>2.71 (64)</u>		DISPERSING AGENT <u>A₆ 11040a</u>						
DISH NO. _____		DATE <u>11-24-53</u>		AMOUNT <u>125</u> ml		DATE CALIB _____				
CLOCK TIME	TEST TIME	TEMP. °C	HYD. READ	HYD. CORR.	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER		
9:26	START MIX	—	—	—	—					
9:22	STOP MIX	—	—	—	—					
9:27.5	0.5 min.	21	48	5.0	43.0		86	0.05 ϕ 4 mm		
9:28	1.0 min	21	44	5.0	39.0		78	0.02 ϕ 10 mm		
9:31	4.0 min	21	38.5	5.0	33.5		67	0.01 ϕ 20 mm		
9:45	19 min	21	33	5.0	28.0		56	0.00 ϕ 10 mm		
10:27	60 min	21.2	29	4.9	24.1		48	0.00 ϕ 5 mm		
10:33	7h 0 min	22.6	22	4.3	17.7		36	0.002 mm		
10:09	2h 45 min	20	20	5.4	14.6		29	0.001 mm		
GRAVEL <u>0%</u>		SAND <u>7%</u>		CLAY-SILT <u>93%</u>		STORAGE LOCATION _____				

* CORRECTION INCLUDES TEMP., MENISCUS, AND DEBLOCULENT

DATE IN: _____ SUPERVISOR: _____

L-4 (5-55)

LOCATION: _____ A.4-84 _____

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GRADATION ANALYSIS

WORKSHEET

LAB NO _____

JOB NO. 147393 PART NO. _____ PREP. BY TC DATE _____
 JOB NAME EBASCO TRIPLE A. Hwy DEFO CALC. BY SU CKED BY SU

HOLE 7-BE-1 DEPTH 0.5-2 SAMPLE NO. 5951
 VISUAL DESCRIPTION: Very Silty Clayey Gravelly Sand

SAMPLE PREPERATION							SIEVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	8/8"	NO. 4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE	192.168	
DRY WT. RETAINED		0	28.36	36.02	38.12	RETAINED ON NO. 4		
DRY WT. PASSING						PASSING NO. 4		
% OF TOTAL PASSING		100	85	81	80	W% = _____		

SIEVE AND HYDROMETER ANALYSIS					SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{W_2}{W}$ = _____ = <u>1.336925</u>				
10 (10)	63.57		67	MOISTURE DETERMINATION				
16	2.87		63	MATERIAL	MATERIAL	HYGRO. MOISTURE	HYDRO. SAMPLE	
30 (20)	3.58		62	DISH NO.	pliny			
50	5.31		60	WT. WET SOIL AND DISH	345.60	209.99	50.93	
100	3.84		55	WT. DRY SOIL AND DISH	Dividuy	325.06	208.94	
200	13.93		49	WT. DISH	131.13		0	
PAN	14.11		—	WT. OF DRY SOIL	121.6 = W		50.252	
TOTAL			—	% MOISTURE		1.349	→	

HYDROMETER ANALYSIS										
CYLINDER NO. <u>5</u>		SPECIFIC GRAVITY <u>2.7 (Est.)</u>			DISPERSING AGENT <u>4% NaPO₃</u>					
DISH NO. _____		DATE <u>11-25-83</u>		AMOUNT <u>1x25</u> mi		DATE CALIB _____				
CLOCK TIME	TEST TIME	TEMP. C°	HYD. READ	HYD. CORR.	CORR. READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER		
8:35	START MIX	—	—	—	—		—	—	—	
8:36	STOP MIX	—	—	—	—		—	—	—	
8:53	0.5 min.	21.3	33	4.9	28.1		37	0.075 ₂ mm		
8:57	1.0 min	21.3	28	4.9	23.1		31	0.075 ₁₅ mm		
9:01	5 + 0 min	21.3	21.5	4.9	16.6		22	0.075 ₃ mm		
9:15	19 min	21.3	16.5	4.9	11.6		15	0.075 ₁₁ mm		
9:56	60 min	21.5	15	4.8	10.2		14	0.0075 mm		
3:57	359 min	23	9	4.1	4.9		6	0.0075 mm		
9:43	244 45 min	21.4	8	4.8	3.2		4	0.001 mm		
GRAVEL <u>20%</u>		SAND <u>31%</u>		CLAY-SILT <u>49%</u>		STORAGE LOCATION _____				

* CORRECTION INCLUDES TEMP., MENISCUS, AND DEFOCULENT

DATE IN: _____ SUPERVISOR: _____
 L-4 (5-85) LOCATION: _____ A.4-85 _____

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GRADATION ANALYSIS

WORKSHEET

LAB NO. _____

JOB NO. 147393

PART NO. _____

PREP. BY _____

DATE 11-29-92

JOB NAME Etascri tunnel Army Depot

CALC. BY (initials)

CKED BY (initials)

HOLE 05-DW 5-108-73 DEPTH 69-71 SAMPLE NO. 59513

VISUAL DESCRIPTION: Slightly Sandy Clay

SAMPLE PREPERATION							SIEVING TIME	
SIEVE SIZE	3"	1 1/2"	3/4"	3/8"	NO.4	SAMPLE WEIGHTS		
OF PAN AND SAMPLE						WET	DRY	
WT. OF PAN						TOTAL SAMPLE		
DRY WT. RETAINED						RETAINED ON NO. 4		
DRY WT. PASSING						PASSING NO. 4		
% OF TOTAL PASSING						WX = _____		

SIEVE AND HYDROMETER ANALYSIS				SIEVING TIME			
SIEVE NO.	WEIGHT RETAINED	WEIGHT PASSING	% OF TOTAL PASSING	FACTOR = $\frac{WX}{W} = \frac{\quad}{\quad} = 2.026384$			
8 (10)	0		100	MOISTURE DETERMINATION			
16	0.03		100	#4 MATERIAL	#4 MATERIAL	HYGRO. MOISTURE	HYDRO. SAMPLE
30 (40)	0.22		100	DISH NO.	CHAT		
50	0.69		99	WT. WET SOIL AND DISH	378.76	283.29	51.7
100	1.82		96	WT. DRY SOIL AND DISH	335.39	278.40	
200	3.62		93	WT. DISH	129.57		
PAN	3.68		—	WT. OF DRY SOIL	199.27		49.399
TOTAL			—	% MOISTURE		3.286	

HYDROMETER ANALYSIS										
CYLINDER NO. _____		SPECIFIC GRAVITY <u>2.7 (Est.)</u>			DISPERSING AGENT <u>4% NaPO₃</u>					
DISH NO. _____		DATE <u>11-29-92</u>		AMOUNT <u>125</u> ml			DATE CALIB. _____			
CLOCK TIME	TEST TIME	TEMP. °C	HYD. READ	HYD. CORR	CORR READ	FACTOR X CORRECTED READING = % OF TOTAL PASSING	% OF TOTAL PASSING	PARTICLE DIAMETER		
9:28	START MIX	—	—	—	—					
9:49	STOP MIX	—	—	—	—					
9:49g	0.5 min.	21.6	45	4.7	40.3			81	0.05 ϕ mm	
9:50	1.0 min	21.6	42	4.7	37.3			75	0.08 ϕ mm	
9:53	4.0 min	21.6	38	4.7	33.3			67	0.1 ϕ mm	
10:08	19 min	21.6	30.5	4.7	25.8			52	0.08 ϕ mm	
10:49	60 min	22	23	4.6	18.4			37	0.008 ϕ mm	
4:20	75 min	23.5	15	3.9	11.1			22	0.002 mm	
9:54	2h 45 min	21.6	12	4.7	7.3			15	0.001 mm	
GRAVEL _____ %		SAND _____ %		CLAY-SLT _____ %		STORAGE LOCATION _____				

* CORRECTION INCLUDES TEMP., MENISCUS, AND DISPERGENT

DATE IN: _____ SUPERVISOR: _____

L-4 (5-85) LOCATION: _____ A.4-86 _____

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Chen Northern, Inc.
TRIAxIAL PREPARATION
 WORKSHEET

JOB NO. 113794 PART NO. _____ PREP. BY FW DATE 11-08-93
 JOB NAME EBASCO, TOOELE CALG. BY AK CKED. BY SV

HOLE NO. 3-E-2-E DEPTH 1-15 SAMPLE NO. 58118 STAGE NO. 11A
 CELL NO. G TYPE OF TEST Perm EFFECTIVE CONSOLIDATION STRESS 3.0 psi
 SAMPLE DESCRIPTION: soil (Not)

MOISTURE CONTENT				
	BEFORE TEST		AFTER TEST	
	SPECIMEN	TRIMMINGS	SPECIMEN	TRIMMINGS
<i>sandy clay</i>				
DISH NO.	<u>P2d</u>		<u>P0</u>	<u>KNEE</u>
WT. OF WET SOIL & DISH	<u>632.7</u>		<u>487.74</u>	
WT. OF DRY SOIL & DISH			<u>408.78</u>	<u>21.84</u>
WT. OF DISH	<u>317.59</u>		<u>137.87</u>	<u>240.66</u>
WT. OF WATER	<u>35.5</u>		<u>79.46</u>	
WT. OF WET SOIL	<u>315.1</u>		<u>349.87</u>	
WT. OF DRY SOIL w_s	<u>277.59</u>		<u>270.41</u>	<u>7.18</u>
% MOISTURE %	<u>13.5</u>		<u>29.4</u>	

VOL. OF SOLIDS $V_s = \frac{W_s}{G_s} = \frac{102.46}{2.698} = 38.34 \text{ cm}^3$		SAMPLE DATA			
		INITIAL	SATURATED	CONSOLIDATED	FINAL
DIAMETER D	<u>2.00</u> in. cm				
HEIGHT CHANGE ΔH	DIAL INITIAL _____ in.		<u>0</u>	<u>0</u>	<u>0</u>
HEIGHT H	<u>3.12</u> in. cm				<u>3.0</u> in. <u>7.62</u> cm
AREA A					<u>23.286</u> cm ²
VOLUME CHANGE ΔV_T					<u>-46.76</u> cm ³
TOTAL VOLUME V_T	<u>231.20</u> cm ³				<u>184.44</u> cm ³
VOL. OF WATER V_W	<u>37.52</u> cm ³				<u>86.57</u> cm ³
VOL. OF AIR V_A					

VOID RATIO e	<u>0.1150</u> <u>1.246</u>			<u>0.603</u> <u>0.92</u>
SATURATION S%	<u>38.4</u> <u>29.2</u> %			<u>100</u>
MOISTURE CONTENT w%	<u>13.5</u> %			<u>29.4</u>
WET DENSITY ρ	<u>21.72</u> pcf			<u>103.60</u> pcf
DRY DENSITY ρ_d	<u>9.00</u> pcf		<u>9.00</u> pcf	<u>93.9</u> pcf

REMARKS 'B' _____

Sample Failure Diagram

CIRCUITRY INSTRUMENTAL
TRIAxIAL SATURATION
 WORKSHEET

JOB NO. 113794 PART NO. _____ RUN BY F.D DATE 12-04
 JOB NAME EBASCO, TOOLE CKED. BY CJ

HOLE NO. 3-BK-6 DEPTH 1-15 SAMPLE NO. 5818 STAGE NO. N/A
 CELL NO. 4
 EFFECTIVE CONSOLIDATION STRESS, 3.0 psi

DATE	TIME	REMARKS	CHAMBER BURETTE			SAMPLE BURETTE				
			PRES. PSI	BURETTE READING cm	SAMP. VOL. Δ cm ³	CAP		PEDESTAL		SAMP. VOL. Δ cm ³
						PRES. PSI	READ. cm	PRES. PSI	READ. cm	
12-04	13:30	Set Rp + CD, R	55	N/A		50	25.0	50	24.0	
12-06	8:10	R	"	N/A		"	66.5	"	61.5	
	9:40	Raise CP + Ep, B + R	10.5			10.0	67.0	10.0	71.5	
	15:20	R	"			"	77.0	"	79.0	
		B; 12.2 → 22.2; 11.0 → 19.6		B=82						
	15:20	Raise CP + Rp, B + R	15.5			15.0	81.0	15.0	79.0	
12-7	8:45	R	"			"	75.0	"	81.0	
	8:50	Raise CP + Fp, B + R	20.5			20.0	77.0	20.0	77.0	
	15:20	R	"			"	67.0	"	75.0	
		B; 22.7 → 32.7; 20.8 → 27.9		B=71						
	16:00	Raise CP + Rp, B + R	25.5			25.0	75.0	25.0	79.0	
12-8	11:00	R	"			"	73.0	"	77.0	
	11:20	Raise CP + Fp, B + R	30.5			30.0	77.0	30.0	74.0	
12-9	8:10	R	"			"	70.5	"	62.6	
		B; 22.2 → 42.2; 21.0 → 40.8		B=93						
	9:20	Raise CP + Fp, B + R	35.5			35.0	80.0	35.0	61.0	
	15:30	R	"			"	76.5	"	6.6	
		B; 37.4 → 47.4; 36.6 → 45.9		B=93						
	15:40	Raise CP + Fp, B + R	40.5			40.0	85.0	40.0	57.0	
12-10	11:00	R	"			31	73.7	"	61.4	
		B; 42.9 → 52.9; 42.0 → 51.5		B=95						

FINAL 'B' PARAMETER: 95 CHAMBER BURETTE 'K' _____ cm³/cm
 TOTAL TIME TO SATURATE: _____ SAMPLE BURETTE 'K' _____ cm³/cm
 TOTAL SAMPLE VOLUME CHANGE FROM CHAMBER BURETTE _____ cm³
 TOTAL SAMPLE VOLUME CHANGE FROM SAMPLE BURETTE _____ cm³

Chen Northern, Inc.
TRIAxIAL CONSOLIDATION
WORKSHEET

JOB NO. 113794 PART NO. _____ RUN BY F.D DATE 12-10-93
 JOB NAME EBASCO, Tovele CKED. BY SO

HOLE NO. 3-BK-2 DEPTH 1-1.5 SAMPLE NO. 58118 STAGE NO. 11E
 CELL NO. 6 TYPE OF TEST Perm
 (CELL PRESS. 430 psi - BACK PRESS. 40.0 psi) - EFFECTIVE CONSOLIDATION PRESSURE 3.0 psi

DATE	CLOCK TIME HR:MIN:SEC	ELAPSED TIME MIN.	PORE WATER BURETTE		CELL BURETTE		PORE PRESSURE psi
			READ. ka ____ cc/div	VOLUME CHANGE -cm ³	READ. ka ____ cc/div	VOLUME CHANGE -cm ³	
<u>12-10-93</u>		INITIAL	<u>cap</u>		<u>pad</u>		<u>Total V. found</u>
	<u>13:17</u>	0	<u>73.0</u>	0	<u>64.0</u>	0	
		<u>.10(6sec.)</u>	<u>74.0</u>		<u>65.5</u>		
		<u>.25(15sec.)</u>	<u>74.0</u>		<u>65.8</u>		
		<u>.50(30sec.)</u>					
	<u>13:18</u>	1	<u>74.5</u>		<u>66.4</u>		
	<u>13:19</u>	2	<u>75.0</u>		<u>67.0</u>		
		4					
		9					
	<u>13:26</u>	16	<u>74.0</u>		<u>69.0</u>		
	<u>13:47</u>	30	<u>73.0</u>		<u>70.0</u>		
	<u>14:17</u>	60	<u>71.8</u>		<u>71.2</u>		
	<u>15:07</u>	120	<u>69.5</u>		<u>72.1</u>		<u>143.5</u>
		<u>240</u>					
<u>12-11</u>	<u>10:50</u>	<u>480</u>	<u>67.7</u>		<u>75.5</u>		<u>143.8</u>
		<u>1440</u>					
			<u>61</u>		<u>75</u>		<u>14</u>
			TOTAL VOL. Δ = _____ cm ³	TOTAL VOL. Δ = _____ cm ³			

REMARKS: _____

JOB NO. 113794 PART NO. _____
 JOB NAME EBASCO, TOOLE

Chen Northern, Inc.
TRIAXIAL PERMEABILITY

RUN BY F.D DATE 12-13-93
 CALC. BY SUAL CHECKED BY SU

HOLE NO. 3-BK-2 DEPTH 1-15 SAMPLE NO. 5818 SAMPLE TYPE Undis. CELL NO. 4 EFF. σ_3 3.0
 SAMPLE AREA, "A" _____ $\text{in}^2 = \frac{23.286}{2.54^2} \text{cm}^2$ FINAL SAMPLE LENGTH, "L" _____ $\text{in} = 2.915 \text{cm}$ BURET AREA, "a" 0.303 cm^2

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD, cm				WATER HEAD ₂ PED-CAP = HEAD, cm					TOTAL HEAD, cm 1+2	$\text{Log} \frac{h_1}{h_2}$ $\frac{\Delta t}{\Delta t}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log} \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ	HEAD ₂			
	12-13	12:00	—	43.0		59.5	40.5	1.0	20.2	9.5		51.0			209.87		
		1:00	900												158.62	1.16729×10^{-4}	1.18×10^{-5}
		2:00	1080												119.32	1.14483×10^{-4}	1.41×10^{-5}
		3:00	1260							9.6		76.0			50.12	1.04677×10^{-4}	1.06×10^{-5}
		4:00	1440							11.0		15.4			74.72	9.11599×10^{-5}	9.60×10^{-6}
		5:00	1620							11.0		15.0		139.0	209.31	—	—
A-4-90		6:00	1800							2.6		—		17.9	88.22	9.92×10^{-5}	1.18×10^{-5}
		7:00	1980							11		17		-5.3	65.02	8.8746×10^{-5}	1.05×10^{-5}
		8:00	2160							2.0		—		136.0	206.32	—	—
		9:00	2340							71.2	34.2	15.0	51.0	30.8	101.12	8.6028×10^{-5}	1.02×10^{-5}
		10:00	2520							86.5	12.3	9.0	12.1	6.4	76.72	7.6277×10^{-5}	9.13×10^{-6}
		11:00	2700							101.7	15.0	6.0	15.3	-24.1	46.22	7.2277×10^{-5}	8.89×10^{-6}
		12:00	2880							20.0		100.0		119.4	177.72	—	—
		1:00	3060							—	53.1	41.1	44.0	16.9	17.22	—	—
		2:00	3240							34.0		122.0		56.0	56.0	—	—
		3:00	3420							24.0	10.0	111.0	9.0	37.0	47.0	9.9970×10^{-5}	—

Avg. = 9.7×10^{-6}

Valves set Wrong

$k = \frac{(2.18 \times 10^{-4})}{A} = \frac{0.118691}{0.1012}$

JOB NO. 113794 PART NO. _____
 JOB NAME EBASCO, TOOELE

Chem Northern, Inc.
SPECIFIC GRAVITY TEST
 WORKSHEET

PREP. BY F.D DATE 12-07-93
 CALC. BY AL CKED. BY SU

SPECIFIC GRAVITY OF SOLS (G _s) ASTM D-854		TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2
RUN BY							
HOLE AND DEPTH / SAMPLE NO. <u>3-BK-2.</u>							
DESCRIPTION							
PREP. DISH							
FLASK NO.		<u>EE</u>	<u>K</u>				
TEMPERATURE OF WATER AND SOL, T, °C		<u>26.0</u>	<u>26.0</u>				
DISH NO.		<u>GET</u>	<u>6</u>				
DISH + DRY SOL, g		<u>296.6</u>	<u>300.55</u>				
DISH, g		<u>221.53</u>	<u>275.76</u>				
DRY SOL, g	A	<u>74.73</u>	<u>74.79</u>				
FLASK + WATER @ T, °C, g	B	<u>354.67</u> 354.67 <u>387.403</u>	<u>355.075</u> 355.075 <u>374.805</u>				
A + B, g		<u>387.403</u>	<u>374.805</u>				
FLASK + WATER + SOL, g	C	<u>370.41</u>	<u>367.84</u>				
DISPLACED WATER, (A + B) - C, g		<u>9.117</u> 11.993	<u>9.171</u> 12.215				
CORRECTION FACTOR FOR TEMP. T, °C	K	<u>.9986</u>	<u>.9986</u>				
G _s = (A*K) ÷ (A + B - C)		<u>2.006938</u>	<u>2.0076991</u>				
G _s , TRIAL 1 - G _s , TRIAL 2*		<u>0.0007</u>					
AVERAGE G _s		<u>2.007696</u>					

A.4-91

REMARKS

*The difference between G_s values for the two trials should be ≤ 0.050.

should be - 0.0007 - should be -

Chen Northern, Inc.
TRIAXIAL PREPARATION
WORKSHEET

JOB NO. 113794 PART NO. _____ PREP. BY FV DATE _____
 JOB NAME EBASCO, TOPELE CALC. BY SU CKED. BY SU

HOLE NO. Q-RK-1 DEPTH 0.5 SAMPLE NO. 58153 STAGE NO. N/A
 CELL NO. 10 TYPE OF TEST Perm EFFECTIVE CONSOLIDATION STRESS 3.0 psi
 SAMPLE DESCRIPTION: non-sat.

MOISTURE CONTENT				
	BEFORE TEST		AFTER TEST	
	SPECIMEN	TRIMMINGS	SPECIMEN	TRIMMINGS
moist fine sandy clay				
DISH NO.			HOT	GOLDE
WT. OF WET SOIL & DISH	695.0 g		= 2.53 g	---
WT. OF DRY SOIL & DISH			440.32 g	245.84 g
WT. OF DISH	?? 22		129.48	241.71
WT. OF WATER	49.80 g			
WT. OF WET SOIL	352.77			
WT. OF DRY SOIL w_s	314.97		310.84	4.13
% MOISTURE w	15.81		23.23	

		SAMPLE DATA			
		INITIAL	SATURATED	CONSOLIDATED	FINAL
VOL. OF SOLIDS $V_s = \frac{w_s}{G_s} = \frac{118.99}{2.647} \text{ cm}^3$		$G_s = 2.647$			
DIAMETER D	2.3 in. cm				
HEIGHT CHANGE ΔH	DIAL INITIAL _____ in.	0		0	
HEIGHT H	2.84 in. cm			2.84" 7.214 cm	
AREA A				26.639 cm ²	
VOLUME CHANGE ΔV_T				-1.19 cm ³	
TOTAL VOLUME V_T		193.35		192.16 cm ³	
VOL. OF WATER V_w		49.80 cm ³		73.17 cm ³	
VOL. OF AIR V_a					

VOID RATIO e	0.625		0.615
SATURATION $S\%$	67.0 %		100%
MOISTURE CONTENT $w\%$	15.8 %		23.2%
WET DENSITY γ			
DRY DENSITY γ_d	g/cc 101.7 Pcl		g/cc Pcl 102.38 Pcl

REMARKS 'B' _____ _____ _____ _____ _____	Sample Failure Diagram
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CHIEF, UNIVERSITY
TRIAxIAL SATURATION
WORKSHEET

JOB NO. 113794 PART NO. _____ RUN BY F.D DATE _____
 JOB NAME EPASCO, TOOLE CKED. BY SU

HOLE NO. 9-BK-1 DEPTH 0.5 SAMPLE NO. 5853 STAGE NO. 1/A
 CELL NO. 10
 EFFECTIVE CONSOLIDATION STRESS. 3.0 psi

DATE	TIME	REMARKS	CHAMBER BURETTE			SAMPLE BURETTE				
			PRES. psi	BURETTE READING cm	SAMP. VOL. Δ cm ³	CAP		PEDESTAL		SAMP. VOL. Δ cm ³
						PRES. psi	HEAD cm	PRES. psi	HEAD cm	
2-3	11:30	SE, CP+BP, P	5.5	25.0		5.0	25.0	5.0	25.0	
	15	R	"	28.0		"	40.0	"	"	
	"	Raise cell - P+R	10.5	66.0		10.0	10.0	10.0	10.0	
2-4	12:25	R	"	57.0		"	51.0	"	51.0	
	"	Raise CP+BP, P+R	15.5	11.0		15.0	15.0	15.0	15.0	
	13:20	L		44.0		"	36.0	"	36.0	
	"	Raise CP+BP, P+R	20.0	60.7		20.0	26.0	20.0	26.0	
2-7	9:15	R	"	24.5		"	27.5	"	27.0	
		B; 21.9 → 31.9; 20.9 → 29.0			B=81					
	9:20	Raise CP+BP, P+R	25.5	57.0		25.0	40.0	25.0	40.0	
	10:00	R	"	36.5		"	25.0	"	25.0	
		P; 27.8 → 37.8; 26.0 → 34.2			B=82					
	11:20	Raise CP+BP, P+R	30.5	60.0		30.0	40.0	30.0	40.0	
2-8	9:00	R	"	62.4		"	37.0	"	37.0	
		B; 30.8 → 42.8; 31.6 → 39.4								
	9:40	Raise CP+BP, P+R	35.5	61.0		35.0	37.0	35.0	37.0	
2-9	9:00	R	"	40.0		"	27.0	"	27.0	
	9:00	Raise CP+BP, P+R	40.0	42.5		40.0	38.0	40.0	40.0	
2-10	7:50	R	"	33.0		"	34.0	"	34.0	
		B; 42.9 → 52.9; 42.2 → 51.9			B=57					

FINAL 'B' PARAMETER: 97 CHAMBER BURETTE 'K' _____ cm³/cm
 TOTAL TIME TO SATURATE: _____ SAMPLE BURETTE 'K' _____ cm³/cm
 TOTAL SAMPLE VOLUME CHANGE FROM CHAMBER BURETTE _____ cm³
 TOTAL SAMPLE VOLUME CHANGE FROM SAMPLE BURETTE _____ cm³

JOB NO. 113794 PART NO. _____

JOB NAME EBASCO, TOOLE

Chen Northern, Inc.
TRIAxIAL PERMEABILITY

RUN BY F.D DATE _____
 CALC. BY SU CKED. BY SU

HOLE NO. 9-BK-1 DEPTH 0.5 SAMPLE NO. 58153 SAMPLE TYPE Undis CELL NO. 10 EFF. σ_v 3.0

SAMPLE AREA, "A" _____ $\text{in}^2 = 26.639 \text{ cm}^2$ FINAL SAMPLE LENGTH, "L" _____ $\text{in} = 7.214 \text{ cm}$ BURET AREA, "a" 0.302 cm^2

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD ₁ cm				WATER HEAD ₂ PED-CAP = HEAD ₂ cm				TOTAL HEAD, cm +2	$\text{Log } \frac{h_1}{h_2}$ $\frac{\Delta t}{h_1}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log } \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ			
FD		00:00.00	✓	43.0	N/A	40.0	40.0	0.0	0.0	12.0	/	74.0	/	62	—	
			368							30.0	18.0	57.5	16.5	27.5	9.5939 $\times 10^{-4}$	
			—							11.0	/	74.5	/	63.5	—	
			407							29.5	18.0	55.5	16.0	29.0	8.363 $\times 10^{-4}$	
			—							11.0	/	75.0	/	64.0	—	
A-4-95			445							30.0	19.0	58.2	16.8	28.2	7.998 $\times 10^{-4}$	
			—							11.0	/	77.0	/	66.0	—	
			421							30.0	19.0	60.0	17.0	30.0	8.033 $\times 10^{-4}$	
			—							12.0	/	74.2	/	62.2	—	
			460							31.2	19.2	57.5	16.7	26.3	8.126 $\times 10^{-4}$	
			—							12.0	/	74.5	/	62.5	—	
			428							30.0	19.0	55.7	15.8	28.7	7.877 $\times 10^{-4}$	7.43 $\times 10^{-5}$
			—							12.0	/	74.0	/	62.0	—	
			434							30.0	18.0	58.1	15.0	28.1	7.919 $\times 10^{-4}$	7.45 $\times 10^{-5}$
			—							12.0	/	76.3	/	64.3	—	
			420							30.0	18.0	60.0	16.3	30.0	7.883 $\times 10^{-4}$	7.42 $\times 10^{-5}$
			—							12.0	/	74.6	/	62.6	—	
			420							30.0	15.0	59.6	15.6	29.0	7.956 $\times 10^{-4}$	7.49 $\times 10^{-5}$

$k = \left(\frac{1.181 \text{ gH}}{A} \right) = 0.094128$

Chen & Associates SPECIFIC GRAVITY TEST

COARSE AGGREGATE
worksheet

SHEET ___ OF ___

JOB NO. <u>112794</u>	PART NO. _____	PREP. BY <u>F.D</u>	DATE _____
JOB NAME <u>Essex, Top-12</u>	CALC. BY <u>SU</u>	CKED. BY <u>SU</u>	

APPARENT (G_a) AND BULK (G_m) SPECIFIC GRAVITY, ASTM C 127

RUN BY /DATE RUN		/	/	/	/
HOLE AND DEPTH/SAMPLE NO. / LAB NO.		9-BK-1 / 58,53			
DESCRIPTION					
TEMPERATURE OF WATER AND AGG. T. °C		26.5	27.5		
TARE + SATURATED SURFACE-DRY AGG., g					
TARE OF FLASK		N	E		
SATURATED SURFACE-DRY AGG., g	B				
(WIRE BASKET + AGG.) IN WATER, g					
WIRE BASKET IN WATER, g					
SATURATED AGG. IN WATER, g	C	371.52	368.54		
TARE NAME		READ	THINK		
TARE + DRY AGG., g		297.87	300.06		
TARE, g		272.6	275.03		
DRY AGG., g	A	25.27	25.03		
CORRECTION FACTOR FOR TEMP.	K	0.99842	0.99867		
$G_a = (AK) + (A-C)$ APPARENT 23°C					
$G_m = (AK) + (B-C)$ BULK 23°C					
G_m (SAT. SURF.-DRY) = (BK) + (B-C) 23°C					
ABSORPTION, % = $(B-A) \div A \times 100$					
% AGG. RETAINED ON NO. 4 SIEVE	R ₁				
% AGG. PASSING NO. 4 SIEVE	P ₁				
G FROM ABOVE	G ₁				
G OF AGG. PASSING NO. 4 SIEVE	G ₂	2.6417	2.6516		
WEIGHTED AVERAGE = $G_{avg} = \frac{1}{\frac{R_1}{100G_1} + \frac{P_1}{100G_2}}$					
<input type="checkbox"/> BULK <input type="checkbox"/> APPARENT		$k = 0.0009$			
REMARKS $k = \frac{\text{Rel Density of Water @ T.C}}{0.9975702}$		$G_{avg} = 2.647$			

Huntingdon Engineering & Environmental, Inc.

EFFECTIVE POROSITY WORK SHEET

JOB NO. 113792 PART NO. 2
 JOB NAME Er - search soil

PREP. BY SU CALC. BY SU DATE 3-26-78
 CHKD. BY _____ SHEET 1 OF 1

Hole Number <u>9-BK-1</u>	Depth <u>0.5'</u>	Sample Number <u>5853</u>	Cell Number <u>10</u>
Initial Height 7.54		<u>2.94</u>	
Initial Diameter 2.50"		<u>2.30"</u>	
Initial Volume		<u>193.4 cm³</u>	
Volume Loss During Consolidation		<u>3.9 cm³</u>	
Initial Weight		<u>364.77 g</u>	
Initial Moisture (Estimate/Approximate)		<u>15%</u>	
Weight of Dry Soil (Approximate)		<u>317.2 g</u>	
Specific Gravity (Estimate/Actual)		<u>2.647</u>	
Volume of Dry Soil (Approximate)		<u>119.8 cm³</u>	<u>(118.99)</u>
Pore Volume (Approximate)		<u>69.7 cm³</u>	<u>(73.17)</u>
log (h _r /h ₀) / t (Average of 4)		<u>7.9 x 10⁻⁴</u>	<u>(Q = k · 7.9 x 10⁻⁴ · r · v · 302)</u>
Coefficient of Permeability, k (Approximate)			
Time for 0.1 Pore Volumes (Approximate)		<u>475 sec</u>	<u>(7 min 55 sec) (t = 57 min)</u>

Porosity = 38.1%

Time of Reading	Estimated Pore Volume	BSE Reading	Bromide Concentration	Effluent Burette	Volume E.B. x .309*	% of Pore Volu.
<u>10:1</u>	<u>0.1</u>	<u>140.6^(@ 10:1)</u>	<u>0.5 mg/l</u>	<u>25.3 cm</u>	<u>7.97 cm³</u>	<u>< 10</u>
	<u>0.2</u>	<u>92.8^(@ 10:1)</u>	<u>3.5 mg/l</u>	<u>47.0 cm</u>	<u>22.49 cm³</u>	<u>7.0</u>
	<u>0.3</u>	<u>91.0^(@ 10:1)</u>	<u>3.8 mg/l</u>	<u>37.5 cm</u>	<u>34.08 cm³</u>	<u>22.8</u>
	<u>0.4</u>	<u>67.9^(@ 10:1)</u>	<u>9.4 mg/l</u>	<u>27.0 cm</u>	<u>47.43 cm³</u>	<u>34.2</u>
	<u>0.5</u>	<u>42.7^(@ 5:1)</u>	<u>25.6 mg/l</u>	<u>85.5 cm</u>	<u>68.85 cm³</u>	<u>70.3</u>
	<u>0.6</u>	<u>57.6^(@ 10:1)</u>	<u>14.1 mg/l</u>	<u>23.3 cm</u>	<u>76.05 cm³</u>	<u>80.2</u>
	<u>0.7</u>					
	<u>0.8</u>					
	<u>0.9</u>					
	<u>1.0</u>					

100 mg/l minimum concentration (10 dilute @ 10:1 to 10 mg/l)

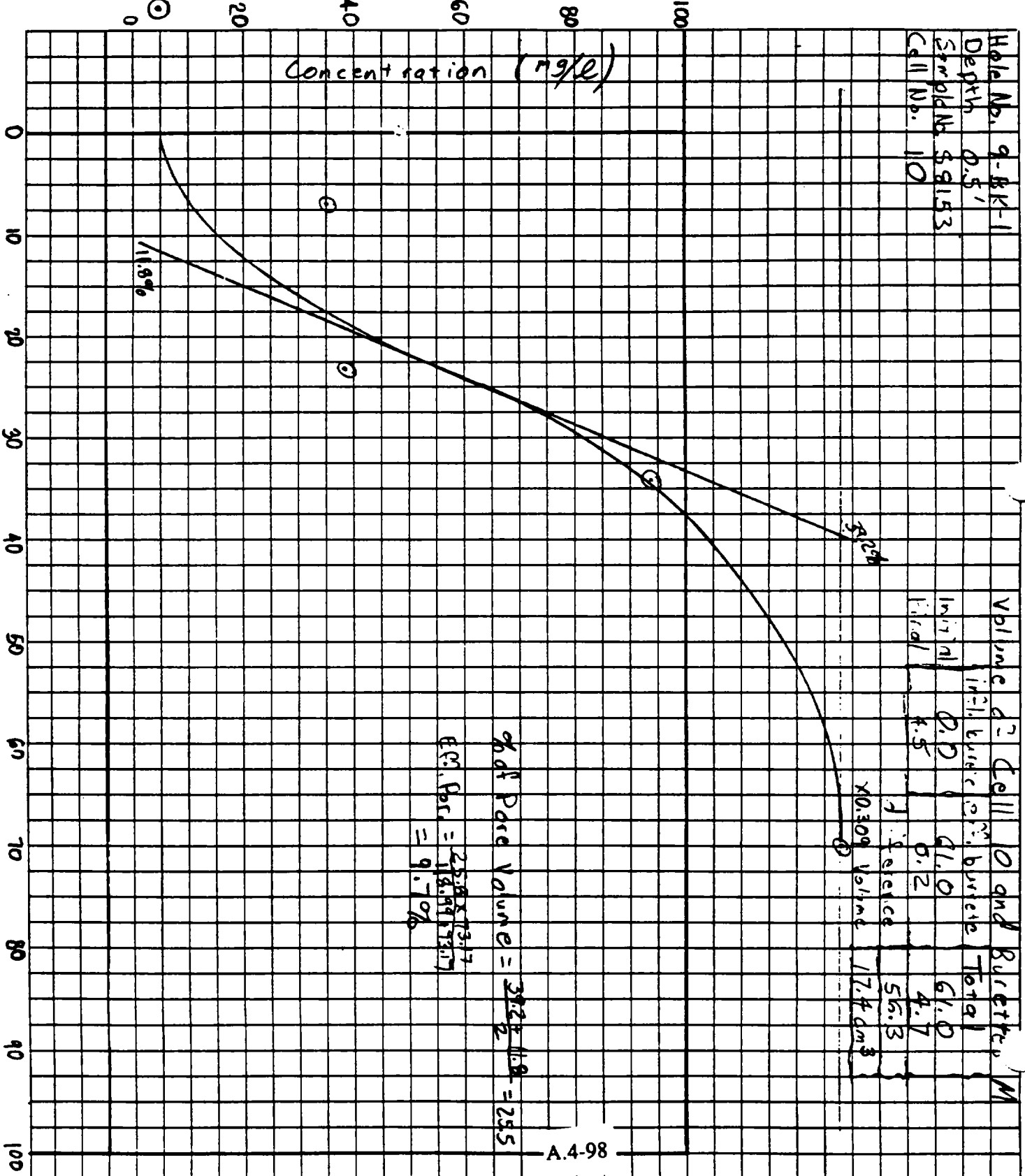
Total Volume = $120 \text{ cm} \times .302 \text{ cm}^2 = 36.24 \text{ ml}$, mix with 773.3 mg/l solution
 $100 \text{ mg/l} = (V \times 773.3 \text{ mg/l}) / (V + 36.24 \text{ ml})$
 A.4-97

Huntingdon

Consulting Engineers Environmental Scientists

JOB NO. 113794 JOB TITLE Ensearch, Tooele DATE 3-13-93 BY S. Jr + J.A.

SUBJECT Effective Porosity Results CHECKED _____ SHEET _____ BY _____



Chene Northern, Inc.
TRIAXIAL PREPARATION
WORKSHEET

JOB NO. 113794 PART NO. _____ PREP. BY FD DATE _____
 JOB NAME EBASCO, TOPELE CALL BY SU CKED. BY CJ

HOLE NO. B-BK-1 DEPTH 1-3' SAMPLE NO. 597004 STAGE NO. N/A
 CELL NO. H TYPE OF TEST Perm EFFECTIVE CONSOLIDATION STRESS 3.0 psi
 SAMPLE DESCRIPTION: Res. Mat.

MOISTURE CONTENT				
	BEFORE TEST		AFTER TEST	
	SPECIMEN	TRIMMINGS	SPECIMEN	TRIMMINGS
Dry loose silt.				
DISH NO.	Platten		Green	F111A
WT. OF WET SOIL & DISH	651.7 g		537.68 g	
WT. OF DRY SOIL & DISH			430.92	195.15 g
WT. OF DISH	331.33		37.42	193.47
WT. OF WATER	25.19			
WT. OF WET SOIL	320.37			
WT. OF DRY SOIL w_s	295.18		293.5	1.68
% MOISTURE %	8.53		36.37	

	SAMPLE DATA			
	INITIAL	SATURATED	CONSOLIDATED	FINAL
VOL. OF SOLIDS $V_s = \frac{W_s}{G_s} = 109.81 \text{ cm}^3$	$G_s = 2.698$			
DIAMETER D	2.50 in. cm			
HEIGHT CHANGE ΔH	DIAL INITIAL _____ in.	0	0	0
HEIGHT H	2.51 in. cm			2.51" 6.375 cm
AREA A				34.066 cm ²
VOLUME CHANGE ΔV_T				15.28 cm ³
TOTAL VOLUME V_T	201.90 cm ³			217.12 cm ³
VOL. OF WATER V_W	25.19 cm ³			107.37 cm ³
VOL. OF AIR V_A				

VOID RATIO e	0.839		0.978
SATURATION S%	27.4 %		100 %
MOISTURE CONTENT w%	8.5 %		36.4 %
WET DENSITY γ			
DRY DENSITY γ_d	g/cc 91.3 Pcf		g/cc Pcf 84.9 Pcf

REMARKS "B" _____ _____ _____ _____ _____ _____ _____	Sample Failure Diagram
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A.4-99

cm³ = 16.39 in³; cm² x .001076 = in²; G_s = G_w; e = $\frac{V_v}{V_s}$

CENTRO NACIONAL DE INVESTIGACIONES CIENTÍFICAS
**TRIAxIAL SATURATION
 WORKSHEET**

JOB NO. 113794 PART NO. _____ RUN BY F.D DATE _____
 JOB NAME EPASCO, TOOLE CKED. BY EU

HOLE NO. 8-BK-1 DEPTH 1-3 SAMPLE NO. STC2A STAGE NO. N/A
 CELL NO. H
 EFFECTIVE CONSOLIDATION STRESS, 3.0 psi

DATE	TIME	REMARKS	CHAMBER BURETTE			SAMPLE BURETTE				
			PRES. psi	BURETTE READING cm	SAMP. VOL. Δ cm ³	CAP		PEDESTAL		SAMP. VOL. Δ cm ³
						PRES. psi	READ. cm	PRES. psi	READ. cm	
2-3	11:00	St, CP+BP, R	5.5	N/A		5.0	150.0	5.0	142.0	
	14:40	R	"			"	45.0	"	117.0	
	"	Raise CP+BP, B+R	10.5			10.0	107.0	10.0	117.0	
2-4	8:15	R	"			"		"		
2-4	8:15	Raise CP+BP, B+R	15.5			15.0	39.0	15.0	108.5	
	12:00	R	"			"	23.0	"	28.5	
	"	Raise CP+BP, B+R	20.5			20.0	50.0	45.0	28	
2-7	2:30	R	"			"	27.0	"	31.0	
		B. 21.1 → 31.1 ; 20.8 → 20.4		B=96						

FINAL 'B' PARAMETER: 96 CHAMBER BURETTE 'K' _____ cm³/cm
 TOTAL TIME TO SATURATE: _____ SAMPLE BURETTE 'K' _____ cm³/cm
 TOTAL SAMPLE VOLUME CHANGE FROM CHAMBER BURETTE _____ cm³
 TOTAL SAMPLE VOLUME CHANGE FROM SAMPLE BURETTE _____ cm³

Chen Northern, Inc
TRIAxIAL CONSOLIDATION
WORKSHEET

JOB NO. 113794 PART NO. _____ RUN BY F.D DATE 2-7-94
 JOB NAME EBASCO, Tooele CKED. BY SU

HOLE NO. 8-BK-1 DEPTH 1-3 SAMPLE NO. 561004 STAGE NO. N/A
 CELL NO. H TYPE OF TEST Perm
 (CELL PRESS. 27.0 psi - BACK PRESS. 20.0 psi) - EFFECTIVE CONSOLIDATION PRESSURE 7.0 psi

DATE	CLOCK TIME HR:MIN:SEC	ELAPSED TIME MIN.	PORE WATER BURETTE		CELL BURETTE		PORE PRESSURE psi
			READ. k. <u>395</u> cc/div	VOLUME CHANGE -cm ³	READ. k. <u>2000</u> cc/div	VOLUME CHANGE -cm ³	
	9:56	INITIAL	cap		pe.8		
<u>1-7</u>	9:50	0	37.7	0	34.7	0	
		.10(6sec.)	37		40		
		.25(15sec.)	40		45.5		
		.50(30sec.)	41.1		47		
	9:57	1	42.5		47.5		
	10:00	2	43.3		48.3		
	10:00	4	43.4		49.4		
	10:05	9	43.5		49.5		
	10:12	16	43.6		49.6		
	10:26	30	41.5		49.7		
	10:56	60	41.4		49.4		
	11:56	120	41.4		53.2		
	12:56	240	41.2		55.8		
		480					
	9:56	1440	41.2		57.3		
			TOTAL VOL. Δ = _____ cm ³	TOTAL VOL. Δ = _____ cm ³			

REMARKS: _____

A.4-101

JOB NO. 113794 PART NO. _____
 JOB NAME EBASCO, TOOLE

Chen Northern, Inc.
TRIAxIAL PERMEABILITY

RUN BY F.D DATE 2-8-94
 CALC. BY SU CKED. BY SU

HOLE NO. B-BK-1 DEPTH 1-3 SAMPLE NO. 59T000 SAMPLE TYPE Undist. CELL NO. H EFF. 0.30
 SAMPLE AREA, "A" in² = 32.066 cm² FINAL SAMPLE LENGTH, "L" in = 6.375 cm BURET AREA, "a" cm² = 32.55

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD ₁ cm				WATER HEAD ₂ PED-CAP = HEAD ₂ cm					TOTAL HEAD ₁₊₂ cm	$\frac{\log \frac{h_1}{h_2}}{\Delta t}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \log \frac{h_1}{h_2} = k, \frac{cm}{sec}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ	HEAD ₂			
	19 11	15:10	—	23.90	N/A	20.0	20.0	0.0	0.0	37.0	/	135.3	/	98.3	—		
		15:30	1200							71.2		109.5		30.3	4.2354	$\times 10^{-4}$	
		15:32	—							35.9	/	141.0	/	105.5	—		
		15:51	1190							72.1		109.0		30.9	4.678	$\times 10^{-4}$	
A4-102		15:52	—							36.5	/	141.0	/	104.5	—		
		16:15	1260							72.5		103.5		29.0	4.418	$\times 10^{-4}$	
		16:16	—							36.0	/	138.0	/	102.0	—		
		16:38	1320							73.0		102.0		29.0	4.13789	$\times 10^{-4}$	
		10:19	—							34.0	/	139.0	/	105.0	—		
		11:11	1320							71.0		102.8		27.8	3.930	$\times 10^{-4}$	
		11:15	—							35.0	/	126.0	/	91.0	—		
29		11:40	1500							70.8		91.0		21.0	4.245	$\times 10^{-4}$	
SU	2-16	11:55	—							70.5	/	134.7	/	64.2	—		
"	"	11:56	60							71.4	0.9	133.0	1.7	61.6	2.99	$\times 10^{-4}$	
"	"	11:57	60							72.3	0.9	132.1	0.9	59.8	2.15	$\times 10^{-4}$	
"	"	11:58	60							73.4	1.1	130.8	1.3	57.4	2.96	$\times 10^{-4}$	
"	"	11:59	60							75.3	1.9	129.3	1.5	54.0	4.42	$\times 10^{-4}$	
"	"	12:00	60							77.1	1.8	127.8	1.5	50.7	4.56	$\times 10^{-4}$	
"	"	12:01	60							78.1	1.0	126.3	1.5	48.2	3.66	$\times 10^{-4}$	

$k = \left(\frac{1.18}{1} \right)^4 = 0.066023$

7.6 7.4

Avg. = 2.6×10^{-5}

JOB NO. 113794 PART NO. _____
 JOB NAME Fbasco, Toole
 Chem Northern, Inc.
SPECIFIC GRAVITY TEST
 WORKSHEET
 PREP. BY F.D DATE _____
 CALC. BY SU CKED. BY SU

SPECIFIC GRAVITY OF SOILS (G _s) ASTM D-854		TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2
RUN BY							
HOLE AND DEPTH / SAMPLE NO. <u>8-BK-1/SGT004</u>							
DESCRIPTION							
PREP. DISH							
FLASK NO.		<u>E</u>	<u>I</u>				
TEMPERATURE OF WATER AND SOIL, T, °C		<u>24.5</u>	<u>24.0</u>				
DISH NO.		<u>11</u>	<u>TREFS</u>				
DISH + DRY SOIL, g		<u>297.87</u>	<u>298.02</u>				
DISH, g		<u>273.05</u>	<u>272.97</u>				
DRY SOIL, g	A	<u>24.82</u>	<u>25.05</u>				
FLASK + WATER @ T, °C, g	B	<u>353.068</u>	<u>350.390</u>				
A + B, g		<u>377.888</u>	<u>375.440</u>				
FLASK + WATER + SOIL, g	C	<u>368.50</u>	<u>366.23</u>				
DISPLACED WATER, (A + B) - C, g		<u>9.328</u>	<u>9.210</u>				
CORRECTION FACTOR FOR TEMP. T, °C	K	<u>0.998964</u>	<u>0.999091</u>				
G _s = (A*K) / (A + B - C)		<u>2.6580</u>	<u>2.7175</u>				
G _s , TRIAL 1 - G _s , TRIAL 2*		<u>0.0595</u>					
AVERAGE G _s		<u>2.688</u>					

A.4-103

REMARKS _____
 *The difference between G_s values for the two trials should be ≤ 0.050.

Huntingdon Engineering & Environmental, Inc.

EFFECTIVE POROSITY WORK SHEET

JOB NO. 113794 PART NO. 2
 JOB NAME Ensearch, Teele

PREP. BY SV CALC. BY SU DATE 7-28-69
 CHKD. BY _____ SHEET OF

Hole Number	<u>B-BK-1</u>	Depth	<u>1-3'</u>	Sample Number	<u>SGT 004</u>	Cell Number	<u>H</u>
Initial Height				<u>2.51"</u>			
Initial Diameter				<u>2.50"</u>			
Initial Volume				<u>201.0 cm³</u>			
Volume Loss During Consolidation				<u>11.2 cm³</u>			
Initial Weight				<u>320.37 g</u>			
Initial Moisture (Estimate/Approximate)				<u>3%</u>			
Weight of Dry Soil (Approximate)				<u>311.0 g</u>			
Specific Gravity (Estimate/Actual)				<u>2.688</u>			
Volume of Dry Soil (Approximate)				<u>115.7 cm³</u> (109.8/cm ³)			
Pore Volume (Approximate)				<u>75.0 cm³</u> (107.37 cm ³)			
log (h _r /h _i) / t (Average of 4)				<u>3.90 x 10⁻⁴</u> (Q = h * 3.9 x 10 ⁻⁴ * v _i * 1.15 * 1.3065)			
Coefficient of Permeability, k (Approximate)				<u>5 cm²</u>			
Time for 0.1 Pore Volumes (Approximate)				<u>991 sec</u> (16 min 31 sec) (Q = $\frac{k \cdot A}{L} \cdot h$) (h = 50 cm)			

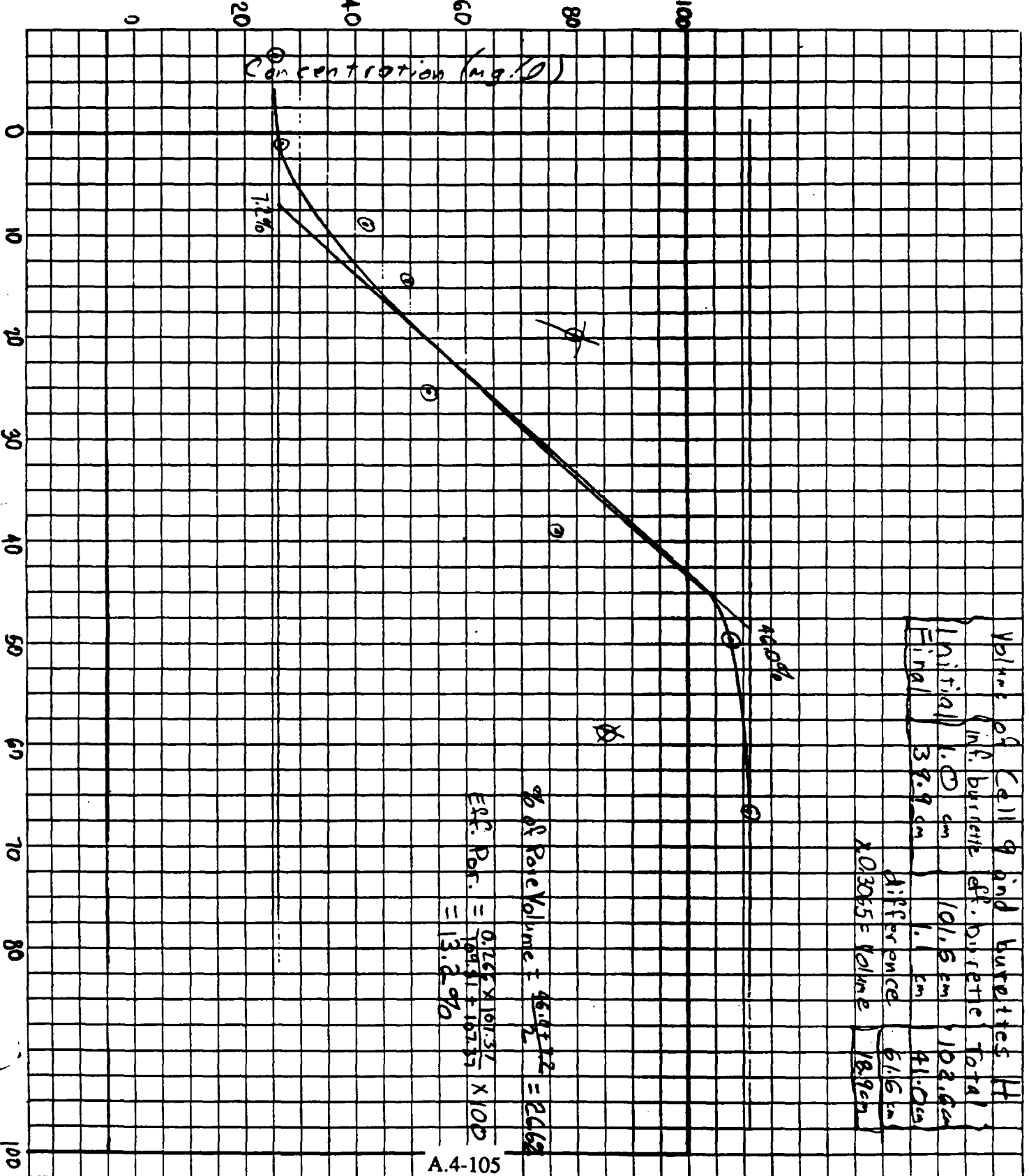
Porosity = 49.4%

Time of Reading	Estimated Pore Volume	BSE Reading	Bromide Concentration	Effluent Burette	Volume E.B. x .3065	% of Pore Volume
<u>15 min</u>	<u>0.1</u>	<u>100.2</u> (^{@ 10:1})	<u>2.6 mg/l</u>	<u>34.3 cm</u>	<u>17.51 cm³</u>	<u>< 0</u>
 	<u>0.2</u>	<u>99.3</u> (^{@ 10:1})	<u>2.7 mg/l</u>	<u>31.6 cm</u>	<u>20.20 cm³</u>	<u>1.2</u>
 	<u>0.3</u>	<u>88.1</u> (^{@ 10:1})	<u>4.2 mg/l</u>	<u>25.1 cm</u>	<u>27.89 cm³</u>	<u>8.4</u>
 	<u>0.4</u>	<u>84.1</u> (^{@ 10:1})	<u>4.9 mg/l</u>	<u>19.9 cm</u>	<u>33.99 cm³</u>	<u>14.1</u>
 	<u>0.5</u>	<u>71.8</u> (^{@ 10:1})	<u>8.0 mg/l</u>	<u>18.9 cm</u>	<u>59.78 cm³</u>	<u>19.4</u>
 	<u>0.6</u>	<u>82.4</u> (^{@ 10:1})	<u>5.3 mg/l</u>	<u>20.8 cm</u>	<u>46.16 cm³</u>	<u>25.4</u>
 	<u>0.7</u>	<u>72.9</u> (^{@ 10:1})	<u>7.7 mg/l</u>	<u>46.4 cm</u>	<u>60.38 cm³</u>	<u>38.6</u>
 	<u>0.8</u>	<u>64.5</u> (^{@ 10:1})	<u>10.8 mg/l</u>	<u>37.0 cm</u>	<u>71.72 cm³</u>	<u>49.2</u>
 	<u>0.9</u>	<u>70.4</u> (^{@ 10:1})	<u>8.5 mg/l</u>	<u>31.8 cm</u>	<u>81.47 cm³</u>	<u>59.3</u>
 	<u>1.0</u>	<u>63.6</u> (^{@ 10:1})	<u>11.1 mg/l</u>	<u>28.4 cm</u>	<u>90.17 cm³</u>	<u>66.4</u>

100 mg/l min max concn = 13.7 mg/l (20 cm³ @ 10:1) = 13 mg/l
 Total Volume = ~~150 cm³ * 2.055 cm³~~ = 45.8 cm³ mix with 773.3 mg/l solution
 100 mg/l = V * 773.3 mg/l / (V + 45.8 ml) A.4-104

JOB NO. 113794 JOB TITLE Enseorch, Toole DATE 3-13-94 BY Sam Ur-on

SUBJECT Effective Porosity Results CHECKED _____ SHEET _____ BY _____



Volume of Cell and burettes H
 Initial 1.0 cm
 Final 32.9 cm
 Difference 31.9 cm
 X 0.3065 = Volume 9.78 cm

Initial 102.6 cm
 Final 41.0 cm
 Difference 61.6 cm
 X 0.3065 = Volume 18.9 cm

% of Pore Volume = $\frac{46.0 \times 1.2}{2} = 27.6\%$

Eff. Por. = $\frac{0.25 \times 107.37}{104.31 + 107.37} \times 100 = 13.2\%$

Chen Northern, Inc.
TRIAxIAL PREPARATION
WORKSHEET

JOB NO. 113794 PART NO. _____ PREP. BY FU DATE 12-01-74
 JOB NAME EBASCO, TOPELE CALC. BY AV CKED. BY SU

HOLE NO. 8-BK-2 DEPTH 2-3 SAMPLE NO. SGT 007 STAGE NO. N/A
 CELL NO. 11 TYPE OF TEST Perr EFFECTIVE CONSOLIDATION STRESS 3.2 psi
 SAMPLE DESCRIPTION: Rem. Not

MOISTURE CONTENT				
	BEFORE TEST		AFTER TEST	
	SPECIMEN	RIMMINGS	SPECIMEN	TRIMMINGS
<i>silt + clay.</i>				
DISH NO.	<i>ped.</i>		<i>USA</i>	<i>MEG</i>
WT. OF WET SOIL & DISH	<i>676.12 g</i>		<i>598.0 g</i>	<i>—</i>
WT. OF DRY SOIL & DISH			<i>508.68 g</i>	<i>217.94 g</i>
WT. OF DISH	<i>374.48</i>		<i>240.8</i>	<i>208.9</i>
WT. OF WATER	<i>29.77</i>		<i>89.347</i>	
WT. OF WET SOIL	<i>301.64</i>		<i>357.2</i>	
WT. OF DRY SOIL W_s	<i>276.87</i>		<i>267.83</i>	<i>9.04</i>
% MOISTURE %	<i>8.946</i>		<i>32.3</i>	<i>33.37</i>

			SAMPLE DATA			
			INITIAL	SATURATED	CONSOLIDATED	FINAL
VOL. OF SOLIDS $V_s = \frac{W_s}{G_s} = \frac{102.562}{2.65} \text{ cm}^3$			$G_s = \frac{2.65}{1.03}$			
DIAMETER D	2.4	in.	cm			
HEIGHT CHANGE ΔH		DIAL INITIAL	in.	c		c
HEIGHT H	2.74	in.	cm			7.00 6.90
AREA A						27.00 cm^2 27.548 cm^2
VOLUME CHANGE ΔV_T						0.30 $- 0.107 \text{ cm}^3$
TOTAL VOLUME V_T	203.120	cm ³				192.03 cm^3
VOL. OF WATER V_W	24.77	cm ³				92.20 cm^3 92.151 cm^3
VOL. OF AIR V_A						

VOID RATIO e	0.9813			0.9813
SATURATION S%	24.256 %			100 %
MOISTURE CONTENT w%	8.89 %			32.3
WET DENSITY ρ				116.13 pcf
DRY DENSITY ρ_d	0.951 Pcf		0.951 Pcf	87.78 pcf

REMARKS 'B' _____ _____ _____ _____ _____	Sample Failure Diagram
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CIRCLE NORTH, INC.
TRIAxIAL SATURATION
 WORKSHEET

JOB NO. 113794 PART NO. _____ RUN BY F.D DATE 12-04-71
 JOB NAME ERASCO, TOOLE CKED. BY CU

HOLE NO. B-BK-2 DEPTH 2-2.0 SAMPLE NO. 59T007 STAGE NO. N/A
 CELL NO. 11
 EFFECTIVE CONSOLIDATION STRESS, 3.0 psi

DATE	TIME	REMARKS	CHAMBER BURETTE			SAMPLE BURETTE				
			PRES. PSI	BURETTE READING cm	SAMP. VOL. Δ cm ³	CAP		PEDESTAL		SAMP. VOL. Δ cm ³
						PRES. PSI	READ. cm	PRES. PSI	READ. cm	
12-04	12:20	Set CP + BP, R	5.5	70		5.0	77.5	5.0	202.0	
12-06	8:00	R	"	72		"	77.7	"	290	
	9:10	Raise CP + BP, R	10.5	71.0		11.0	68.0	10.0	49.0	
	12:00	R	"	5.7		"	74.0	"		
	15:00	Raise CP + BP, R + R	15.5	60		15.0	62.5	15.0	55.0	
12-7	8:00	R	"	58.0		"	52.5	"	100	
	8:50	Raise CP + BP, R + R	20.5	53.0		20.0	53.5	20.0	59.7	
	16:00	R	"	54		"	56.4	"	50.7	
		B; 23.3 → 33.3 ; 22.4 → 21.0 B = 70								
	16:00	Raise CP + BP, R + R	25.5	43.0		25.0	45.0	25.0	62.4	
12-9	10:00	R	"	43.5		25.0	61.0	25.0	61.7	
	11:00	Raise CP + BP, R + R	30.5	40.0		30.0	65.5	30.0	51.6	
12-9	9:10	R	"	40.0		"	66.0	"	100	
		B; 33.6 → 43.6 ; 22.7 → 41.2 B = 80								
	9:50	Raise CP + BP, R + R	35.5	34.0		35.0	69.4	35.0	62.1	
	15:10	R	"	36.0		"	62.4	"	67.0	
		B; 38.6 → 48.6 ; 22.7 → 46.3 B = 80								
	15:20	Raise CP + BP, R + R	40.5	31.0		40.0	59.4	40.0	46.2	
12-10	15:00	R	"	29		"	62.0	"	79.0	
	10:20	Raise CP + BP, R + R	45.5	23.0		45.0	41.0	45.0	79.0	
11	12:00	R	"	24.0		"	37.0	"	75.4	
		B; 48.6 → 58.6 ; 42.8 → 52.4								

FINAL 'B' PARAMETER: 96 CHAMBER BURETTE 'K' _____ cm³/cm
 TOTAL TIME TO SATURATE: _____ SAMPLE BURETTE 'K' _____ cm³/cm
 TOTAL SAMPLE VOLUME CHANGE FROM CHAMBER BURETTE _____ cm³
 TOTAL SAMPLE VOLUME CHANGE FROM SAMPLE BURETTE _____ cm³

Chen Northern, Inc.
TRIAxIAL CONSOLIDATION
 WORKSHEET

JOB NO. 113794 PART NO. _____ RUN BY F.D DATE 12-11-71
 JOB NAME EBASCO, Tooele CKED. BY SU

HOLE NO. 2-PK-2 DEPTH 2.0 SAMPLE NO. 157007 STAGE NO. N/A
 CELL NO. 11 TYPE OF TEST Perm
 (CELL PRESS. 450 psi - BACK PRESS. 550 psi) - EFFECTIVE CONSOLIDATION PRESSURE 30 psi

DATE	CLOCK TIME HR:MIN:SEC	ELAPSED TIME MIN.	PORE WATER BURETTE		CELL BURETTE		PORE PRESSURE psi
			READ. k= cc/div	VOLUME CHANGE -cm ³	READ. k= cc/div	VOLUME CHANGE -cm ³	
<u>12-11-71</u>		INITIAL	<u>cup</u>	<u>ped</u>			
	<u>15:09</u>	0	<u>2.0</u>	<u>164.0</u>	<u>67.5</u>	0	
		.10(6sec.)			<u>67</u>		
		.25(15sec.)					
		.50(30sec.)	<u>9.5</u>	<u>17.4</u>	<u>66.5</u>		
	<u>15:10</u>	1	<u>10.2</u>	<u>18.0</u>	<u>65.0</u>		
		2	<u>11.6</u>	<u>18.5</u>	<u>64.5</u>		
	<u>15:13</u>	4	<u>10.5</u>	<u>19.0</u>	<u>63.0</u>		
	<u>15:18</u>	9	<u>10.5</u>	<u>19.4</u>	<u>63.0</u>		
		16			<u>63.0</u>		
	<u>15:19</u>	30		<u>21.0</u>	<u>62.5</u>		
		60			<u>62.5</u>		
		120					
		240					
		480					
		1440					
				<u>27.5</u>	<u>62.5</u>		
			TOTAL VOL. Δ = _____ cm ³	TOTAL VOL. Δ = _____ cm ³			

REMARKS: _____

JOB NO. 113794 PART NO. _____
 JOB NAME EBASCO, TOOLE

Chen Northern, Inc.
TRIAxIAL PERMEABILITY

RUN BY F.D DATE 12-13-93
 CALC. BY AL CKED. BY GU

HOLE NO. 8-PK 2 DEPTH 2-? SAMPLE NO. 95007 SAMPLE TYPE Undist. CELL NO. 11 EFF. σ_3 3.0

SAMPLE AREA, "A" _____ $\text{in}^2 = \frac{27.093}{2.54^2} \text{cm}^2$ FINAL SAMPLE LENGTH, "L" _____ $\text{in} = \frac{6.960}{2.54} \text{cm}$ BURET AREA, "a" 1.3079 cm^2

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD ₁ cm				WATER HEAD ₂ PED-CAP = HEAD ₂ cm				TOTAL HEAD, cm +2	Log $\frac{h_1}{h_2}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log} \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ			
	12-13	11:21	—	480	NOT TAKEN	44.5	46.5	1.0	20.32	5.5	/	31.6	/	—	—	—
		11:48	1800							22.2	/	67.	/	115.12	2.6825	3.29×10^{-6}
		15:30	—							30.8	/	57.4	/	46.92	2.9652	2.65×10^{-6}
	12-14	8:54	—								/		/	146.32	—	—
		11:55	9240							31.0	/	45.	/	211.32	2.5906	2.32×10^{-6}
A.4-109		11:19	10860							48.5	/	36.6	/	58.42	1.1674	1.31×10^{-6}
		11:32	—							3.0	/		/	146.52	—	—
		11:36	—							11.1	/		/	111.67	2.0771	1.87×10^{-6}
		11:45	3600							22.5	/	61.3	/	109.12	1.6023	1.43×10^{-6}
		17:00	1970							48.0	/	36.1	/	48.42	2.3344	2.09×10^{-6}
	12-15	7:23	—							15.8	/	75.1	/	142.72	—	—
		11:16	7380							22.7	/	61.4	/	109.02	1.585	1.42×10^{-6}
		14:28	10920							39.6	/	44.5	/	75.22	1.4759	1.32×10^{-6}
		16:18	6600							47.0	/	31.1	/	54.42	2.1299	1.90×10^{-6}
	12-16	9:08	—							2.9	/	72.6	/	119.02	—	—
		16:19	23860							44.1	/	35.8	/	64.62	1.2865	1.15×10^{-6}
										29.0	/	38.6	/	—	—	—
										—	/	—	/	—	—	—
	12-17	10:11	—							4.5	/	8.5	/	146.32	—	—
		15:38	20040							35.0	/	30.9	/	85.42	1.1663	1.07×10^{-6}
										50.1	/	30A	/	—	—	—
										15.1	/		/	—	—	—

$k = \frac{(1.151 \text{ cm})}{A} = \frac{0.088104}{0.394}$

continued.

2/2

JOB NO. 1179A PART NO. _____ **Chen Northern, Inc.** RUN BY SL DATE _____
 JOB NAME 1100, Teeple **TRIAxIAL PERMEABILITY** CALC. BY AL/SU CKED. BY SU

HOLE NO. B-VV-2 DEPTH 2-3 SAMPLE NO. SGT 007 SAMPLE TYPE Uncons. CELL NO. 11 EFF. 3.0
 SAMPLE AREA, "A" in² = 27.993 cm² FINAL SAMPLE LENGTH, "L" in = 6.967 cm BURET AREA, "a" cm²

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD, cm				WATER HEAD ₂ PED-CAP = HEAD, cm					TOTAL HEAD, cm 1+2	Log $\frac{h_1}{h_2}$ $\frac{h_1}{h_2}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log} \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS, psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ	HEAD ₂			
	12-20	10:00:00		48.0	NOT TAKEN	44.5	45.5	1.0	70.36	13.9	/	26.4	/	63.3	133.62		1.17×10^{-6} 1.19×10^{-6} 1.13×10^{-6} 1.03×10^{-6} Avg. = 1.1×10^{-6}
	12-20	10:40		"	"	"	"	"	"	21.9	16.8	17.8	26.7	97.02			
	12-20	15:20		"	"	"	"	"	"	19.7	7.8	40.8	7.8	-8.9	61.42		
	12-21	9:00								4.6	8.2						
A-4-110																Values from Page 1/2	

$k = \left(\frac{1.181}{A} \right)^{-4} =$ _____

JOB NO. 113794 PART NO. _____
 JOB NAME EBASCO, TOOELE
 Chem Northern, Inc.
SPECIFIC GRAVITY TEST
 WORKSHEET
 PREP. BY F.D DATE _____
 CALC. BY AL CKED. BY GU

A.4-111

SPECIFIC GRAVITY OF SOILS (G _s) ASTM D-854		TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2
RUN BY							
HOLE AND DEPTH / SAMPLE NO. <u>S-BK-2</u>							
DESCRIPTION							
PREP. DISH							
FLASK NO.		<u>M</u>	<u>N</u>				
TEMPERATURE OF WATER AND SOIL, T, °C		<u>25.5</u>	<u>25.5</u>				
DISH NO.		<u>River</u>	<u>Buyer</u>				
DISH + DRY SOIL, g		<u>295.89</u>	<u>298.11</u>				
DISH, g		<u>271.03</u>	<u>277.18</u>				
DRY SOIL, g	A	<u>24.86</u>	<u>24.93</u>				
FLASK + WATER @ T, °C, g	B	<u>349.719</u>	<u>355.857</u>				
A + B, g		<u>374.104</u>	<u>380.787</u>				
FLASK + WATER + SOIL, g	C	<u>364.90</u>	<u>371.60 (371.60)</u>				
DISPLACED WATER, (A + B) - C, g		<u>9.208</u>	<u>9.1874</u>				
CORRECTION FACTOR FOR TEMP. T, °C	K	<u>8708</u> <u>.9967</u>	<u>8708</u> <u>.9967</u>				
G _s = (A*K) / (A + B - C)		<u>2.69765</u>	<u>2.7050</u>				
G _s , TRIAL 1 - G _s , TRIAL 2*			<u>-.0135</u>				
AVERAGE G _s			<u>2.69703</u>				

REMARKS

*The difference between G_s values for the two trials should be ≤ 0.050.

Chen Northern, Inc.
TRIAXIAL PREPARATION
WORKSHEET

JOB NO. 113794 PART NO. _____ PREP. BY FV DATE _____
 JOB NAME EBASCO, TOOELE CALC. BY SU CKED. BY SU

HOLE NO. 30-05A-1 DEPTH 4-3 SAMPLE NO. S&T 011 STAGE NO. N/A
 CELL NO. E TYPE OF TEST Pern EFFECTIVE CONSOLIDATION STRESS 3.2 psi
 SAMPLE DESCRIPTION: Bas. Mat.

MOISTURE CONTENT				
	BEFORE TEST		AFTER TEST	
	SPECIMEN	TRIMMINGS	SPECIMEN	TRIMMINGS
wet silt.				
DISH NO.			HAIR	BIRCH
WT. OF WET SOIL & DISH			576.74 g	_____
WT. OF DRY SOIL & DISH			472.14	212.06 g
WT. OF DISH			131.66	210.75
WT. OF WATER	82.11 g			
WT. OF WET SOIL	423.9 g			
WT. OF DRY SOIL w_s	341.79		340.48	1.31
% MOISTURE %	24.02		30.60	

		SAMPLE DATA			
		INITIAL	SATURATED	CONSOLIDATED	FINAL
VOL. OF SOLIDS $V_s = \frac{W_s}{G_s} = 175.15 \text{ cm}^3$	$G_s = 2.731$				
DIAMETER D	2.4 in. cm				
HEIGHT CHANGE ΔH	DIAL INITIAL _____ in.	0	0	0	
HEIGHT H	2.04 in. cm				3.04" 7.722 cm
AREA A					29.754 cm ²
VOLUME CHANGE ΔV_T					4.39 cm ³
TOTAL VOLUME V_T	225.36 cm ³				229.75 cm ³
VOL. OF WATER V_W	82.11 cm ³				102.60 cm ³
VOL. OF AIR V_A					

VOID RATIO e	0.801			0.836
SATURATION S%	81.9 %			100%
MOISTURE CONTENT w%	24.0 %			30.6%
WET DENSITY γ				
DRY DENSITY γ_d	g/cc 94.7 Pcf		g/cc Pcf	92.9 Pcf

REMARKS "B" _____

Sample Failure Diagram

JOB NO. 113794 PART NO. **Chem Northern, Inc.**
SPECIFIC GRAVITY TEST PREP. BY FD DATE
 JOB NAME Ebasco, Tavelle **WORKSHEET** CALC. BY SU CKED. BY SU

A.4-113

SPECIFIC GRAVITY OF SOILS (G _s) ASTM D-854		TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2
RUN BY							
HOLE AND DEPTH / SAMPLE NO. <u>30-05A-1 / 59T010</u>							
DESCRIPTION							
PREP. DISH							
FLASK NO.		<u>AA</u>	<u>K</u>				
TEMPERATURE OF WATER AND SOIL, T, °C		<u>27.0</u>	<u>27.0</u>				
DISH NO.		<u>A2</u>	<u>fine</u>				
DISH + DRY SOIL, g		<u>297.24</u>	<u>298.41</u>				
DISH, g		<u>271.63</u>	<u>273.27</u>				
DRY SOIL, g	<u>A</u>	<u>25.61</u>	<u>25.14</u>				
FLASK + WATER @ T, °C, g	<u>B</u>	<u>346.096</u>	<u>342.167</u>				
A + B, g		<u>371.706</u>	<u>377.307</u>				
FLASK + WATER + SOIL, g	<u>C</u>	<u>362.32</u>	<u>368.14</u>				
DISPLACED WATER, (A + B) - C, g		<u>9.386</u>	<u>9.167</u>				
CORRECTION FACTOR FOR TEMP. T, °C	<u>K</u>	<u>0.998307</u>	<u>0.998307</u>				
G _s = (A*K) / (A + B - C)		<u>2.7238</u>	<u>2.7579</u>				
G _s , TRIAL 1 - G _s , TRIAL 2*			<u>0.014</u>				
AVERAGE G _s			<u>2.731</u>				

REMARKS

*The difference between G_s values for the two trials should be ≤ 0.050.

CIVIL ENGINEERING
TRIAxIAL SATURATION
WORKSHEET

JOB NO. 113794 PART NO. _____ RUN BY F.D DATE _____
 JOB NAME ERASCO, TOOLE CKED. BY SU

HOLE NO. 30-OSA-1 DEPTH 1 1/2 - 3 SAMPLE NO. SAT01 STAGE NO. N/A
 CELL NO. E
 EFFECTIVE CONSOLIDATION STRESS, 3.0 psi

DATE	TIME	REMARKS	CHAMBER BURETTE			SAMPLE BURETTE				
			PRES. psi	BURETTE READING cm	SAMP. VOL. Δ cm ³	CAP		PEDESTAL		SAMP. VOL. Δ cm ³
						PRES. psi	READ. cm	PRES. psi	READ. cm	
2-3	9:50	SE, CP+BP, R	5.5	N/A		5.0	104.0	5.0	104.0	
	14:50	R	"			"	59.0	"	57.0	
	"	Raise CP+BP, B+R	10.5			10.0	101.0	10.0	101.0	
2-4	8:10	R	"			"	62.0	"	73.0	
	"	Raise CP+BP, B+R	15.5			15.0	109.0	15.0	107.0	
	13:00	R	"			"	72.0	"	73.0	
	"	Raise CP+ED, E+R	20.5			20.0	97.0	20.0	96.0	
2-7	2:10	R	"			"	85.0	"	77.4	
		B; 21.3 → 31.3 ; 20.7 → 30.5		B=98						

FINAL 'B' PARAMETER: 98 CHAMBER BURETTE 'K' _____ cm³/cm
 TOTAL TIME TO SATURATE: _____ SAMPLE BURETTE 'K' _____ cm³/cm
 TOTAL SAMPLE VOLUME CHANGE FROM CHAMBER BURETTE _____ cm³
 TOTAL SAMPLE VOLUME CHANGE FROM SAMPLE BURETTE _____ cm³

JOB NO. 113744 PART NO. _____ **Chen Northern, Inc.** RUN BY F.D DATE 2-9-90
 JOB NAME EPASCO, Tangle **TRIAxIAL PERMEABILITY** CALC. BY SU CKED. BY SU

HOLE NO. 30-05A-1 DEPTH 15-3 SAMPLE NO. SGT oil SAMPLE TYPE Undist. CELL NO. E EFF. σ_3 3.0
 SAMPLE AREA, "A" _____ $\text{in}^2 = 29.754 \text{ cm}^2$ FINAL SAMPLE LENGTH, "L" _____ $\text{in} = 7.722 \text{ cm}$ BURET AREA, "a" 0.248 cm^2

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD, cm				WATER HEAD ₂ PED-CAP = HEAD, cm				TOTAL HEAD, cm t+2	Log $\frac{h_1}{h_2}$ of	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log} \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS, psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ			
FD	2-9	9:19	—	230	N/A	17.5	20.5	1.0	70.32	40.5	/	139.5	/	169.32	—	
1		9:40	1260							59.0	12.5	121.4	12.3	162.72	5.2707	8.40×10^{-5}
		10:26	2760							80.7	11.7	98.5	11.9	148.12	7.4875	6.95×10^{-5}
		12:00	5880							98.0	17.3	78.0	20.5	50.32	4.1383	$\times 10^{-5}$
		14:00	—							75.2	/	139.1	/	174.32	—	
		15:15	4500							62.0	16.5	101.0	38.4	109.32	4.1922	$\times 10^{-5}$
		15:37	—							34.5	/	131.5	/	173.32	—	
		15:59	1320							84.5	50.0	89.5	48.0	75.12	2.4407	7.74×10^{-4}
	2-11	8:52	—							40.0	/	135.0	/	165.32	—	
		9:08	960							118.0	11.5	91.0	44.0	73.32	3.6781	$\times 10^{-4}$
SU	3-08	7:59	—	23.0		20.0	20.0	0.0	20	35.8	/	163.6	/	127.8	—	
	"	9:49	600	"		"	"	"	"	48.4	12.6	151.4	12.2	123.0	2.068	1.531×10^{-4}
1	"	9:54	300	"		"	"	"	"	56.9	8.5	142.0	7.4	85.1	2.017	1.49×10^{-4}
1	"	10:23	1440	"		"	"	"	"	72.2	15.3	126.5	15.5	54.3	1.088	8.06×10^{-5}
1	"	10:33	200	"		"	"	"	"	73.9	4.7	121.6	4.9	44.7	2.025	1.50×10^{-4}
1	"	10:58	1500	"		"	"	"	"	84.9	7.5	114.1	7.5	29.7	1.003	7.43×10^{-5}

$k = (1.18^3 \text{ dl}) = 0.074077$

JOB NO. 113794 PART NO. _____
 JOB NAME Research Tarele

Chen Northern, Inc.
TRIAxIAL PERMEABILITY

RUN BY SU DATE 3-08-94
 CALC. BY SU CKED. BY SU

HOLE NO. 30-001-1 DEPTH 1.5-3 SAMPLE NO. SGT 011 SAMPLE TYPE Undis? CELL NO. E EFF. 3.0ps
 SAMPLE AREA, "A" _____ $ln^2 = 29.754 \text{ cm}^2$ FINAL SAMPLE LENGTH, "L" _____ $ln = 7.722 \text{ cm}$ BURET AREA, "B" 0.248 cm²

BY	DATE	CLOCK TIME	Δt sec	CHAMBER DATA		BACK-PRESSURE HEAD ₁ DIFF X 70.32 = HEAD, cm				WATER HEAD ₂ PED-CAP = HEAD, cm					TOTAL HEAD, cm 1+2	Log $\frac{h_1}{h_2}$	COEFFICIENT OF PERMEABILITY $\frac{C}{\Delta t} \times \text{Log} \frac{h_1}{h_2} = k, \frac{\text{cm}}{\text{sec}}$
				PRESS. psi	BURET cm	CAP	PED	DIFF	HEAD ₁	CAP	Δ	PED	Δ	HEAD ₂			
SU	3-08	11:51	—	73.0	NA	20.0	200	0.0	0.0	45.1	/	163.9	/	118.8			
SU	3-08	12:47	3360	"	"	"	"	"	"	87.8	42.7	121.2	42.7	33.4		1.64×10^{-4}	
"	"	12:57	600	"	"	"	"	"	"	91.0	3.2	117.3	3.9	26.3		1.73×10^{-4}	
"	"	1:07	600	"	"	"	"	"	"	93.3	2.3	115.8	1.5	22.5		1.13×10^{-4}	
"	"	1:17	600	"	"	"	"	"	"	95.2	1.9	113.9	1.9	18.7		1.34×10^{-4}	
"	"	1:27	600	"	"	"	"	"	"	96.8	1.6	112.8	1.1	16.0		1.13×10^{-4}	
"	"	1:37	600	"	"	"	"	"	"	98.1	1.3	111.1	1.7	13.0		1.50×10^{-4}	

A-4-117

Avg = 9.4×10^{-5}

$k = \frac{(1.181 \text{ cL})}{A} = 0.074077$

Huntingdon Engineering & Environmental, Inc.

EFFECTIVE POROSITY WORK SHEET

JOB NO. 113794 PART NO. 2
 JOB NAME Ersearch, Toole

PREP. BY SU CALC. BY SU DATE 3-08-73
 CHKD. BY _____ SHEET 1 OF 1

Hole Number <u>30-22-1</u>	Depth <u>1.5-3</u>	Sample Number <u>SGT 011</u>	Cell Number <u>E</u>
Initial Height		<u>3.04"</u>	
Initial Diameter		<u>2.40"</u>	
Initial Volume		<u>225.4 cm³</u>	
Volume Loss During Consolidation		<u>10.1 cm³</u>	
Initial Weight		<u>423.9 g</u>	
Initial Moisture (Estimate/Approximate)		<u>25%</u>	
Weight of Dry Soil (Approximate)		<u>339.1 g</u>	
Specific Gravity (Estimate/Actual)		<u>2.731</u>	
Volume of Dry Soil (Approximate)		<u>124.2 cm³</u>	<u>(125.15 cm³)</u>
Pore Volume (Approximate)		<u>91.1 cm³</u>	<u>(104.60 cm³)</u>
log (h _r /h _i) / t (Average of 4)		<u>1.28 x 10⁻⁴</u> (<u>Q = hr^{1.28} 5⁴ v^{1.5} x .248</u>)	
Coefficient of Permeability, k (Approximate)			
Time for 0.1 Pore Volumes (Approximate)		<u>5000 sec (83 min 20 sec)</u>	

Time of Reading	Estimated Pore Volume	BSE nV Reading	Bromide Concentration	Effluent Burette	Volume E.B. x 0.248	% of Pore Volume
<u>50 min</u>	<u>0.1</u>	<u>93.8^(@ 2:1)</u>	<u>3.4 mg/l</u>	<u>73.3 cm</u>	<u>18.18 cm³</u>	<u>40</u>
	<u>0.2</u>	<u>81.7^(@ 2:1)</u>	<u>5.4 mg/l</u>	<u>53.2 cm</u>	<u>31.37 cm³</u>	<u>9.1</u>
	<u>0.3</u>	<u>96.3^(@ 10:1)</u>	<u>3.0 mg/l</u>	<u>17.3 cm</u>	<u>35.66 cm³</u>	<u>13.3</u>
	<u>0.4</u>	<u>75.0^(@ 10:1)</u>	<u>7.1 mg/l</u>	<u>36.4 cm</u>	<u>44.60 cm³</u>	<u>21.9</u>
	<u>0.5</u>	<u>71.2^(@ 10:1)</u>	<u>8.2 mg/l</u>	<u>27.7 cm</u>	<u>51.56 cm³</u>	<u>28.5</u>
	<u>0.6</u>	<u>65.8^(@ 10:1)</u>	<u>10.2 mg/l</u>	<u>37.0 cm</u>	<u>60.74 cm³</u>	<u>37.2</u>
	<u>0.7</u>	<u>64.5^(@ 10:1)</u>	<u>10.8 mg/l</u>	<u>38.1 cm</u>	<u>70.19 cm³</u>	<u>46.3</u>
	<u>0.8</u>					
	<u>0.9</u>					
	<u>1.0</u>		<u>A.4-118</u>			

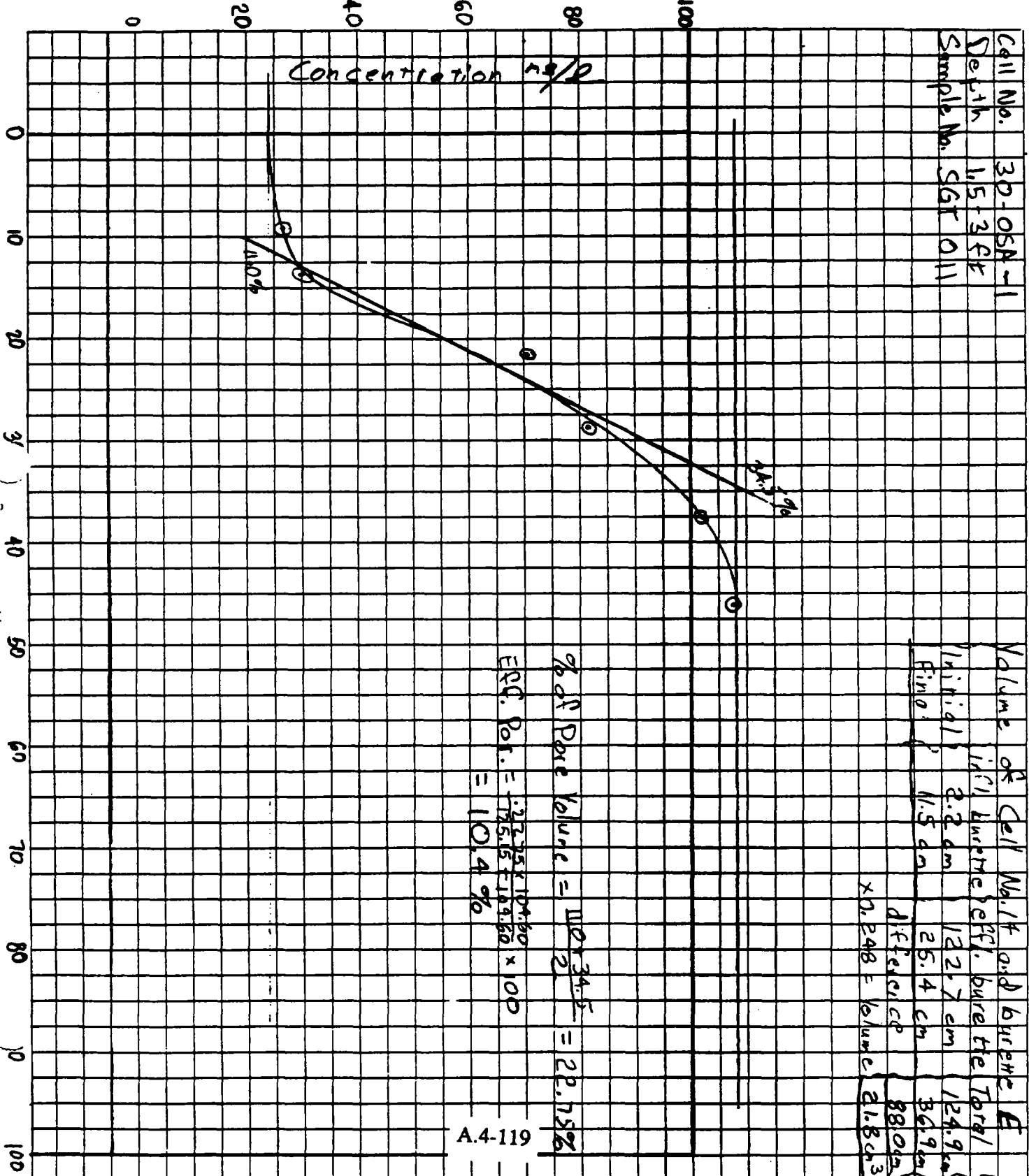
100 mg/l minimum concentration (to dilute to 10 mg/l @ 10:1)
 Total Volume = 120 cm³, mix with 773.3 mg/l solution
 $100 \text{ mg/l} = (V \times 773.3 \text{ mg/l}) / (V + 120 \text{ ml})$

Huntingdon

Consulting Engineers Environmental Scientists

JOB NO. 113794 JOB TITLE Ensear, Tooe DATE 3-13-94 BY _____

SUBJECT Effective Porosity Results CHECKED _____ SHEET _____ BY _____



Cell No. 3D-OSA-1
 Depth 15-3 FT
 Sample No. SGT 011

Volume of Cell No. 14	and burette E
Initial	Initial burette
Final	Final burette
Difference	Difference
$\times 0.248 =$ Volume	Volume

$$\% \text{ of Pore Volume} = \frac{11.0 \times 34.5}{2} = 22.75\%$$

$$\text{Eff. Por.} = \frac{22.75 \times 104.60}{175.15 + 104.60} \times 100$$

$$= 10.4\%$$

A.4-119

Chen Northern, Inc.
TRIAxIAL PREPARATION
WORKSHEET

JOB NO. 113794 PART NO. _____ PREP. BY FU DATE 12-11-93
 JOB NAME EBASCO, TOOLE CALC. BY SU/PE CHECKED BY SU

HOLE NO. 30-05A-2 DEPTH 2-3 SAMPLE NO. 54T01A STAGE NO. N/F
 CELL NO. L TYPE OF TEST Perm EFFECTIVE CONSOLIDATION STRESS 3.0 psi
 SAMPLE DESCRIPTION: Rem. Arg.

MOISTURE CONTENT				
	BEFORE TEST		AFTER TEST	
	SPECIMEN	TRIMMINGS	SPECIMEN	TRIMMINGS
DISH NO. <u>6</u>	<u>cap</u>		<u>RCM</u>	<u>SIP</u>
WT. OF WET SOIL & DISH			<u>638.0 g</u>	<u>—</u>
WT. OF DRY SOIL & DISH			<u>533.06</u>	<u>215.45 g</u>
WT. OF DISH	<u>129.71</u>		<u>239.42</u>	<u>208.87</u>
WT. OF WATER	<u>78.38 g</u>		<u>104.94</u>	
WT. OF WET SOIL	<u>378.60</u>		<u>398.58</u>	
WT. OF DRY SOIL w_s	<u>303.22</u> <u>300.22</u>		<u>293.64</u>	<u>68.58</u>
% MOISTURE %	<u>24.9</u> <u>26.11</u>		<u>35.58</u>	

VOL. OF SOLIDS $V_s = \frac{W_s}{G_s} = \frac{109.77}{2.735} = 39.77 \text{ cm}^3$		SAMPLE DATA			
		INITIAL	SATURATED	CONSOLIDATED	FINAL
DIAMETER D	2.110 in. cm				
HEIGHT CHANGE ΔH	DIAL INITIAL in.	0	0	0	
HEIGHT H	2.75 in. cm				2.75' 6.985 cm
AREA A					31.075 cm ²
VOLUME CHANGE ΔV_T					13.20 cm ³
TOTAL VOLUME V_T	203.86 cm ³				217.06 cm ³
VOL. OF WATER V_W	78.38 cm ³				157.29 cm ³
VOL. OF AIR V_A					

VOID RATIO e	0.957		0.977
SATURATION S%	83.3 %		100%
MOISTURE CONTENT w%	26.1 %		35.6%
WET DENSITY γ			
DRY DENSITY γ_d	g/cc 91.9 Pcf		g/cc Pcf 86.39

REMARKS 'B' 9B

Sample Failure Diagram

A.4-120

cm³ = 16.39 × in.³; cm² × .001076 = in.²; g = Gw; e = $\frac{V_v}{V_s}$

UNIVERSITY OF CALIFORNIA
TRIAxIAL SATURATION
 WORKSHEET

JOB NO. 13794 PART NO. _____ RUN BY F.D DATE 12-01-79
 JOB NAME EPASCO, TOOLE CKED. BY SU

HOLE NO. 20--9A2 DEPTH 2' SAMPLE NO. 59T014 STAGE NO. 11A
 CELL NO. L
 EFFECTIVE CONSOLIDATION STRESS, 3.0 psi

DATE	TIME	REMARKS	CHAMBER BURETTE			SAMPLE BURETTE				
			PRES. psi	BURETTE READING cm	SAMP. VOL. cm ³	CAP		PEDESTAL		SAMP. VOL. cm ³
						PRES. psi	READ. cm	PRES. psi	READ. cm	
12-7	15:00	St. CP+BP, R	5.5	N/A		5.0	140.0	5.0	140.0	
12-8	10:00	look	"			"		"		
	11:00	Raise CP+B, B+R	10.5			10.0	77.5	10.0	91.1	
	14:10	R	"			"	78.5	"	99.0	
	14:10	Raise CP+B, B+R	15.0			15.0	79.0	15.0	101.0	
12-9	10:00	R	"			"	82.2	"	89.5	
	10:00	Raise CP+B, B+R	20.5			20.0	85.0	20.0	89.5	
	15:30	R	"			"	85.7	"	85.0	
	15:30	Raise CP+B, B+R	25.5			25.0	87.0	25.0	85.0	
12-10	10:10	R	"			"	89.7	"	81.6	
	15:00	R	"			"	83.0	30.0	89.5	
	17:00	R	"			"	83.2	"	85.4	
	17:10	Raise CP+B, B+R	35.0			35.0	91.0	35.0	84.2	
12-11	10:40	R	"			"	87.0	"	85.0	
		B; 77.2 → 47.2; 16.8 → 46.6 B=9A								

FINAL 'B' PARAMETER: 98 CHAMBER BURETTE 'K' _____ cm³/cm
 TOTAL TIME TO SATURATE: _____ SAMPLE BURETTE 'K' _____ cm³/cm
 TOTAL SAMPLE VOLUME CHANGE FROM CHAMBER BURETTE _____ cm³
 TOTAL SAMPLE VOLUME CHANGE FROM SAMPLE BURETTE _____ cm³

Cnen Northern, Inc.
TRIAxIAL CONSOLIDATION
WORKSHEET

JOB NO. 113794 PART NO. _____ RUN BY F.D DATE 12-11-5
 JOB NAME EBASCO, Tooele CKED. BY SU

HOLE NO. 0001-2 DEPTH 23 SAMPLE NO. SQT 014 STAGE NO. N/A
 CELL NO. L TYPE OF TEST Perm
 (CELL PRESS. 38.0 psi - BACK PRESS. 35.0 psi) - EFFECTIVE CONSOLIDATION PRESSURE 3.0 psi

DATE	CLOCK TIME HR:MIN:SEC	ELAPSED TIME MIN.	PORE WATER BURETTE		CELL BURETTE		PORE PRESSURE psi
			READ. ke ____cc/div	VOLUME CHANGE -cm ³	READ. ke ____cc/div	VOLUME CHANGE -cm ³	
12-11-93	12:15	INITIAL	57.0	0	62.5	0	
		0	57.0	0	62.5	0	
		.10(6sec.)	58.0		63.6		
		.25(15sec.)	58.5		63.9		
		.50(30sec.)	58.8		64.1		
		1	59.2		64.4		
		2					
		4					
		9	62.0		65.4		
		16	63.0		65.5		
30	63.5		65.6				
60							
120	65.0		70.0				
		240					
		480					
	1:40	1440	68.5		73.0		
			TOTAL VOL. Δ = _____cm ³	TOTAL VOL. Δ = _____cm ³			

REMARKS: _____

JOB NO. 113794 PART NO. _____
 JOB NAME EBASCO, TOOLE
 Chem Northern, Inc.
SPECIFIC GRAVITY TEST
 WORKSHEET
 PREP. BY F.D DATE _____
 CALC. BY _____ CKED. BY _____

SPECIFIC GRAVITY OF SOILS (G _s) ASTM D-854		TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2	TRIAL 1	TRIAL 2
RUN BY							
HOLE AND DEPTH / SAMPLE NO. <u>SGT 014</u>		<u>2005A-2P 2-3' SGT 014</u>					
DESCRIPTION							
PREP. DISH							
FLASK NO.		<u>N</u>	<u>CC</u>				
TEMPERATURE OF WATER AND SOIL, T, °C		<u>24.0</u>	<u>24.0</u>				
DISH NO.		<u>14</u>	<u>DD</u>				
DISH + DRY SOIL, g		<u>320.57</u>	<u>315.59</u>				
DISH, g		<u>275.21</u>	<u>271.02</u>				
DRY SOIL, g	A	<u>44.90</u>	<u>44.56</u>				
FLASK + WATER @ T, °C, g	B	<u>355.942</u> 354.167	<u>354.956</u> 357.167				
A + B, g		<u>400.842</u> 402.167	<u>399.516</u> 402.167				
FLASK + WATER + SOIL, g	C	<u>384.55</u>	<u>383.33</u>				
DISPLACED WATER, (A + B) - C, g		<u>16.492</u> 18.194	<u>16.186</u> 18.194				
CORRECTION FACTOR FOR TEMP. T, °C	K	<u>.999091</u>	<u>.999091</u>				
G _s = (A*K) + (A + B - C)		<u>2.720</u>	<u>2.7505</u> 2.367				
G _s , TRIAL 1 - G _s , TRIAL 2*			<u>.0304</u>				
AVERAGE G _s			<u>2.735</u>				

A.4-124

REMARK N 1051257 A7 113 ↑ 0.05103 1.150 1.20

*The difference between G_s values for the two trials should be ≤ 0.050.

Chen Northern, Inc.
TRIAXIAL PREPARATION
WORKSHEET

JOB NO. 113794 PART NO. _____ PREP. BY FD DATE _____
 JOB NAME EBASCO, TOOELE CALC. BY _____ CKED. BY _____

HOLE NO. 31-BK-1 DEPTH 1-3 SAMPLE NO. 9TC20 STAGE NO. N/A
 CELL NO. 11 TYPE OF TEST Permeffective Consolidation Stress 3.0 psi
 SAMPLE DESCRIPTION: Red. Sil.

MOISTURE CONTENT				
	BEFORE TEST		AFTER TEST	
	SPECIMEN	TRIMMINGS	SPECIMEN	TRIMMINGS
dry loose clay				
DISH NO.			<u>PA16</u>	<u>R</u>
WT. OF WET SOIL & DISH	<u>508.0 g</u>		<u>423.60 g</u>	<u>103.54 g</u>
WT. OF DRY SOIL & DISH			<u>328.49 g</u>	<u>103.54 g</u>
WT. OF DISH	<u>266.66</u>		<u>115.69</u>	<u>115.69</u>
WT. OF WATER	<u>18.58</u>		<u>75.11</u>	
WT. OF WET SOIL	<u>241.34</u>		<u>297.91</u>	
WT. OF DRY SOIL w_s	<u>223.26</u>		<u>222.80</u>	<u>.46</u>
% MOISTURE %	<u>8.1</u>		<u>33.7</u>	

VOL. OF SOLIDS $V_s = \frac{w_s}{G_s} = \frac{223.26}{2.68} = 83.31 \text{ cm}^3$	SAMPLE DATA			
	INITIAL	SATURATED	CONSOLIDATED	FINAL
DIAMETER D	<u>2.35 in. 5.97 cm</u>			<u>2.253</u>
HEIGHT CHANGE ΔH	DIAL INITIAL _____ in.	<u>0</u>	<u>0</u>	<u>0</u>
HEIGHT H	<u>2.42 in. 6.17 cm</u>			<u>2.42 in. 6.17 cm</u>
AREA A	<u>27.98</u>			<u>25.72</u>
VOLUME CHANGE ΔV_T				<u>-1.57</u>
TOTAL VOLUME V_T	<u>172.040</u>			<u>159.47</u>
VOL. OF WATER V_W	<u>18.08</u>			<u>75.47</u>
VOL. OF AIR V_A				

VOID RATIO e	<u>1.070</u>			<u>0.876</u>
SATURATION S%	<u>21.3 %</u>			<u>100.0 %</u>
MOISTURE CONTENT w%	<u>8.1 %</u>			<u>33.7 %</u>
WET DENSITY γ	<u>1.703</u>			<u>1.888</u>
DRY DENSITY γ_d	<u>1.295 g/cc x 1.0 Pcf</u>		<u>g/cc</u>	<u>1.295 / 88.1 Pcf</u>

REMARKS 'B' PA16 soil volume = 22.2 cm³
10.0 cm = 2.5 cm
10.0 cm = 87.7 cm
2.42 in. = 76.0 cm
2.42 in. = 22.2 cm

Sample Failure Diagram

Tooele Geotechnical Chain-of-Custody

Ebasco Services Incorporated

Project Name:
Tooele Army Depot - South Area
RFI - Phase II

Samplers: (Signature)
S. Subalak-Bryan
A. Dwyer-Bryan

Sample Date:
10-29-93

ANALYSIS REQUIRED

Site Identification	Sample Tag Number	Time (Primary Standard)	Sample Depth (Feet)	SAMPLE TECHNIQUE	pH	Conductivity	TOC	Cation-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	Number of Containers	REMARKS
5-BK-1	SGT024	10/05	1.5-2.3	S	X		X	X								1	
5-BK-1	SGT025	10/05	1.5-2.3	S					X	X	X	X				3	
5-BK-1	SGT026	10/05	1.5-2.3	S										X		1	
5-BK-1	SGT027	10/05	1.5-2.3	S										X		1	

A.4-128

Relinquished by: (Signature) [Signature]	Date/Time (MD/Yr) () 10-25-93	Received by: (Signature) Robert K. Juedt	Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)
Relinquished by: (Signature) Robert K. Juedt	Date/Time (MD/Yr) () 10-30-93 12:00	Received by: (Signature) FEDERAL EXPRESS	Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature) Samuel D. [Signature]	Date/Time (MD/Yr) ()	Sample Analysis Date _____	
Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)	Date/Time (MD/Yr) ()	AIR BILL # 7499147353	

Tooele Geotechnical Chain-of-Custody

Chase Services Incorporated

Project Name:

Tooele Army Depot - South Area
RFI - Phase II

ANALYSIS REQUIRED

Samplers: (Signature)

S. S. Cox-Zuk-Bryan
J. A. [Signature]

Sample Date:

10-29-93

Site Identification	Sample Tag Number	Time (Military Standard)	Sample Depth (Feet)	SAMPLE TECHNIQUE	pH	Conductivity	TOC	Cation-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	NUMBER OF CONTAINERS	REMARKS
5-BK-2	S6T028	0950	15 2-3 ⁵⁰ ₁₀₋₂₋₉₃	S	X		X	X								2	SSB 10-29-93
5-BK-2	S6T029	0950	15 2-3 ⁵⁰ ₁₀₋₂₋₉₃	S					X	X	X	X				3	
5-BK-2	S6T030	0950	15 2-3 ⁵⁰ ₁₀₋₂₋₉₃	S											X	1	
5-BK-2	S6T031	0950	15 2-3 ⁵⁰ ₁₀₋₂₋₉₃	S										X		1	
A.4-129																	

Relinquished by: (Signature)

[Signature]

Date/Time (MD/Yr) ()

10-29-93/1100

Received by: (Signature)

Robert K. [Signature]

Relinquished by: (Signature)

[Signature]

Date/Time (MD/Yr) ()

Received by: (Signature)

[Signature]

Relinquished by: (Signature)

Robert K. [Signature]

Date/Time (MD/Yr) ()

10-30-93 1200

Received by: (Signature)

FEDERAL EXPRESS

Relinquished by: (Signature)

[Signature]

Date/Time (MD/Yr) ()

Received by: (Signature)

[Signature]

Relinquished by: (Signature)

[Signature]

Date/Time (MD/Yr) ()

Received by: (Signature)

Samuel D. [Signature]

Relinquished by: (Signature)

[Signature]

Date/Time (MD/Yr) ()

Received by: (Signature)

[Signature]

Sample Analysis Date

AIR BILL # 7499147353

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Tooele Geotechnical Chain-of-Custody

Ebasco Services Incorporated

Project Name:
Tooele Army Depot - South Area
RFI - Phase II

Samplers: (Signature)
S. Sobczak - Bryan
[Signature]

Sample Date:
10-29-93

ANALYSIS REQUIRED

Site Identification	Sample Tag Number	Time (Military Standard)	Sample Depth (Feet)	SAMPLE TECHNIQUE	pH	Conductivity	TOC	Cation-Exchange Capacity	Grain-Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	Number of Containers	REMARKS
5-BLD-17	S6T032	0825	2-3	S	X	X	X									1	
5-BLD-17	S6T033	0825	2-3	S					XX	XX	XX					1	
5-BLD-17	S6T034	0825	2-3	S										X		1	
7-400 10-2-93																	
A-4-130																	

Relinquished by: (Signature) [Signature]	Date/Time (MD/Yr) () 10-29-93	Received by: (Signature) Robert K. Aweid	Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)
Relinquished by: (Signature) Robert K. Aweid	Date/Time (MD/Yr) () 10-30-93 1200	Received by: (Signature) FEDERAL EXPRESS	Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature) Samuel P. Utter	Date/Time (MD/Yr) ()	Sample Analysis Date _____	
Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)	Date/Time (MD/Yr) ()	AIR BILL # 7499147353	

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Tooele Geotechnical Chain-of-Custody

Ebasco Services Incorporated

Project Name:
Tooele Army Depot - South Area
RFI - Phase II

Samplers: (Signature)

R.T. Canon

Sample Date:

10/28/93

ANALYSIS REQUIRED

Site Identification	Sample Tag Number	Time (Military Standard)	Sample Depth (Feet)	SAMPLE TECHNIQUE	pH	Conductivity	TOC	Cation-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	NUMBER OF CONTAINERS	REMARKS
MWS-109-93	SGT035	1610	68-69	S											X	1	
MWS-109-93	SGT036	1610	69-70	S										X		1	
MWS-109-93	SGT037	1610	69-70	S					X	X	X	X				1	
MWS-109-93	SGT037	1635	70-71	S					X	X	X	X				2	
MWS-109-93	SGT038	1705	72-73	S	X		X	X								1	

A-4-131

/ / / / X /

Relinquished by: (Signature) R.T. Canon	Date/Time (M/D/Yr) () 11/2/93	Received by: (Signature) Robert K. Swartz	Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)
Relinquished by: (Signature) Robert K. Swartz	Date/Time (M/D/Yr) () 11-2-93 1422	Received by: (Signature) FEDERAL EXPRESS	Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature) Samuel D. Waters	Date/Time (M/D/Yr) ()	Sample Analysis Date _____ AIR BILL # 6804800693	
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)	Date/Time (M/D/Yr) ()		

Tooele Geotechnical Chain-of-Custody

Phase Services Incorporated

Project Name:

Tooele Army Depot - South Area
RFI - Phase II

and 10/31/93

Samplers: (Signature)

R.T. Canon

Sample Date:

10/30/93

ANALYSIS REQUIRED

Site Identification	Sample Tag Number	Time (Army Standard)	Sample Depth (Foot)	SAMPLE TECHNIQUE	PH	Conductivity	TOC	Cation-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	Number of Containers	REMARKS
MWS-110-93	SGT039	1535	69-70	SB										X		1	collected on 10/30/93
MWS-110-93	SGT040	1535	69.5-70.5	S											X	1	
MWS-110-93	SGT041	1500	67.0-67.5	S					X	X	X	X	X			1	
MWS-110-93	SGT041	1500	67.5-68.0	S					X	X	X	X	X			1	
MWS-110-93	SGT041	1500	68.0-68.5	S					X	X	X	X	X			1	
MWS-110-93	SGT042	1045	82.5-83.5	S	X	X	X	X								1	Collected on 10/31/93

A.4-132

Relinquished by: (Signature)

R.T. Canon

Date/Time (MD/Yr)

10/31/93

Received by: (Signature)

Robert K. Swedt

Relinquished by: (Signature)

Date/Time (MD/Yr)

Received by: (Signature)

Relinquished by: (Signature)

Robert K. Swedt

Date/Time (MD/Yr)

11-2-93
1430

Received by: (Signature)

FEDERAL EXPRESS

Relinquished by: (Signature)

Date/Time (MD/Yr)

Received by: (Signature)

Relinquished by: (Signature)

Date/Time (MD/Yr)

Received by: (Signature)

Samuel D. Utter

Date/Time (MD/Yr)

Sample Analysis Date

Relinquished by: (Signature)

Date/Time (MD/Yr)

Received by: (Signature)

Date/Time (MD/Yr)

AIR BILL # 6804800693

JOB NO. _____ PART NO. _____

Chen Northern, Inc.

DATE ASSIGN 11-20-93 BY SU

JOB NAME Ebaso, Tooele Army Depot

LABORATORY TESTING PROGRAM

DATE SET UP _____ BY _____

ENGINEER SU BY SU

SHEET 01 of 3

DATE COMPLETED _____ BY _____

HOLE NO.	DEPTH FT.	SAMPLE NO.	SAMPLE TYPE	VISUAL CLASS.	MOISTURE CONTENT	MOIST-DENSITY GRADATION	HYDROMETER	"200"	ATTERBERG	SWELL-CONSOL.	AIR DRY CONSOL.	TIME -CONSOL.	UNCONFINED	DIRECT SHEAR	TRIAXIAL SHEAR	STD. PROCTOR	MOD. PROCTOR	RELATIVE	C.B.R.	PERMEABILITY	SULFATE	EFFECTIVE Porosity	TOC	CEC	PH	REMARKS	
																											(SGT) #
3-BK-1	1-3	001	1	1																							
	1-3	002	3	2	/	/	/	/																			
	1-3	003	1	3																							
	1-3	004	1	4																							
3-BK-2	1-3	005	1	5																							
	1-3	006	3	6	/	/	/	/																			
	1-3	007	1	7																							
30-05A-1	1.5-3	008	1	8																							
	1.5-3	009	3	9	/	/	/	/																			
A4-133	2.5-3	010	1	10																							
	1.5-3	011	1	11																							
	2-3	012	1	12																							
	2-3	013	3	13	/	/	/	/																			
	2-3	014	1	14																							
	2-3	015	1	15																							
31-BK-1	0-02	016	1	16																							
	1-3	017	1	17																							
	1-3	018	3	18	/	/	/	/																			
	1-3	019	1	19																							
	1-3	020	1	20																							
				21																							
TOTAL TESTS																											

JOB NO. _____ PART NO. _____

Chen Northern, Inc.

DATE ASSIGN 11-20-93 BY SU

JOB NAME Ebaso, Toole Army Depot

LABORATORY TESTING PROGRAM

DATE SET UP _____ BY _____

ENGINEER SU BY SU

SHEET 2 of 3

DATE COMPLETED _____ BY _____

HOLE NO.	DEPTH FT.	SET #	SAMPLE NO.	SAMPLE TYPE	VISUAL CLASS.	MOISTURE CONTENT	MOIST-DENSITY	GRADATION	HYDROMETER	-200	ATTERBERG	SWELL-CONSOL.	AIR DRY SWELL.	TIME -CONSOL.	UNCONFINED	DIRECT SHEAR	TRIAxIAL SHEAR	STD. PROCTOR	MOD. PROCTOR	RELATIVE	C.B.R.	PERMEABILITY	SULFATE	Effective Porosity	TOC	CEC	PH	REMARKS			
31-BK-2	1-2.5	021	1	1																											
	1-2.5	022	3	2		/	/	/	/																						
	1-2.5	023	1	3																	/										
MWS-11-93	70-70.5	043	1	4		/	/	/	/																						
	70.5-71	043	1	5		/	/	/	/																						
	71-71.5	043	1	6		/	/	/	/																						
	71.5-2	044	1	7																		/									
	72-72.5	045	1	8																											
A.4-134	72.5-73	046	1	9																			/	/	/						
				10																											
				11																											
				12																											
				13																											
				14																											
				15																											
				16																											
				17																											
				18																											
				19																											
				20																											
				21																											

TOTAL TESTS

JOB NO. _____ PART NO. _____

Chen Northern, Inc.

DATE ASSIGN 11-20-93 BY SU

JOB NAME Ebaso, Tooele Army Depot

LABORATORY TESTING PROGRAM

DATE SET UP _____ BY _____

ENGINEER SU BY SU

SHEET 3 of 3

DATE COMPLETED _____ BY _____

HOLE NO.	DEPTH FT.	S. SAMPLE NO.	#	SAMPLE TYPE	VISUAL CLASS.	MOISTURE CONTENT	MOIST-DENSITY	GRADATION	HYDROMETER	-200	ATTERBERG	SWELL-CONSOL.	AIR DRY SWELL.	TIME -CONSOL.	UNCONFINED	DIRECT SHEAR	TRIAxIAL SHEAR	STD. PROCTOR	MOD. PROCTOR	RELATIVE	C.B.R.	TYPERMEABILITY	SULFATE	EFFECTIVE Porosity	TOC	CEC	PH	REMARKS		
3-BK-1	0-1.5	8093	3	1	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	0.5-1	8094	1	2	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	1-1.5	8095	1	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
3-BK-2	0.5-2	8097	3	4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	1-1.5	8118	1	6	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	2.5-3	8098	1	8	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
9-BK-1	0.5-2	8151	3	9	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	0.5-1	8153	1	9	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	2-3	8150	2	10	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
A.4.135	0-2"	8152	2	11	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
05-MW S-106-93	64-71	9512	1	12	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	69-71	9513	1	13	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	72.5-73	9514	1	14	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	74-74.5	9515	1	15	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	74.5-75	9516	1	16	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
				17																										
				18																										
				19																										
				20																										
				21																										

TOTAL TESTS

1

Tooele Geotechnical Chain-of-Custody

Phase Services Incorporated

Project Name:
Tooele Army Depot - South Area
RFI - Phase II

ANALYSIS REQUIRED

Samplers: (Signature)

S. Sobczak-Bryan
J. D. K. Berg

Sample Date:

10-25-93

Site Identification	Sample Tag Number	Time (Army Standard)	Sample Depth (Feet)	Sampler Technician	ANALYSIS REQUIRED										Number of Containers	Remarks		
					PH	Conductivity	TOC	Calor-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability			Effective Porosity	
8-BK-1	SGT001	1410	12-3 ^{550 10-25-93}	S	X	X	X										1	
8-BK-1	SGT002	1410	12-3 ^{550 10-25-93}	S					X	X	X	X					3	
8-BK-1	SGT003	1410	12-3 ^{550 10-25-93}	S										X			1	
8-BK-1	SGT004	1410	12-3 ^{550 10-25-93}	S									X				1	
8-BK-2	SGT005		12-3^{550 10-25-93}	S	X	X											1	
8-BK-2	SGT006		12-3^{550 10-25-93}	S					X	X	X	X					3	
8-BK-2	SGT007		12-3^{550 10-25-93}	S									X				1	

A4-136

550
10-25-93
550
10-25-93

Relinquished by: (Signature) J. D. K. Berg	Date/Time (MDYr) () 10-25-93/1630	Received by: (Signature) Robert K. Tweidt	Relinquished by: (Signature)	Date/Time (MDYr) ()	Received by: (Signature)
Relinquished by: (Signature) Robert K. Tweidt	Date/Time (MDYr) () 10-26-93 1400	Received by: (Signature) FEDERAL EXPRESS	Relinquished by: (Signature)	Date/Time (MDYr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (MDYr) ()	Received by: (Signature) Samuel D. Utter	Date/Time (MDYr) ()	Sample Analysis Date _____	
Relinquished by: (Signature)	Date/Time (MDYr) ()	Received by: (Signature)	Date/Time (MDYr) ()	Air Bill # 7499147316	

2

Tooele Geotechnical Chain-of-Custody

Ebasco Services Incorporated

Project Name:
Tooele Army Depot - South Area
RFI - Phase II

Samplers: (Signature) *S. Spiczak-Bryan*
S. Spiczak-Bryan
Sample Date: 10-26-93

ANALYSIS REQUIRED

Site Identification	Sample Tag Number	Time (Military Standard)	Sample Depth (Feet)	SAMPLE TECHNIQUE	PH	Conductivity	TOC	Cation-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	NUMBER OF CONTAINERS	REMARKS
8-BK-2	SGT005	0950	12-3 <small>10-26-93</small>	S	X	X										1	
8-BK-2	SGT006	0950	12-3 <small>10-26-93</small>	S					X	X	X	X				3	
8-BK-2	SGT007	0950	1-3	S										X		1	

A.4-137

Relinquished by: (Signature) <i>S. Spiczak-Bryan</i>	Date/Time (M/D/Yr) () 10-26-93/1730	Received by: (Signature) <i>Robert K. Weidt</i>	Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)
Relinquished by: (Signature) <i>Robert K. Weidt</i>	Date/Time (M/D/Yr) () 10-27-93/1400	Received by: (Signature) FEDERAL EXPRESS	Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature) <i>Samuel D. Utter</i>	Date/Time (M/D/Yr) ()	Sample Analysis Date _____	
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)	Date/Time (M/D/Yr) ()	AIR BILL # 7499147305	

3

Tooele Geotechnical Chain-of-Custody

Phase Services Incorporated

Project Name:
Tooele Army Depot - South Area
RFI - Phase II

ANALYSIS REQUIRED

Samplers: (Signature)
S. Sobczak-Bryan
J. H. Bryan

Sample Date:
10-28-93
SSP

Site Identification	Sample Tag Number	Time (Military Standard)	Sample Depth (Feet)	SAMPLE TECHNIQUE	pH	Conductivity	TOC	Cation-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	NUMBER OF CONTAINERS	REMARKS
30-OSA-1	SGT008	1210	1.5-3	S	X		X	X								1	
30-OSA-1	SGT009	1210	1.5-3	S					X	X	X	X				3	
30-OSA-1	SGT010	1210	1.5-3	S											X	1	
30-OSA-1	SGT011	1210	1.5-3	S										X		1	
30-OSA-2	SGT012	0958	2-3	S	X		X	X								1	
30-OSA-2	SGT013	0958	2-3	S					X	X	X	X				3	
30-OSA-2	SGT014	0958	2-3	S										X		1	
30-OSA-3	SGT015	1110	2-3	S	X		X									1	

A.4-138

Relinquished by: (Signature) J. H. Bryan	Date/Time (M/D/Y) () 10-27-93 1730	Received by: (Signature) Robert K. Tweidt	Relinquished by: (Signature)	Date/Time (M/D/Y) ()	Received by: (Signature)
Relinquished by: (Signature) Robert K. Tweidt	Date/Time (M/D/Y) () 10-28-93 1400	Received by: (Signature) FEDERAL EXPRESS	Relinquished by: (Signature)	Date/Time (M/D/Y) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (M/D/Y) ()	Received by: (Signature) Samuel D. Utter	Date/Time (M/D/Y) ()	Sample Analysis Date _____	
Relinquished by: (Signature)	Date/Time (M/D/Y) ()	Received by: (Signature)	Date/Time (M/D/Y) ()	AIR BILL # 749914732d	

4

Tooele Geotechnical Chain-of-Custody

Ebasco Services Incorporated

Project Name:
Tooele Army Depot - South Area
RFI - Phase II

Samplers: (Signature)
S. Sabczak-Bryan
S. Sabczak-Bryan
Sample Date:
10-26-93

ANALYSIS REQUIRED

Site Identification	Sample Tag Number	Time (Military Standard)	Sample Depth (Feet)	SAMPLE TECHNIQUE	pH	Conductivity	TOC	Cation-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	Number of Containers	Remarks
✓ 31-BK-1	SGT016	1400	0-0.2	G	X	X										1	
✓ 31-BK-1	SGT017	1408	1-3	S	X	X	X									1	
✓ 31-BK-1	SGT018	1408	1-3	S					X	X	X	X				3	
A-4-139 31-BK-1	SGT019	1408	1-3	S										X		1	
31-BK-1	SGT020	1408	1-3	S										X		1	

Relinquished by: (Signature) <i>S. Sabczak-Bryan</i>	Date/Time (MD/Yr) () 10-26-93/1730	Received by: (Signature) Robert K. Tweidt	Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)
Relinquished by: (Signature) Robert K. Tweidt	Date/Time (MD/Yr) () 10-27-93 1400	Received by: (Signature) FEDERAL EXPRESS	Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature) <i>Samuel D. Ute</i>	Date/Time (MD/Yr) ()	Sample Analysis Date _____	
Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)	Date/Time (MD/Yr) ()	AIR BILL # 7499147305	

5

Tooele Geotechnical Chain-of-Custody

Essoce Services Incorporated

Project Name:
Tooele Army Depot - South Area
RFI - Phase II

Samplers: (Signature)
S Sobczak-Bryan
S Sobczak-Bryan

Sample Date:
10-26-93

ANALYSIS REQUIRED

Site Identification	Sample Tag Number	Time (Military Standard)	Sample Depth (Feet)	SAMPLE TECHNIQUE	pH	Conductivity	TOC	Cation-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	Number of Contractions	REMARKS
✓ 31-BK-2	SGT021	1300	1205 ^{5:30} 41-32.5	S	X		X	X								1	
✓ 31-BK-2	SGT022	1300	1205 ^{5:30} 41-32.5	S					X	X	X	X				3	
✓ 31-BK-2	SGT023	1300	1205 ^{5:30} 41-32.5	S										X		1	

A-4-140

Relinquished by: (Signature) S Sobczak-Bryan	Date/Time (M/D/Yr) () 10-26-93/	Received by: (Signature) Robert K. Sweidt	Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)
Relinquished by: (Signature) Robert K. Sweidt	Date/Time (M/D/Yr) () 10-27-93 1400	Received by: (Signature) FEDERAL EXPRESS	Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature) Samuel D. Huter	Date/Time (M/D/Yr) ()	Sample Analysis Date _____	
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)	Date/Time (M/D/Yr) ()	AIR Bill # 7499147305	

6

Tooele Geotechnical Chain-of-Custody

Essoce Services Incorporated

Project Name:
Tooele Army Depot - South Area
RFI - Phase II

Samplers: (Signature)
R.T. Canon

Sample Date:
11/11/93

ANALYSIS REQUIRED

Site Identification	Sample Tag Number	Time (Military Standard)	Sample Depth (Feet)	SAMPLE TECHNIQUE	pH	Conductivity	TOC	Cation-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	Number of Containers	REMARKS
MWS-111-93 ↓ A-4-141	SGT 043	1313	70.0-70.5	S					X	X	X	X				1	
	SGT 043	1313	70.5-71.0	S					X	X	X	X				1	
	SGT 043	1313	71.0-71.5	S					X	X	X	X				1	
	SGT 044	1313	71.5-72.0	S											X	1	
	SGT 045	1335	72.0-72.5	S										X		1	
	SGT 046	1335	72.5-73.0	S		X	X	X								1	

Relinquished by: (Signature) <i>R.J. Canon</i>	Date/Time (M/D/Yr) (1730) <i>11/11/93</i>	Received by: (Signature) <i>Fed Ex</i>	Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)	Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature) <i>Samuel A. Utter</i>	Date/Time (M/D/Yr) ()	Sample Analysis Date _____	
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)	Date/Time (M/D/Yr) ()		

Tooele Geotechnical Chain-of-Custody

Fluore Services Incorporated

Project Name:
Tooele Army Depot - South Area
RFI - Phase II

Samplers: (Signature) *Weingartz* Sample Date: 10-21-93

ANALYSIS REQUIRED

Site Identification	Sample Tag Number	Time (Army Standard)	Sample Depth (Feet)	SAMPLE TECHNIQUE	pH	Conductivity	TOC	Cation-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	Number of Containers	REMARKS
9-BK-1	58151	0830	5-2'	ST					X	X	X	X				3	
"	58153	0835	5-1'	ST											X	1	
3-BK-1	58049	1005	0-1 1/2	ST					X	X	X	X				3	
"	58048	1008	0-5-1	ST										X		1	
"	58095	1008	1-1 1/2	ST										X		1	
3-BK-2	58097	945	1/2-2'	ST					X	X	X	X				3	
"	58118	945	1-1 1/2	ST										X		1	
A-4-142																	

Relinquished by: (Signature) <i>[Signature]</i>	Date/Time (MD/Yr) () 1200 10-21-93	Received by: (Signature) FEDERAL EXAMERS	Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature) <i>Samuel D. [Signature]</i>	Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)	Date/Time (MD/Yr) ()	Sample Analysis Date _____	
Relinquished by: (Signature)	Date/Time (MD/Yr) ()	Received by: (Signature)	Date/Time (MD/Yr) ()		

Tooele Geotechnical Chain-of-Custody

Ebasco Services Incorporated

Project Name:
Tooele Army Depot - South Area
RFI - Phase II

Samplers: (Signature)

R. WEINGARTZ

Sample Date:

10/20/93

ANALYSIS REQUIRED

Site Identification	Sample Tag Number	Time (Military Standard)	Sample Depth (Feet)	SAMPLE TECHNIQUE	pH	Conductivity	TOC	Calcium-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	Number of Containers	REMARKS
3-BK-2	S8096	0945	2.5-3		X		X	X									
3-BK-2	S8092	0907	2-2.5		X		X	X									
A.4-143																	

Relinquished by: (Signature) <i>[Signature]</i>	Date/Time (M/D/Yr) () 10/21/93	Received by: (Signature) F.C.D. EY.	Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)	Date/Time (M/D/Yr) ()	Sample Analysis Date _____	
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)	Date/Time (M/D/Yr) ()		

Tooele Geotechnical Chain-of-Custody

Ebasco Services Incorporated

Project Name:
Tooele Army Depot - South Area
RFI - Phase II

Samplers: (Signature) *Robert J Querek* Sample Date:
10/10/93

ANALYSIS REQUIRED

Site Identification	Sample Tag Number	Time (Army Standard)	Sample Depth (Feet)	SAMPLE TECHNIQUE	pH	Conductivity	TOC	Cation-Exchange Capacity	Grain Size	Atterberg Limits	Moisture Content	Bulk Density	Specific Gravity	Permeability	Effective Porosity	Number of Containers	REMARKS
05-MW-S-108-93	S9512	1110	69-71	600g	X		X										
05-MW-S-108-93	S9513	1110	69-71	600g					X	X	X						
05-MW-S-108-93	S9514	1120	72.5-73.0	Stave							X						} UNDISTURBED SAMPLES
05-MW-S-108-93	S9515	1140	74.0-74.5	Stave								X					
05-MW-S-108-93	S9516	1140	74.5-75.0	Stave										X			

A.4-145

Relinquished by: (Signature) <i>[Signature]</i>	Date/Time (M/D/Yr) () 10/21/93	Received by: (Signature) FCD EX	Relinquished by: (Signature) J	Date/Time (M/D/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature) <i>Samuel D. Carter</i>	Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)	Date/Time (M/D/Yr) ()	Sample Analysis Date _____	
Relinquished by: (Signature)	Date/Time (M/D/Yr) ()	Received by: (Signature)	Date/Time (M/D/Yr) ()		

ARBILL # 7499/47274