EPA WORK ASSIGNMENT NUMBER: 148-1L34
EPA CONTRACT NUMBER: 68-01-7250
EBASCO SERVICES, INCORPORATED

FINAL SUPPLEMENTAL REMEDIAL INVESTIGATION AND PUBLIC HEALTH EVALUATION REPORT VOLUME III - APPENDICES

PINETTES SALVAGE YARD SITE
TOWN OF WASHBURN
AROOSTOOK COUNTY, ME

MARCH 1989

NOTICE

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PINETTES SALVAGE YARD SITE
TOWN OF WASHBURN
AROOSTOOK COUNTY, ME

MARCH 1989

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SOIL BORING LOGS

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1234
LOCATION Washburn ME BORING NO. B4
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7/12/88 DATE COMPLETED 7/12/88
FIELD SUPERVISOR Robert J. Melvin PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
2	SFS-B4-1 SS-B4-1	NA	1.5	NA	NA	Black gravelly silty sand, organic rich, roots, loose dry Brown to tan gravelly medium to fine sand, some iron staining, slight bedding, loose and dry; upper half - gravels 30 to 40% of column, subround to round lower half - gravels 10 to 20% of column, subround to round	< OVA = 0.3 background, sample and boring < - Phillips and Carrizo < CME-55 < - SFS-B4-1 upper 6 inches
4	SS-B4-2	NA	1.5	NA	NA	Light gray silty clay, slightly firm, slight moist Brown and gray gravelly silts and sands, sands fine to medium in size, gravels - black dolomitic limestone rock fragments, round to angular, coarse sand to small gravel size, loose, slight moist (lower 3" moist)	< - OVA = 0.3 ppm
6	SS-B4-3	NA	1.63	NA	NA	Brown silty fine sand, occassional laminae, low plasticity, loose to slightly firm, slightly moist, moist along laminae	< OVA = 0.4 ppm - slightly background/boring
8	SS-B4-4	NA	1.88	NA	NA	Gray gravelly silt, trace clay, gravels round to subround (dolomitic limestone), low plasticity, slightly moist	< OVA = 0.3 ppm background/sample/boring
10	SS-B4-5	NA	1.33	NA	NA	Gray clayey silts, <10% gravels (round to subangular) slightly firm to firm, low plasticity. (gravels in upper 4 inches) slightly moist	< OVA = 0.2 ppm background/sample/boring
						B.O.B. 10 ft.	

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148 1134
LOCATION Washburn ME BORING NO. B/C-9
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7.9.88 DATE COMPLETED 7.9.88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SPS-B/C9-1 SS-B/C9-1	-		-	-	Brown Gravelly Organic Silt, dry Brown Gravelly silt, with trace clay, Gravels fine angular to subangular, moist around 2'	O/A Back 1.0 Auger 2.0 ppm Spoon 1.2 DPM
4	SS-B/C9-2	-		-	-	Greyish Brown Coarse Sandy Clay	
6	SS-B/C9-3	-	3.9	-	-	Yellowish Brown laminated silt and clay low to moderate plastic dry to moist Grey Clayey Silt laminated with 1/4" Grey Clay lenes, wet	O/A Back 1.0 ppm Auger 1.0 ppm Spoon 1.0 ppm
8	SS-B/C9-4	-		-	-	Grey Gravelly silt, trace clay with gravel subrounded, wet	
10	SS-B/C9-5	-	5	-	-		
						BOB-10'	Mobile B57 S. Underwood T. Nunman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1L34
LOCATION Washburn, ME. BORING NO. C-3
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION ____
DATE STARTED 6-20-88 DATE COMPLETED 6-20-88
FIELD SUPERVISOR James T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY (FT)	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
2	SS-C3-1	NA		NA	NA	Brown Gravelly SAND, with little (-) f. gravel, trace silt, poorly sorted, dry.	L-Rig #2 CME-55
						Dark Greyish-Brown Gravelly SAND, little (-) fine gravel, trace clay, poorly sorted, moist to dry.	Background OVA- 0.2 ppm Auger- 0.2 ppm Spoon - 0.4 ppm
4	SS-C3-2	NA		NA	NA	Greyish Brown Clayey Gravelly SAND, with little fine gravel, ≤ mf Sand, poorly sorted, moist.	*- Samples were collected with a five foot continuous s/spoon
	SS-C3-3	NA	2.9FT	NA	NA	Grey Silty SAND, mostly coarse sand, with medium / fine constituents, little (+) silt, trace (-) f. gravel, moist	
6	SS-C3-4	NA		NA	NA	Brown SILT, with trace (+) clay, low plasticity to non-plastic, well sorted, moist	Background OVA readings: 2.0 ppm Auger- 2.4 ppm Spoon - 3.0 ppm
						Brown Clayey SILT, laminated with 1/4 inch bands of clay, non-plastic to moderate plasticity, moist.	
8	SS-C3-5	NA	5.0FT	NA	NA	Gray Gravelly CLAY, with fine Angular to subround gravel, little (-) silt, poorly sorted, moist.	
10						B.C.B. - 10.0 FT	Driller - N. Phillips

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1C34
LOCATION Washburn, ME. BORING NO. C-4
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION
DATE STARTED 7-8-88 DATE COMPLETED 7-8-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY (FT)	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-C4-1 SFS-C4-1	NA		NA	NA	Brown Organic Gravelly SILT, moist Brown Gravelly SAND, with mf gravel, angular to subrounded, poorly sorted, moist	Background Hnu- 0.2ppm Auger- 0.2ppm Spoon- 0.4 ppm
4	SS.	NA		NA	NA		
6	SS.	NA	3.8	NA	NA	Grey SILT and Clay, moderate to Non-plasticity, well sorted, moist to wet. Grey Clayey SILT, with laminated areas of 1/4 inch lens of Dark Grey Clay. Moist to wet.	4 - wet Background Hnu- 0.2ppm Auger- 0.2ppm Spoon - 0.2ppm
8	SS.	NA		NA	NA		
10	SS.	NA	3.6	NA	NA	Grey Clayey Gravelly SILT, little (-) gravel is angular to subrounded, poorly sorted, dry to moist.	
						B.C.B. - 10.0 FT	Drill rig #1 Mobile B-57 Driller - S. Underwood Helper - T. Nuzzo *- A five foot continous sampling split spoon was used to collect sample.

ICF TECHNOLOGY INCORPORATED

PROJECT Bartlett Salvage JOB NO. 148-1634
LOCATION Washburn ME BORING NO. C5
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-28-88 DATE COMPLETED 6-28-88
FIELD SUPERVISOR JT MOORE PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SFS-C5-1 SS-C5-1	NA		-	-	Brown Gravelly Sand, with angular to subangular gravel, trace silt, dry	OVA Back 1.0 ppm Auger Spoon 2.0 ppm HNU Back 0.2 ppm Auger Spoon 1.4 ppm
4	SS-C5-2	NA		-	-	Brown Very Coarse Silty Sand dry	
	SS-C5-3	NA	39	-	-	Very Dark Brown Gravelly Silty Sand, dry Brown Silt & Clay, moderate to high plastic., moist Grey Clay high plastic, dry to damp	OVA Back 1.3 ppm Auger 1.8 ppm Spoon 1.6 ppm HNU Back 0.2 ppm Auger 0.2 ppm Spoon 0.2 ppm
6	SS-C5-4	NA		-	-	Greyish Brown silt, low plastic moist to wet Brownish Grey Silt & Clay high plastic, moist, with Grey ¼" lenses of clay mod. plastic, dry	
8	SS-C5-5	NA	4	-	-	Grey Gravelly Clay moderate plastic moist to wet	
10						Water table 6' BOB - 10'	CME 55 Norman Phillips John Carrozzi

ICF TECHNOLOGY INCORPORATED

PROJECT Poretta Salvage Yard JOB NO. 148 1134
LOCATION Washburn ME BORING NO. C6
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-27-88 DATE COMPLETED 6-27-88
FIELD SUPERVISOR J. T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS C61	N.A.		—	—	Brown Gravelly Clayey Sand, with angular & subangular gravel, dry to moist.	OVA Back 0.2 ppm Auger 0.2 ppm Spoon 0.2 ppm
	SS C62	N.A.		—	—	Brown Clayey Sand, trace (+) clay, moist.	
4						Greyish brown clayey silt, moderately Plastic, moist	
	SS C63	N.A.	3'	—	—	Greyish Brown Gravelly Sand, wet	
6						Greyish Brown Silty Clay, low plastic moist to wet	OVA Background - 0.2ppm Auger - 0.2ppm Spoon - 0.2ppm
	SS C64	N.A.	2.8'	—	—	Greyish clayey silt, well sorted, moderate to non-plastic, dry to moist.	
8						Water table 3.8' BOB-78'	CME 55 Norman Phillips John Carrozzi
10							

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard JOB NO. 148-1634
LOCATION Washburn ME BORING NO. C-7
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-28-88 DATE COMPLETED 6-28-88
FIELD SUPERVISOR JT Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SB SC7-1 SS-C7-1	NA		-	-	Yellowish Brown organic silt & m.f. sand dry Dark Brown cmf Organic silty sand, dry	OVA Back 1.0 ppm auger 1.0 ppm spoon 1.4 ppm HNO Back 0.2 ppm auger 0.2 ppm spoon 0.6 ppm
4	SSC7-2	NA		-	-	Dark Brown Sandy Clay, with trace silts, organic, dry-moist Greyish Brown very coarse clayey sand, with trace silt, moist	
6	SSC7-3	NA	39	-	-	Yellowish Brown, clay, low to moderate plastic because it is too dry	OVA Back 1.4 ppm Auger 2.4 ppm spoon 2.0 ppm HNO Back 0.2 ppm Auger 0.2 ppm Spoon 0.8 ppm
8	SS C7-4	NA		-	-	Grey Brown clayey silt, moderate to high plastic, moist some sections wet Brownish Grey silt & clay, high plastic moist to dry with ¼" lenes of Grey clay 1" apart, dry	
10	SS-C7-5	NA	3.9	-	-	Grey clay & m.f. gravel, with gravel angular to subangular, high plasticclay, moist	
						Water table 5.6' BOB 10'	Rig #2 CME-55 Norman Phillpps (Driller).

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage JOB NO. 148.1134
LOCATION Loasnburn ME BORING NO. CB
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-27-88 DATE COMPLETED 6-27-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS C81 SS C81	NA		—	—	Brown Organic Silty Sand, dry to moist.	OVA Back 0.6 ppm Auger 0.6 ppm Spoon 0.6 ppm
	SS C82	NA		—	—	Dark Brown Organic Silt	
4						Greyish Brown Sandy Silt	
						Dark Brown organic silt	
	SS C83	NA	4.3'	—	—	Greyish Brown f. gravelly clay moist	
6						Yellowish Brown Clayey Silt non plastic, dry	OVA Background - 0.8 ppm Auger - 0.8 ppm Spoon - 1.2 ppm
	SS C84	NA		—	—	Greyish Brown f. sandy silt, to to non plastic, moist.	
			4.0			Brown Grey Silty Clay, high plastic moist	
8						GREY GRAVELLY CLAY, MOIST	
						Water table 4' BOB 7.9	CME 55 Norman Phillips John Carozzi
10							

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage JOB NO. 148 1134
LOCATION Washburn ME BORING NO. C10
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-27-88 DATE COMPLETED 6-27-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SFS C10-1 SS C10-1	NA		-	-	Dark Brown Gravelly Silty Sand, dry	OVA Back 1.0 ppm Auger 1.4 ppm Spoon 1.0 ppm
4	SS C10-2	NA		-	-	Reddish Brown C. Sandy Clay, low plastic, moist	
	SS C10-3	NA	3.3	-	-	Greenish Grey C. Sandy Clay	
6						Yellowish Brown clay, dry	OVA: Background - 1.0 ppm Auger - 1.8 ppm Spoon - 1.2 ppm
8	SS C10-4	NA		-	-	Grey fine sand & Silt, wet	
						Brownish Grey Silt & Clay, high plastic, moist	
	SS C10-5	NA		-	-	Grey Clay & Gravel, moderate plastic, moist	
10			4.10			Water table 3.8' BOB-10'	CME 55 Norman Phillips John Carozzi

ICF TECHNOLOGY INCORPORATED

PROJECT Rhettes Salvage Yard JOB NO. 148-1134
LOCATION Washburn ME BORING NO. C-1
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-25-88 DATE COMPLETED 6-25-88
FIELD SUPERVISOR T.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-C11-1 SS-C11-1	NA		-	-	Yellowish Brown Gravelly Sand, trace silt, dry	OVA Back 1.0 ppm auger 1.0 ppm Spoon 1.0 ppm HNU 0.2 ppm auger 0.2 ppm
						Dark Reddish Brown Gravelly Sand, little silt, dry	
4	SS-C11-2	NA		-	-	Brown Gravelly Sand, trace silt, moist	
6	SS-C11-3	NA	4'	-	-	Yellowish Brown Sandy Clay, laminated & plastic, moist at 4.2	OVA Back 1.0 ppm auger 1.0 ppm Spoon 1.4 ppm HNU Back 0.2 ppm auger 0.2 ppm Spoon 0.2 ppm
8	SS-C11-4	NA		-	-	Greyish Brown laminated silt, moderately plastic, wet	
						Greyish Brown Clayey silt with Grey 1/4" lenes of clay 1" apart high plastic moist	
10	SS-C11-5	NA	4.2'	-	-	Grey Gravelly Clay, gravel angular, high plastic, moist	
						Ground water table 4' BOB 10'	mobile B57 Steve Underwood Norman, Todd

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1634
LOCATION Washburn, ME. BORING NO. C-12
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION ____
DATE STARTED 6/21/88 DATE COMPLETED 6-21-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY (FT)	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=__FT)	REMARKS (ORG. VAP.)
2	SS-C12-1 SFS-C12-1	NA		NA	NA	Yellowish Brown Gravelly SAND, with trace silt, dominantly f. gravel, poorly sorted, moist.	OVA Background - 2.0ppm Auger - 2.2ppm Spoon - 2.0ppm
	SS-C12-2	NA		NA	NA	Dark Brown Gravelly Sandy SILT, trace (+) organic mater, trace (+) mf gravel, little (+) cmf Sand, poorly sorted moist.	
4	SS-C12-3	NA	4.9	NA	NA	Dark Reddish-Brown Sandy SILT, little (+) cmf sand, moist to wet.	
						Yellowish-Brown CLAY and SILT, non-plastic to moderate plasticity, well sorted, dry	
6	SS-C12-4	NA		NA	NA	Grey Clayey SILT, little (-) clay, well sorted, low plasticity to non-plastic, moist to dry	OVA: Background. 1.7ppm Auger - 1.7ppm Spoon - 1.7ppm
8	SS-C12-5	NA	2.4	NA	NA		
10						B.C.B. - 10.0FT	Rig #1 Mob.6-B57 S. Underwood (Driller) * - A five foot Continuous sampling Spoon was used

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1C34
LOCATION Washburn, ME. BORING NO. D3
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION ____
DATE STARTED 6-20-88 DATE COMPLETED 6-20-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" OR CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-D3-1	NA		NA	NA	Reddish Brown Gravelly SAND, with little (-) f. gravel, trace S.H, dry	Background OVA - 3.0ppm Auger - 3.5ppm Spoon - 3.0ppm
						Dark Greyish-Brown Gravelly SAND, with f. gravel, trace (-) s.H, poorly sorted, dry to moist	
4	SS-D3-2	NA		NA	NA	Dark Brownish Grey Silty Gravelly SAND, trace (+) s.H, trace (+) mf gravel (Angular to subrounded) poorly sorted, moist to wet.	← GWL - is 4.2 ft
	SS-D3-3	NA	2.4	NA	NA		
6						Greyish Brown Clayey SILT, low plasticity to non-plasticity, well sorted, moist.	Background OVA - 3.2ppm Auger - 3.4ppm Spoon - 3.4ppm
	SS-D3-4	NA		NA	NA	SAME: but with lens of clay	
8	SS-D3-5	NA		NA	NA	Greyish Brown Clayey SILT, laminated with clay, non-plastic to high plasticity, moist.	
			4.7			Grey Gravelly Silty CLAY, trace (+) f. gravel, trace S.H. poorly sorted, moist.	
10						B.O.B. - 10.0 FT	Rig #2 CME-55 N. Phillips (driller)
							* - A five foot Continous soil sampler used.

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage Yard JOB NO. 148-1C34
LOCATION Washburn, ME BORING NO. D5
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-15-88 DATE COMPLETED 7-15-88
FIELD SUPERVISOR James T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
	SS-DS-1	NA		NA	NA	Reddish Brown Gravelly Silty SAND, with coarse to fine-grained sands, little coarse to mostly fine gravels, sub-Angular to subrounded, dry. 1.7FT.	OVA: Background - 0.2ppm Auger - 0.6 ppm Spoon - 0.2 - 0.6ppm
2	SS-DS-2	NA		NA	NA	Greyish-Brown Gravelly Silty SAND, fine to mostly coarse-grained sand, trace Clay, with medium to mostly fine Angular to round gravel, poorly sorted, wet. 4.2 FT	
4	SS-DS-3	NA	4.1	NA	NA	Yellowish Brown Silty CLAY, firm, moderate plasticity, well sorted, moist. 4.8 FT	
6	SS-DS-4	NA		NA	NA	Grey Clayey SILT, soft, moderate to mostly low plasticity, well sorted, And moist SAME 7.3FT	OVA: Background - 0.2ppm Auger - 0.2ppm Spoon - 0.2ppm
8	SS-DS-5	NA		NA	NA	Grey SILT and CLAY, Alternating laws 1/4 inch apart of clay, laminated, highly plastic to non-plastic, dry to moist 8.2FT	
10			3.8			Grey Gravelly CLAY, some Angular to sub Angular medium to fine gravel, high plasticity, poorly sorted, moist	
						Bottom of Boring - 10 FT	Mobile B-57 - S. Underwood - T. Newman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148 + 134
LOCATION Washburn ME BORING NO. D7
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-24-88 DATE COMPLETED 6-24-88
FIELD SUPERVISOR T. T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY (ft)	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-D7-1 SS-D7-1	NA.		-	-	Yellowish brown Gravelly Sand, with fm gravel & trace silt dry	OVA Back 1.0 ppm auger 1.4 ppm Spoon 3.0 ppm
						Dark Yellowish brown Gravelly Silty Sand, with fine gravel dry	
4	SS-D7-2	NA		-	-	Dark Reddish Brown Clayey Silt & coarse sand, with little fine gravel moderate plastic, moist	
6	SS-D7-3	NA	3.9	-	-	Greyish Brown silty sand, with very coarse sand to fine gravel moist to wet	OVA Back 0.9 ppm Auger 0.9 ppm Spoon 0.9 ppm
	SS-D7-4	NA		-	-	Yellowish Brown Clayey Silt, moderate plastic, moist to wet	
8	SS D7-5	NA		-	-	Greyish Brown Clayey Silt & Grey Clay 1/4" lenes 1" apart, laminated & moist	
			4.2			Grey Gravelly Clay, with fine gravel, moist.	
10						BOB - 10ft	Mobile B57 Steve Underwood Todd Numan
						4.6' water table	

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1C34
LOCATION Washburn, ME. BORING NO. D9
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION ____
DATE STARTED 7-10-88 DATE COMPLETED 7-10-88
FIELD SUPERVISOR J. T. MOORE PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOWS/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-D9-1 / SFS-D9-1	NA		NA	NA	Brown Silty SAND, moderate sorting, dry Dark Brown Gravelly Silty SAND, little (-) mf Angular to subrounded gravel, trace (+) silt, poorly sorted, dry	OVA: Background - 0.4ppm Auger - 7.0 ppm OVA reading in spoon is 100+ ppm
4	SS-D9-2	NA		NA	NA		
6	SS-D9-3	NA	3.9	NA	NA	Greyish Brown Gravelly SAND, trace Silt, dominantly coarse sand, trace (+) f. gravel wet Yellowish Brown Clayey SILT, laminated with lens of clay, moderate plasticity to non-plastic, moist,	OVA Background - 0.8 ppm Auger - 5.2 ppm Spoon - 2.0 ppm
8	SS-D9-4	NA		NA	NA	Grey CLAYEY SILT, trace cmf Sand, laminated, low plasticity to non-plastic, moist to wet	
10	SS-D9-5	NA	4.2	NA	NA	Grey Silty CLAY, firm, moderate plasticity, with lens of silt/clay, moist. Grey Silty Gravelly CLAY, poorly sorted, moderate to low plasticity, moist to wet.	
						B.O.B. - 10.0 FT	Rig #1 MOBILE B-57 S. Underwood (driller)

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1L34
LOCATION Washburn, ME BORING NO. D-10
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-17-88 DATE COMPLETED 6-17-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY (FT)	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-D10-1 SFS-D10-1	NA		NA	NA	Greyish Brown Silty SAND, little (-) silt, moderate to poorly sorted, dry	OVA background - 1.0ppm Spoon - 1.0ppm
	SS-D10-2	NA		NA	NA	Greyish Brown Gravelly Silty SAND, trace (+) silt, mf gravel, which is Angular to subrounded, dry to moist.	
4	SS-D10-3	NA	4.4ft	NA	NA	Yellowish-Brown Clayey SILT, laminated with thin lens of clay, Non plastic to low plasticity, well sorted, moist	∠ - Ground water level @ 4.2 FT
6						Grey CLAYEY SILT, well sorted, non-plastic, moist B.O.B. - 6.0 FT	Rig #2 CME-55 N. Phillips (driller)

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1C34
LOCATION Washburn, ME. BORING NO. D-12
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION
DATE STARTED 6-25-88 DATE COMPLETED 6-25-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-D12-1	NA		NA	NA	Yellowish-Brown Gravelly SAND, little (-) mf Angular to subAngular gravel, trace (-) silt, dry to moist.	OVA: Background-1.0ppm Auger-1.0ppm Spoon-1.0ppm
4	SS-D12-2	NA		NA	NA	Brown Clayey SAND, with trace (-) clay, dominantly medium to fine sands, moderate sorting moist to wet	
6	SS-D12-3	NA	3.0ft	NA	NA	Yellowish Brown Clayey SILT, laminated with clay laminae, NON-plastic to low plasticity, dry to moist	OVA: Background-1.0ppm Auger-1.0ppm Spoon-1.0ppm
8	SS-D12-4	NA		NA	NA	Grey Clayey SILT, low to NON plastic, well sorted, moist to wet	
10	SS-D12-5	NA	5.0ft	NA	NA		
						B.O.B. - 10.0FT	Rig #1 - MOBILE-B-57 S. Underwood (driller) * - drillers use continuous five foot spoon to collect samples

ICF TECHNOLOGY INCORPORATED

PROJECT Pinnette's Salvage Yard JOB NO. 148-1634
LOCATION Washburn, Maine BORING NO. E3
DRILLING COMPANY Layne-Northern - N. Phillips CME-55
DRILLING METHOD Hollow Stem Augers ELEVATION
DATE STARTED 6-19-88 DATE COMPLETED 6-19-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY (ft)	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-E3-1	NA		—	—	Yellowish Brown Gravelly Sands, dry Reddish Brown Gravelly Sands, poorly sorted, mf gravels, moist.	OVA 0.2 ppm Background
4	SS-E3-2	NA		—	—	Dark Greyish Brown well graded sands some fine gravel, poorly sorted, moist Grey Brown Clayey Gravelly Sand (moist)	
6	SS-E3-3	8/24 NA	3'	—	—	Grey Brown Gravelly silty clay mod. plast. moist	OVA 0.2 Background
8	SS-E3-4	NA		—	—	Brownish Grey clayey silt high plast. to non plastic, well sorted, moist.	
10	SS-E3-5	NA	5'	—	—	Brownish Grey silty clay, high plasticity with non plastic lens, well sorted, moist. Grey C clayey silt high plast. moist	
						BOB=10ft	Rig #2 CME-55 N. Phillips (driller)

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage Yard JOB NO. 148-1L341
LOCATION Washburn ME BORING NO. E4
DRILLING COMPANY Layne Northern - N. Phillips CME-55
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-20-88 DATE COMPLETED 6-20-88
FIELD SUPERVISOR J.T Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY (ft)	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-E4.1	NA		–	–	Yellowish Brown Gravelly sand, with trace silt, dry Very dark grey brown Gravelly sand, mf gravels, trace silt, poorly sorted, moist	Background OVA readings 0.2 auger 5.6 ppm ambient 4.8 ppm spoon 5.8 ppm
4	SS-E4.2	NA		–	–	Reddish Brown silty Gravelly Sand Dark grey brown silty Gravelly Sand, trace (+) silt, little (-) mf Angular to subrounded gravels, poorly sorted, moist to wet.	
6	SS-E4.3	NA	2.5	–	–	Brown Silt moderate plastic moist	* Changed OVA because of the high readings found in first spoon Background 0.6 ppm auger 0.6 ppm spoon 0.6 ppm
8	SS-E4.4	NA		–	–	Greyish brown silt with two 2" bands of clay 7" apart, moist high plastic	
10	SS-E4.5	NA	4.8	–	–	Brownish Grey silt with band of grey clay 1/4" wide 1' apart, well sorted, moist.	
						EOB-10ft	

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage Yard JOB NO. 148-1634
LOCATION Washburn ME BORING NO. EG
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-24-88 DATE COMPLETED 6-24-88
FIELD SUPERVISOR J.T. moore PAGE __ of __

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY (ft)	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
2	SFS EG 1 SS EG 1	NA		-	-	Yellowish Brown Gravelly Sand, with trace silt, dry	OVA Back 1.0 ppm Auger 1.0 ppm Spoon 1.0 ppm
	SS EG 2	NA		-	-		
4						Brown Gravelly sand, with trace silt dry - damp	
	SS EG-3	NA	3'	-	-		
6						Greyish Brown silty Gravelly Sand with very coarse sand moist	OVA Back 1.0 ppm Auger 1.6 ppm Spoon 1.0 ppm
	SS EG-4	NA		-	-	Brown silt, moderate plastic, wet	
8						Grey Clayey silt moderate plastic wet	
	SS EG-5	NA				Grey Gravelly Clay plastic moist	
10			5'	-	-		
						water table 5' BGS-10'	Monte Bell Steve Underwood Todd Newman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage Yard JOB NO. 148-1134
LOCATION Washburn ME BORING NO. EB
DRILLING COMPANY Wayne Northern - N.Phillips CME-55
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-21-88 DATE COMPLETED 6-21-88
FIELD SUPERVISOR J. T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY (ft)	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-EB-1	NA		-	-	Brown Gravelly sand, with trace silt, poorly sorted, dry.	OVA Background 1.0 PPM auger 1.8 PPM spoon 2.2 PPM
						Dark reddish brown Silty Gravelly sand, with medium to coarse sand, poorly sorted, dry to moist.	
4	SSEB-2	NA		-	-	Greenish gray silty sandy Clayey silt, some f. gravel, trace (+) cmf sand, trace (-) clay, poorly sorted, moist to wet.	
6	SS-EB-3	NA	2.8	-	-	Reddish brown silt and Clay high plastic., well sorted moist.	OVA Background 1.0 PPM auger 2.2 PPM spoon=2.2 PPM
	SS-EB-4	NA		-	-	Grey silt, moderate plastic, moist	
8	SS-EB-5	NA		-	-	Grey Clayey silt, with bands of ¼" grey clay 1" apart, well sorted and moist	
10			5.0			BOB-Left	

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148 1L84
LOCATION Washburn ME BORING NO. E10
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7.9.88 DATE COMPLETED 7.9.88
FIELD SUPERVISOR J. T. Morse PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SAS-E10-1 SS-E10-1	-		-	-	Brown Coarse Sand & Silt, coarse sand to gravel angular to subangular, dry Reddish Brown Gravelly Sand Silt, Gravel mf angular to subangular dry to damp	OVA Back 1.0 ppm Auger 1.0 ppm Spoon 1.0 ppm
4	SS-E10-2	-		-	-	Reddish Brown Gravelly coarse sand and silt, dry to moist. Greyish Brown Sand with trace lens of Grey Clay moist to dry	
6	SS-E10-3	-	5'	-	-	Brownish Clayey silt, laminated moderate plastic, moist Grey silt and Clay, moderate plastic, soft moist to wet	OVA Back 1.0 ppm Auger 1.0 ppm Spoon 1.0 ppm
8	SS-E10-4	-		-	-		
10	SS-E10-5	-	3'	-	-	Grey Clay and silt laminated moist to wet BOB - 10'	Mobile B57 S. Underwood T. Norman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard JOB NO. 148-1434
LOCATION Washburn ME BORING NO. E-12
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6/23/88 DATE COMPLETED 6/23/88
FIELD SUPERVISOR J. T Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY (ft)	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
2	SS-E12-1 SB-E12-1	NA		—	-	Yellowish Brown Gravelly sand, dry	OVA Back 0.8 ppm Auger 0.8 ppm Spoon 0.8 ppm
4	SS E12-2	NA		—	-	Dark yellowish brown fine sand little lenses of yellowish Brown silty clay, moist-wet	
6	SS E12-3	NA	3.5	—	-	Reddish brown silty clay moderate plastic.	OVA Back 0.4 ppm Auger 0.4 ppm Spoon 0.4 ppm
8	SS E12-4	NA		—	-	Grey silt moderate plastic moist-wet	
10	SS E12.5	NA	4.1	—	—		
						Water table 4' BOB. 10'	Mobile B57 - Steve Underwood - Todd Norman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148 134
LOCATION Washburn ME BORING NO. F3
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-10-88 DATE COMPLETED 7-10-88
FIELD SUPERVISOR J T Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SFS F3 1 SS F3 1	-		-	-	Reddish Brown Silty Gravelly Sand, with angular to subangular gravel	OVA Back .4 ppm Auger .6 ppm Spoon
	SS F3 2	-		-	-	Greyish Brown Gravelly sand, with very coarse silty sand and trace clay, Gravel is angular to subrounded, moist, little silt	
4	SS F3 3	-	3.5	-	-	Greyish Silty Gravel, Gravel is m.f. subangular to subrounded, wet	
6	SS F3 4	-		-	-	Brown Silty Clay, Soft, wet	OVA Back .4 ppm Auger .4 ppm Spoon .4 ppm
	SS F3 5	-	4'	-	-	Grey silty clay, laminated high plastic, moist to wet	
8							
10						EOB - 10'	Mobile B57 S. Underwood T. Nunman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Ste JOB NO. 148-1L34
LOCATION Washburn, ME. BORING NO. F5
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION ____
DATE STARTED 7-11-88 DATE COMPLETED 7-11-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY (FT)	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-F5-1	NA		NA	NA	Reddish Brown Gravelly Silty SAND, little (-) mF Gravel, sub-Angular to Angular, Poorly sorted, dry.	OVA Background - 0.2ppm Auger - 0.2ppm Spoon - 2.0ppm
4	SS-F5-2	NA		NA	NA	SAME & EXCEPT increasing % of silt, And moist to wet	
	SS-F5-3	NA	4.2	NA	NA	Grey Gravelly SILT and SAND, trace f. gravel (angular to subrounded) poorly sorted, wet.	OVA: Background - 0.0ppm Auger - 0.0ppm Spoon - 0.0ppm
6	SS-F5-4	NA		NA	NA	Yellowish Brown Clayey SILT, laminated with small lens of clay, low plasticity to NON-plastic, moist to wet.	
8	SS-F5-5	NA	4.8	NA	NA	Greyish-Brown Clayey SILT, laminated, low plasticity to non-plastic, well sorted, moist to wet. Grey SILT and CLAY, laminated with 1/4 inch lens of clay (Dark grey), firm, moderate plasticity, moist to wet	
10						B.C.B. - 10.0FT	Rig #1 Mobile-B-57 S. Underwood (driller) * - samples collected with Continuous soil Sore sampler five foot length

ICF TECHNOLOGY INCORPORATED

PROJECT Rhodes Salvage JOB NO. 148 1634
LOCATION Washburn ME BORING NO. F-7
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-24-88 DATE COMPLETED 6-24-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-F7-1 SFS-F7-1	NA		NA	NA	Yellowish-Brown Gravelly SAND, trace silt, poorly sorted, dry	OVA Background- 1.0ppm Auger- 30-80ppm Spoon - 3ppm
	SS-F7-2	NA	4.0	NA	NA	Reddish Brown Gravelly SAND, trace (-) silt, mf gravel, trace (+) organic material, dry.	
4						Dark Brown Gravelly Silty SAND, trace clay, little (-) mf gravel, poorly sorted, moist	
	SS-F7-3	NA		NA	NA	Dark Brown Silty SAND, with Black staining, cmf Sand, little (-) mf gravel, wet, poorly sorted.	OVA Background- 1.0 ppm Auger- 30ppm Spoon - 2 ppm
6	SS-F7-4	NA	4.0	NA	NA	Yellowish Brown Silty CLAY, low to moderate plasticity, laminated, well sorted, dry to moist.	
8						Groundwater @ 4.2FT B.O.B - 8.0FT	Rig # 1 Mobile B-57 S. Underwood (driller)
10							

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard JOB NO. 148-1L34
LOCATION Washburn, Maine BORING NO. F10
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7/14/88 DATE COMPLETED 7/14/88
FIELD SUPERVISOR Robert J. Melvin PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
	SFS-F10-1 SS-F10-1	N.A.	1.66	N.A	N.A	Brown fine to medium sandy silt trace clay, roots, loose, slightly moist	< - OVA = 0.2 air/sample
						Brown gravelly silty sand, sand fine to medium in size, gravels (1" diameter), poorly sorted, low plasticity, loose to slightly firm slightly moist	< - M. Phillips / J Carriere drillers
2						Dark brown medium sand, some fine sand, trace silt loose, slightly moist	< - CHESS
	SS-F10-2	N.A	0.50	N.A	N.A		< - OVA = 0.2 air/sample
4	SS-F10-3	N.A	1.42	N.A	N.A	Dark to drab brown fine and medium sand, some silt, laminae, poorly sorted, slightly firm, moist to damp	< - OVA = 0.2 air/sample
						Grades into lighter brown fine sandy silt, low plasticity, trace of clay, moist, damp along lower contact.	
6	SS-F10-4	N.A	1.58	N.A	N.A	Gray silt, trace clay, slight trace fine sand, faint laminae, firm, slightly moist	< - OVA = 0.3ppm air/sample
8	SS-F10-5	N.A	1.56	N.A	N.A		< - OVA = 0.2ppm air/sample
						Gray gravelly silt, trace clay, gravels 1/8 to 3/16" diameter, subround to subangular dolomitic limestone, firm, dry to very slightly moist	
10						B.O.B = 10ft	

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage JOB NO. 148-1234
LOCATION Washburn ME BORING NO. F12
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7/11/88 DATE COMPLETED 7/11/88
FIELD SUPERVISOR Robert J. Melvin PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SFS-F12-1 SS-F12-1	N.A		N.A	N.A	Brown, orange tint, fine and medium sandy silt, est 20% gravel, round to subround, roots upper 4", slight firm to loose, dry Brown gravelly fine and medium sandy silt, some clay, 15 to 20% small to medium size gravel, angular to subround, loose and dry	OVA Background 0.9 ppm Auger 0.9 ppm Spoon 0.9 ppm
4	SS-F12-2	N.A.		N.A.	N.A	Drab brown medium and fine sand with layers of sandy silt to silty sand (lighter in color), upper one foot, lower foot predominantly medium sand, slight moisture, slightly firm to loose	
	SS-F12-3	N.A.	3.83	N.A	N.A	Light brown fine and medium sand, loose, moist, layers or lenses of light brown with orange tint to tan fine sand and silt layers 1/8 inch thick Drab brown with blackish tint medium sand mixed with some fine sand, loose, moist	
6	SS-F12-4	N.A		N.A	N.A	Multi tinted brown layers of sand and silty sand, loose to slightly firm, iron staining, well layered, sand predominantly fine, wet to saturated Brown fine sandy silt, laminae, finely, thinly bedded, slightly firm, slightly moist.	OVA Background 0.9 ppm Auger 0.9 ppm Spoon 0.9 ppm
8	SS-F12-5	N.A.		N.A	N.A.	Gray silt some clay (trace), luminae, slightly firm to firm, very slight amount of moisture, plasticity	
10			5.0			B.O.B. 10'	Mobile B57 N. Phillips J. Carrizzo

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1C34
LOCATION Washburn, ME. BORING NO. 64
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION ____
DATE STARTED 7-10-88 DATE COMPLETED 7-20-88
FIELD SUPERVISOR T.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=__FT)	REMARKS (ORG. VAP.)
2	SS-64-1 SFS-64-1	NA		NA	NA	Dark Brown Gravelly Silty SAND, mf gravel subrounded to sub angular, poorly sorted, dry	OVA: Background - 0.8 ppm Auger - 2.0 ppm Spoon - 5.0 ppm
						Reddish-Brown Silty SAND, very coarse sands, moderate-to poor sorting, dry	
4	SS-64-2	NA		NA	NA	Black GRAVELLY SILT, trace (+) mf Angular to sub Angular gravel, poorly sorted, moist.	
						Reddish Brown Gravelly SILT, (little (-) clay, f. Gravel; mostly Angular, moist	
6	SS-64-3	NA	3.9	NA	NA	Brown Gravelly SAND, trace (-) silt, poorly sorted, wet	OVA Background 0.8 ppm Auger - 3.0 ppm Spoon - 0.9 ppm
	SS-64-4	NA		NA	NA	Yellowish Brown Clayey SILT, laminated, low plasticity to NON plasticity, well sorted, moist	
8	SS-64-5	NA	3.9	NA	NA	Grey Clayey SILT, laminated, moderate to NON-plastic, lens of clay (dry), dominant matrix is moist.	
10						B.C.B. - 10.0 FT	Rig #1 Mobile B-57 S. Underwood (driller)

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage JOB NO. 148-1184
LOCATION Washburn ME BORING NO. G16
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-14-88 DATE COMPLETED 7-14-88
FIELD SUPERVISOR J.T Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY %	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
2	SFS-G6-1 SS-G6-1	1		-	-	Yellowish Brown Gravelly silty sand, Gravel is f. angular to subangular, dry	OVA Back 0.0 ppm Auger 2.0 ppm Spoon 2-9.0 ppm
						fill misc. organic wood chips Grey sand etc, dry	
4	SS-G6-2	1		-	-	Reddish Brown silty gravel sand, Gravel is f. subangular to rounded	
						Brown Gravelly silt, trace sand trace clay, Gravel is mf. subrounded moist	
6	SS-G6-3	1	3.7	-	-	Grey f. Gravel & C Sand, trace silt rounded to subangular saturated	OVA Back 0.6 ppm Auger 0.6 ppm Spoon 0.6 ppm
						Brown Sand trace silt & clay lenes laminated, saturated (wet)	
8	SS-G6-4	1		-	-	Yellowish Brown Silty clay, laminated, moderate plastic moist	
						Grey Clayey Silt, laminated low plastic, wet	
10	SS G6-5	1	2.8	-	-		
						BOB - 10'	Mobile B57 S. Ondrawood F. Dickerson

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1L34
LOCATION Washburn, ME. BORING NO. G-8
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION ____
DATE STARTED 6-19-88 DATE COMPLETED 6-18-88
FIELD SUPERVISOR J.T. MOORE PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
2	SS-68-1 SPT-68-1	NA		NA	NA	Brown Silty Gravelly SAND, trace silt, little (-) mf gravel, poorly sorted, dry. REDDISH-Brown Silty Gravelly SAND, poorly sorted, dry. Grey Sandy SILT, mottled, mostly fine sands, moderate sorting, moist.	OVA: Background-0.0 ppm Auger- 0.8 ppm Spoon- 3-10ppm
4	SS-68-2	NA		NA	NA	Grey Gravelly CLAY, medium to mostly fine gravel, moderate to high plasticity, poorly sorted, moist.	
6	SS-68-3 SS-68-4	NA	3.6FT	NA	NA	Dark Brown Silty SAND, cmf sands, trace (+) silt, moderate sorting, wet @ 4.3 ft. Brown Silty CLAY, little (+) silt, moderate to non-plastic, well sorted, moist.	OVA Background-0.0 ppm Auger- 0.0 ppm Spoon- 0.0 ppm
8	SS-68-5	NA	4.0FT	NA	NA	Grey Sandy SILT, trace (-) clay, little (-) cmf sand, non-plastic, moderate sorting, moist	
10						B.O.B. - 10.0 FT	Rig # 2 CME-55 N. Phillips (Driller)

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1L34
LOCATION Washburn, ME. BORING NO. G11
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION ____
DATE STARTED 6-17-88 DATE COMPLETED 6-17-88
FIELD SUPERVISOR T.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-G11-1	NA		NA	NA	Brown Silty Gravelly SAND, trace (-) silt, mf gravel, poorly sorted, dry	OVA- Back- 0.0ppm Auger- 0.8ppm Spoon - 1.4ppm
4	SS-G11-2	NA		NA	NA	Brown Silty SAND, trace (-) mf gravel, with small lens of silt and clay, moderate to poor sorting, moist	
6	SS-G11-3	NA	3.0	NA	NA		OVA Background- 0.0 ppm Auger- 1.0ppm Spoon- 1.0ppm
8	SS-G11-4	NA		NA	NA	Reddish Brown Silty CLAY, little (-) silt, moderate plasticity, dry.	
10	SS-G11-5	NA	4.0	NA	NA	Grey Silty CLAY, moderate plasticity, well sorted, moist.	
						Groundwater table @ 4.0 ft B.O.B. - 10.0 FT	Rig #2 CME-55 N. Phillips (driller)

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage Yard JOB NO. 148124
LOCATION Washburn ME BORING NO. G-11A
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-23-88 DATE COMPLETED 6-23-88
FIELD SUPERVISOR J.T. MORE PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY (ft)	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SSG11A-1	NA		-	-	Brown cm ~~sand~~ Gravelly Sand, with coarse to medium sand and fine gravel dry	OVA Back 0.2 ppm Auger 0.8 ppm Spoon 0.6 ppm
4	SSG11A-2 SSG11A Dup	NA		-	-	Brown fine Sand, with lenes of greyish brown clay moist to wet	
6	SS-G11A-3	NA	4'	-	-		OVA Back 0.2 ppm Auger 0.2 ppm Spoon 0.2 ppm
8	SSG11A-4	NA		-	-	Reddish brown clay, moderate plastic, dry	
10	SS-G11A-5	NA	4.8 ft	-	-	Grey Silty clay, moderately Plastic, moist	
						water table 4' BOB - 10ft	Mobile B-57 Steve Underwood Todd Norman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148-1634
LOCATION Washburn ME BORING NO. H-2
DRILLING COMPANY Wayne Northern - N. Phillips CME-55
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-18-88 DATE COMPLETED 6-18-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
2	SS H2-1	NA		-	-	Reddish brown sand, with trace gravel & silt, poorly sorted, dry	OVA 0.Eppm Auger - 0.9ppm Spoon - 1.8ppm
4	SS H2-2	NA		-	-	Blackish grey Gravelly sand, with f. gravel and trace silt, moist	
	SS H2-3	NA	32"	-	-	Grey silt, trace clay, low plastic, well sorted and moist.	OVA- Background - 0.8 ppm Auger - 0.8 ppm Spoon - 0.8 ppm
6	SS H2-4	NA		-	-	Grey Clayey silt moderate plastic moist	
8						alternating lenses of clay and silt, moist	7' Saturated
	SS-H2-5	NA	5"	-	-	Grey silty clay, trace f. sand and some fine gravel poorly sorted, moist.	
10						BOB 10ft	

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148 1L34
LOCATION Washburn Me BORING NO. H5
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-6-88 DATE COMPLETED 7-6-88
FIELD SUPERVISOR J. T. Moose PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SES HS-1 SS-HS-1	NA		-	-	Dark brown Gravelly Sand with trace clay, dry	OVA Back 0.8ppm Spoon 30ppm H_2O Back 0.2 ppm Spoon 0.2 ppm
4	SS-HS-2	NA		-	-	Light brown sand, wet	
6	SS-HS-3	NA	2.6	-	-	Grey Coarse sand, some gravel and trace silt wet Light Brown Silty Sand, with trace clay & gravel wet	OVA Back 0.8ppm Auger >10 ppm Spoon 1.0 ppm H_2O
8	SS-HS-4	NA		-	-	Light Brown Clay, with trace silt, wet	
10	SS-HS-5	NA	3.4	-	-	Light grey clay, wet	
						Groundwater table 4' BGS - 10ft	Mobile B57 Steve Underwood Todd Nurman

ICF TECHNOLOGY INCORPORATED

PROJECT Pioneer Valley JOB NO. 142134
LOCATION Wareham MA BORING NO. H6
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION ____
DATE STARTED 7-11-86 DATE COMPLETED 7-11-86
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SFS-H6-1 SS H6-1	1		-	-	Reddish Brown Silty Sand, silt increasing with depth, with some m.f. angular to subrounded gravel	OVA Back 0.0ppm Augr 8.0ppm Spoon 2.0ppm
4	SS H6-2	-		-	-	Dark Greyish Brown Gravelly Sandy silt, with m.f. subrounded gravel, moist	
6	SS-H6-3	-	4.0	-	-	Brown Very Coarse sand, some m.f. subangular gravel, wet	
	SS-H6-4	-		-	-	Brown Sand, trace silt saturated	OVA Back 0.0ppm Augr 0.0ppm Spoon 0.0ppm
8	SS-H6-5	-		-	-	Yellowish brown clayey silt laminated moderate to low plastic, moist to wet	
10			3.9			Grey Clayey Silt, laminated moderate plastic moist to wet	
						BOB 10'	Make B57 S Lockwood T. Norman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148 1134
LOCATION Washburn ME BORING NO. H7
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-9-88 DATE COMPLETED 7-9-88
FIELD SUPERVISOR T. J. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SES-H7.1 SS-H7.1	-		-	-	Dark Brown Gravelly Sandy Silt with fargular to subangular gravel, dry	OVA Back 0.8ppm Auger >10 ppm Spoon 2.0ppm
4	SS-H7.2	-		-	-	Brown Gravelly Clayey silt, Gravel S. angular to subrounded, moderate to low plastic moist to wet	
6	SS-H7.3	-	2.9	-	-	Brown coarse Sand, wet Brown fine sand, with trace silt, saturated	OVA Back 0.8ppm Auger 0.8ppm Spoon 0.8ppm
8	SS-H7.4	-		-	-		
10	SS-H7.5	-	3.9	-	-	Brown silt little sand saturated Yellowish Brown clayey silt, laminated, moderate plastic. moist to wet Grey laminated silt wet to moist BoB. 10'	Mobile BS7 S. Underwood T. Nunman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148 1434
LOCATION Washburn ME BORING NO. HS
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-14-88 DATE COMPLETED 7-14-88
FIELD SUPERVISOR J. F. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-HS-1	-		-	-	Reddish Brown Silty Gravelly sand, with mf. angular gravel, dry.	OVA Background 0.6 ppm Auger 0.6 ppm Spoon 0.6 ppm
	SS-HS-2	-		-	-	Brown C. Sand to f. subangular to subrounded gravel, trace silt moist	
4						same but Dark Brown Layer Gravel wet	
	SS-HS-3	-	33	-	-	Brown mf. sand, laminated with trace silt → clay lenes, moderate sorting, moist.	OVA Background 0.6 ppm Auger 0.6 ppm Spoon 0.6 ppm
6							
	SS-HS-4	-		-	-	Brownish Grey laminated fine clay, dry, trace silt	
8						Grey Clayey silt, laminated well sorted, low plastic, wet	
	SS-HS-5	-	3.1	-	-		
10						BOB - 10'	Mobile B57 S. Undercoat T. Noraman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148-1134
LOCATION Washburn ME BORING NO. H-9
DRILLING COMPANY Lyons Northern - V. Phillips CME-55
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6/17/88 DATE COMPLETED 6/17/88
FIELD SUPERVISOR J T Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-H9-1	NA		-	-	Yellowish Brown Gravelly sand, dry Dark brown Sand, sand is coarse, trace (+) silt, moderate sorting, dry Greyish brown Silty sand, trace (+) silt, moderate sorting, with coarse to fine-grained sands, mostly coarse, moist to wet	OVA 3.0 ppm
4	SS-H9-2	NA		-	-		∠-Ground water level - 4.1 ft.
6	SS-H9-3	NA	38"	-	-	Greyish Brown Silty sand. Sand is coarse, trace clay, wet.	OVA 1.8 ppm
8	SS-H9-4	NA		-	-	Grey Clay, trace silt, laminated with lens of silt/clay. well sorted, non-plastic to high plasticity, moist.	
10	SS-H9-5	NA	24	-	-		
						B.O.B-10ft	

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard JOB NO. 148 1634
LOCATION Washburn ME BORING NO. H10
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-23-88 DATE COMPLETED 6-23-88
FIELD SUPERVISOR J T Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS H10 1	WP		-	-	Brown Gravelly sand, with m.f. gravel, dry	OVA Back 0.0 ppm Auger 0.0 ppm Spoon 0.2 ppm
	SS H10 2	NA		-	-	Brown Gravelly sand, with very fine gravel, trace clay	
4	SS-H10-3	NA	3.9	-	-	Brown fine sand with little to trace yellowish brown clay lenes, moist - wet	
6	SS H10-4	NA		-	-	Brown clay moderate Plastic, moist 6.7	OVA Back 0.8 ppm Auger 2.0 ppm Spoon 4.0 ppm
8	SS-H10-5	NA	4.6	-	-	Grey silty clay, moderate Plastic, moist	
10						Water table 4' BOB=10'	Mobile B57 -Steve Underwood Todd Norman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1L34
LOCATION Washburn, ME. BORING NO. I6
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION
DATE STARTED 6/25/88 DATE COMPLETED 6-25-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY (FT)	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-I6-1 SFS-I6-1	NA		NA	NA	Yellowish Brown Gravelly SAND, trace Silt, poorly sorted, dry	OVA: Background - 1.0ppm Auger - 3.8ppm spoon - 2.0ppm Hnu: Background - 0.0ppm Auger - 0.2ppm spoon - 0.0ppm
	SS-I6-2	NA		NA	NA	Reddish Brown Silty Gravelly SAND, with coarse to fine-grained sand, mostly medium, medium to fine gravels, which are mostly subangular, moist.	
4						Greyish Brown Silty Gravelly SAND, dominantly coarse sands, trace silt, poorly sorted, moist to wet.	∠ Groundwater @ 4.3 FT
	SS-I6-3	NA	4.0FT	NA	NA	Brown Silty SAND, little (-) silt, moderate sorting, coarse to fine grained sands, mostly medium, wet.	OVA Background - 1.0ppm Auger - 1.4 ppm spoon - 1.8 ppm Hnu - Background - 0.2 ppm spoon - 0.2ppm
6						Yellowish-Brown Clayey SILT, laminated with clays, non-plastic to moderate plasticity, moist.	
	SS-I6-4	NA		NA	NA	Grey Clayey SILT, laminated, non plastic, to low plasticity, well sorted, moist.	
8	SS-I6-5	NA	4.0FT	NA	NA		
10						B.O.B. - 10.0FT	Rig #1 Mobile B-57 S. Underwood (driller)

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148 1434
LOCATION Washburn ME BORING NO. I8
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-14-88 DATE COMPLETED 7-14-88
FIELD SUPERVISOR T. J Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-I8-1 SS-I8-1	-		-	-	Reddish Brown Silty Gravelly sand, with 8m angular to subangular gravel, dry	OVA Back 0.6 ppm Auger 0.6 ppm Spoon 0.6 ppm
	SS-I8-2	-		-	-	Brown Silt U.f Gravel & Sand with u.f subangular to rounded gravel moist	
4						Brown C. Sand & Gravel, subrounded wet	
6	SS-I8-3	-	30	-	-	Brown well sorted sand, trace laminated silt saturated	OVA Back 0.6 ppm Auger 0.6 ppm Spoon 0.6 ppm
	SS-I8-4	-		-	-	Grey Clay silt laminated well sorted low plastic, wet	
8	SS-I8-5	-	28	-	-		
10						BOB - 10'	Mobile B57 S. Underwood F. Dickerson

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard JOB NO. 148-1134
LOCATION Washburn ME BORING NO. JS
DRILLING COMPANY Ware Northern - N Phillips CME-55
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-18-88 DATE COMPLETED 6-18-88
FIELD SUPERVISOR J.I Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	ft RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-J3-1	NA		-	-	Reddish Brown gravelly sand, medium to mostly fine gravel, Angular to subrounded, trace (-) silt, poorly sorted, dry.	OVA Background 1.0ppm auger 2.0 ppm spoon 1.8ppm
4	SS-J3-2	NA		-	-		
	SS-J3-3	NA	1.2'	-	-		low recovery due to amount of rock
6						Grey Sand, with f. sand and trace silt moist 5.8	OVA auger 3.0ppm spoon 1.0 ppm
	SS-J3-4	NA		-	-	Light brown clay, trace silt, moist	
8						Grey clayey SILT, trace (+) clay, well sorted, non plastic to low plasticity, moist	
			3'	-	-		
10						B.O.B. @ 10.0 ft	Rig #2 CME-55 N Phillips (driller)

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1C34
LOCATION Washburn, ME. BORING NO. J-5
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION
DATE STARTED 6-18-88 DATE COMPLETED 6-18-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-JS-1 SFS-JS-1	NA		NA	NA	Reddish Brown Gravelly SAND, trace silt, poorly sorted, dry.	OVA Background - 1.2ppm Spoon - 1.2ppm
						Dark Reddish Brown Gravelly SAND, trace silt, mf gravels, poorly sorted, dry to moist.	
4	SS-JS-2	NA		NA	NA	Dark Brown Silty Clayey SAND, trace(-) clay, trace silt, moderate sorting, moist.	
	SS-JS-3	NA	4.0'	NA	NA	Brown Silty SAND, little Silt, coarse to fine-grained, mostly coarse, moderate sorting, moist to wet	
6	SS-JS-4	NA		NA	NA	Yellowish Brown Silty Clay, well sorted, moderate plasticity, moist.	OVA: Readings Background - 1.2ppm Spoon - 1.2ppm
8	SS-JS-5	NA	5.0'	NA	NA	Grey Clayey SILT, Non plastic to low plasticity, well sorted, moist.	
10						B.O.B. - 10.0FT	Rig # 2 CME-55 N. Phillips (driller)

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Ste JOB NO. 148-1C34
LOCATION Washburn, ME. BORING NO. J-7
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow-stem Auger ELEVATION
DATE STARTED 6-19-88 DATE COMPLETED 6-19-88
FIELD SUPERVISOR J.T. MOORE PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY (FT)	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-J7-1	NA		NA	NA	Brown Silty Gravelly SAND, poorly sorted, trace silt, dry Reddish Brown Silty Gravelly SAND, coarse to fine-grained sands, mostly coarse, poorly sorted, dry to moist	OVA Background- 0.0ppm Spoon - 0.8ppm
4	SS-J7-2	NA		NA	NA	Brown Silty SAND, mottled with mf Reddish Brown SAND, moist. Dark Brown mf. SAND, mottled with yellowish brown silt and reddish Brown coarse SAND, moist to wet	
6	SS-J7-3	NA	3.0	NA	NA	Dark Brown Silty SAND, moderately sorted, trace Silt, moist	OVA Background 0.0ppm Spoon - 1.6
8	SS-J7-4	NA		NA	NA	Yellowish Brown Silty CLAY, well sorted, non-plastic to high plasticity, moist.	
10	SS-J7-5	NA	4.3	NA	NA	Grey Silty CLAY, high plasticity, well sorted, moist.	
						B.O.B. - 10.0FT	Rig #2 CME-55 N. Phillips (driller)

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148 1434
LOCATION Washburn ME BORING NO. 0-18
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-12-88 DATE COMPLETED 7-12-88
FIELD SUPERVISOR T. T Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
	SS-018-1	1		-	-	Dark Brown Gravelly Silty Sand Gravel is f. angular to subrounded, silt is organic, dry	OVA Back 0.2 ppm Auger 0.8 ppm Spoon 0.2 ppm
2						Brown Silty Gravelly Sand Grael is very fine subangular to round, dry to moist	
	SS-018-2	1		-	-		
4						Greyish Brown w/ Reddish Brown small pockets Sandy Silt, trace grael subangular	
	SS-08-3	1	35	1	-		
6						Brown Gravelly Sand, subangular to round, trace silt saturated	OVA Back 0.2 ppm Auger 0.2 ppm Spoon 0.2 ppm
	SS 08-4	-		-	-	Brown Clayey silt, laminated moderate to low plastic, moist	
8							
	SS-08-5	-	3	-	-		
10						Light Grey Clay laminated silt low plastic moist	
						BOB 10'	Mobile B57 S. Underwood T. Runamen

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148 1131
LOCATION Washburn ME BORING NO. P19
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Augr ELEVATION
DATE STARTED 7-7-88 DATE COMPLETED 7-7-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-P19-1 SS-P19-1	NA		—	—	very Dark Brown organic silt, with some fine roots, wet	OVA Background 2.0 ppm Auger- 2.2ppm Spoon- 2.4ppm
						Yellowish Brown Coarse silty Sand, with very coarse sand to fine gravel angular wet	
4	SS-P19-2	NA		—	—	Reddish Brown with pockets of Grey clayey silt, trace sand moderate plastic, moist	
						Grey Clay, high plastic, dry	
6	SS-P19-3	NA	6'	—	—	Grey Gravelly Clay. Gravel is angular to subangular, high plastic dry	
						BOB-6'	MOBILE B57 Steve Underwood Todd Nunman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148-1134
LOCATION Washburn ME BORING NO. P22
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-13-88 DATE COMPLETED 7-13-88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS P22-1	-		-	-	Dark Brown organic silt, moist	OVA Back 0.1 ppm Auger 6.0 ppm Spoon 2.0 ppm
4	SS P22-2	-		-	-	Greyish Brown Clayey Silt, trace sand trace f. rounded gravel moist Grey sand and Clay some mf. subrounded gravel moist	
6	SS P22-3	-	4.3	-	-	Brown Gravelly Clay, trace silt, with mf. subangular gravel moist	
						BOB-6'	Mobile B57 S. Underwood T. Norman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage Yard JOB NO. 148-1L34
LOCATION Washburn, Maine BORING NO. Q17
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow stem Augers ELEVATION
DATE STARTED 6/19/88 DATE COMPLETED 6/19/88
FIELD SUPERVISOR T. T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY (FT)	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=1FT)	REMARKS (ORG. VAP.)
0	SS-Q17-1	2 3 4 W	1.8	—	—	TOPSOIL - decomposed organic material and silt, dry 0.4 Brown Sandy Gravelly SILT, with fine angular to subrounded gravels, poorly sorted, (dry)	Background OVA readings are 1 ppm. LEL-21.0% / LEL-0.0% ∠-OVA reading is 0.0 ppm Above background ∠-TIME - 12:31 (for 0-2 FT) ∠-OVA - 0.0 ppm ∠-TIME - 12:39
2	SS-Q17-2	2 W W W	0.4	—	—	Greyish Brown Gravelly Clayey SILT, Non-plastic, trace fine subround to angular gravel, (moist)	
4	SS-Q17-3	1 1 1 6	1.8	—	—	SAME 4.8 Light Brown SAND and Gravel, with medium to fine sands, dominantly fine; trace fine gravel, and trace Silt, (wet)	∠-TIME - 12:51 ∠-OVA - 0.0 ppm ∠-GWL - 5.6
6	SS-Q17-4	4 W W W	2.0	—	—	7.1 Light Brown Silty CLAY, mod. plasticity, well graded and wet. 7.7 Grey Clayey SILT, well sorted, Non-plastic and wet.	∠-TIME - 13:14 ∠-OVA - 0.0 ppm ∠ gradation contact ∠ gradational contact ∠-TIME - 13:25 ∠-OVA - 0.0 ppm
8	SS-Q17-5	9 5 W W	2.0	—	—	SAME	
10						B.O.B. - 10 FT.	Hammer - 140 lbs Hammer drop - 30" Rig # 1 Mobile B-57 S. Underwood (driller)

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage JOB NO. 148 1634
LOCATION Washburn ME BORING NO. Q21
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-7-88 DATE COMPLETED 7-7-88
FIELD SUPERVISOR J.T. Moose PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SFS Q21-1 SS Q21-1	NA		-	-	Dark Brown organic silt many roots, moist	OVA Back 0.2 ppm auger 0.2 ppm Spoon 0.2 ppm
						very Dark Brown organic silt, wet	
4	SS Q21-2	NA		-	-	very Dark Greyish Brown/Black organic silt, wet	
	SS Q21-3	NA		-	-	Greenish Grey clay moist	
						Yellowish Brown coarse sandy clay wet	
6			3.9			Grey Gravelly clay high plastic BOB 6'	MOBILE B57 Steve Underwood Todd Norman

ICF TECHNOLOGY INCORPORATED

PROJECT Dingle's Salvage JOB NO. 148 1634
LOCATION Washburn ME BORING NO. Q22
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-13-88 DATE COMPLETED 7-13-88
FIELD SUPERVISOR J.T. Monroe PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-Q22-1	—		—	—	Dark Brown organic silt many roots, moist	OVA Back 1.0 ppm Auger 1.0 ppm Spoon 1.0 ppm
	SS-Q22-2	—		—	—	Greyish Brown silty clay, trace sand, firm, moist	
4	SS-Q22-3	—	3.1	—	—	Grey clay, trace silt, trace fine subangular gravel Brown sand saturated	
6						BOB-6'	Moore B57 S. Underwood T. Donahman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage JOB NO. 148 1134
LOCATION Washburn ME BORING NO. R22
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-13-88 DATE COMPLETED 7-13-88
FIELD SUPERVISOR J. T Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-R22-1	-		-	-	Dark Brown organic silt many roots, moist	OVA Bkgd 1.0 ppm Augr 1.0 ppm Spoon 1.0 ppm
	SS-R22-2	-		-	-	Greyish Brown Silty clay trace m.f. sand, firm, moist	
4	SS-R22-3	-	1.4	-	-	same with trace subangular fine gravel, wet Brown c~~m~~f sand saturated	
6						BOB -6'	Mobile B57 S. Underwood T. Norman
8							
10							

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard JOB NO. 148-1634
LOCATION WASHBURN, ME BORING NO. S-19
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-15-88 DATE COMPLETED 7-15-88
FIELD SUPERVISOR James T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=4FT)	REMARKS (ORG. VAP.)
	SS-S19-1	NA		NA	NA	Brown Clayey Gravelly SILT, trace clay, trace medium to fine subangular to subrounded gravel, poorly sorted, dry to moist. 1.9FT.	OVA- Background - 0.2ppm Auger - 0.6ppm Spoon - 0.2ppm
	SS-S19-2	NA		NA	NA	Brown Gravelly Sand SILT, trace (-) clay, with medium to dominantly fine grained sands, trace fine angular to subround gravel, poorly sorted, trace organic material, moist 4.1	
	SS-S19-3	NA	3.7	NA	NA	Brown Gravelly CLAY, trace (+) medium to fine angular to subangular gravel, poorly sorted, moderate to high plasticity, trace organic material, moist to wet.	
						Bottom of Boring - 6.0FT	Mobile B-57 • S. Underwood • T. Newman

ICF TECHNOLOGY INCORPORATED

PROJECT Proctor's Salvage JOB NO. 148 1634
LOCATION Washburn ME BORING NO. S 18
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7/12/88 DATE COMPLETED 7/12/88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-S18-1	1		-	-	Dark Yellowish Brown Gravelly Sandy Silt, gravel is mf. angular to subrounded dry	OVA Back 0.2 ppm Auger 0.2 ppm Spoon 0.2 ppm
4	SS-S18-2	-		-	-	Brown Sand, trace silt moist to wet	
6	SS-S18-3	-	3.9	-	-	Brown sandy silt, trace clay wet	
						BOB-6'	Mobile B57 S. Underwood T Norman

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage JOB NO. 148-134
LOCATION Washburn ME BORING NO. S20
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7/12/88 DATE COMPLETED 7/12/88
FIELD SUPERVISOR J.T. Moore PAGE 1 of 1

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY ft	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
2	SS-S20-1	1		-	-	Dark brown organic silt moist	OVA Back 0.2 ppm Augr 0.2 ppm Spoon 0.2 ppm
	SS-S20-2	1		-	-	Dark Brown sandy organic silt moist Grey Clay, trace silt, high Plastic moist	
4	SS-S20-3	-	4.2	-	-	Greyish Gravelly silty sand Graicl is med-fine angular to subangular, wet	
6						BOB-6'	mobile B57 Underwood T. Nunaman

SOIL BORING LOG

ICF TECHNOLOGY

Well No DMW-1

Sheet 1 of 2

Client U.S.E.P.A. Site Pine Hk's Salvage Job No 117-03 01530 Surveyed Elevation, Ground ____

Date Started 10/28/87 Date Completed 11/2/87 Top of Casing ____ Screen Length 8 ft

Total Depth 34 ft. Drilling Method Used Auger Drilling Contractor Layne-Northern Rig Type Gus Pech Beat-22

Field Geologist T. J. Moore Organic Vapor Instruments Used OVA / HNu Static Water Level ____

Depth (feet)	Samp No.	Blows per 6" 140 lbs.	Sample Interval	Rec'v. / Recov.	Org. Vap. - PPM	Sample Description	Lith Log	Remarks
0								
	SS-1	4-4 6-28	2'	2.0/1.0	0.0 ppm	Dark Brown Silty Clayey SAND, trace (-) rock fragments, trace (-) Silt, trace (+) clay, poorly sorted, (SM-SC) (MOIST).		
2								
	SS-2	25-18 26-22	2'	2.0/1.5	0.0	Gray Gravelly SAND, trace (-) clay and silt, mottled, gravel is angular to subangular, iron staining. (GP) (wet).		∠-Groundwater observed at 3 ft. below surface
4								
	SS-3	25-20 22-34	2'	2.0/0.2	0.0	Dark Gray Sandy Gravelly CLAY, trace f. sand, gravel is angular to sub angular, (CL-SC) (moist to wet).		
6								
	SS-4	15-18 15-23	2'	2.0/0.8	0.0	SAME - but trace amount of mottled material, poorly sorted.		
8								
	SS-5	9-19 23-100/4"	2'	2.0/0.5	0.0	Dark Gray to Gray Sandy Gravelly CLAY, poorly sorted, mottled, medium plasticity, gravel is Angular to sub-rounded, flat (CL-GC) (moist).		
10								
	SS-6	142-23 30-45	2'	2.0/1.3	0.0 or 1 ppm	Gray Gravelly CLAY, trace (-) Silt, gravel is Angular to sub angular, flat to elongated, very dense, high to low plasticity (CL-GC) (dry to moist)		
12								
	SS-7	55-43 68-76	2'	2.0/0.9	SAME	Dark Gray Gravelly Silty CLAY, trace (-) f. Silt, Gravel is rounded to Angular, very dense, poorly sorted medium to high plasticity (CL) (moist)		
14								
	SS-8	24-50 48-91	2'	2.0/1.5	SAME	Dark Gray Gravelly Silty CLAY, trace (-) Silt, gravel is mostly Angular to sub Angular, poorly sorted, very dense, medium to low plasticity, (CL-GC) (dry to moist)		
16								
	SS-9	22-37 70-59	2'	2.0/1.1	SAME	SAME:		
18								
	SS-10	50-46 75-100/11"	2'	2.0/1.4	SAME	Dark Gray Silty Clayey GRAVEL, trace (-) clay, some silt, gravel is sub-rounded to Angular, poorly sorted, NON-plastic, (GM-GC) (moist).		
20								
	SS-11	100/4"	2'	2.0/0.3	SAME	Dark Gray Silty Clayey GRAVEL, (weather Bedrock) trace (+) clay, trace (-) Silt, (wet).		
22								
	SS-12	100/5"	2'	2.0/0.2	SAME	SAME		
24								
	Run #1	3½ MIN 3½ MIN			SAME	Light Gray, extensively fractured DOLOMITE or DOLOMITIC LIMESTONE, high ANGLE fractures, with calcite IN-filling throughout, extensive micro-fractures perpendicular to bedding planes, bedding plains barely recognizable, 10° bedding @ 27.0 ft. extensive brecciation from 25 to 27 ft (over)		∠ Rock coring @ 24 to 34 ft ∠ Brown cts Column will indicate core rate (time) / ft.
26								
	Run #1	3½ MIN 3½ MIN			SAME			

ICF TECHNOLOGY

Well No DMW-1

Sheet 2 of 2

Depth (feet)	Sample No	Blows per 6" ____ lbs.	Sample Interval	Rec. / Recov.	Org Vap. - PPM	Sample Description	Lith Log	Remarks
28	Run # 1	4 min / 4 min			SAME	microfractures cross each other (at 90° to one another). SAME: 28 to 30. high angle bedding plain fractures		RQD - 70% Rec - 73%
30	Run # 1	3 1/2 min / 3 1/2 min			SAME			
32	Run # 1	4 min / 4 min			SAME	SAME: 32 to 33.1 ft, high angle bedding plain fractures with possible slickensides. SAME: 33.3 to 33.5, extensive brecciation with calcite infilling and angular fragments.		← - Coring operations completed @ 34.0 ft.
34						B.O.H — 33.5		

ICF NORTHWOOD

Well No DMW 2

Sheet 1 of 2

Client U.S.E.P.A. Site Pinelle's Salvage Yard Job No 01530-47-03 Surveyed Elevation: Ground ____

Date Started 10/29/87 Date Completed 11/7/87 Top of Casing ____ Screen Length 8.0 ft

Total Depth 34.0 ft Drilling Method Used Auger Drilling Contractor Layne-Northern Rig Type Gus Pech

Field Geologist James T. Moore Organic Vapor Instruments Used OVA/HNU KGI Static Water Level ____

Depth (feet)	Sample No.	Blows per 6" 140 lbs.	Sample Interval	Adv./Recov.	Org Vap. - PPM	Sample Description	Lith Log	Remarks
0	SS-1	4-4 6-8	2'	2.0/1.0	0.0 ppm	Brownish Gray Gravelly Sandy CLAY, poorly sorted, (CL-SC)(wet).		
2	SS-2	2-4 6-7	2'	2.0/1.1	0.0 ppm	Brown Silty SAND, mostly medium to fine grained, with lens/laminae of Gray Silt, well sorted (SM) (wet).		
4	SS-3	2-4 4-6	2'	2.0/2.0	0.0 ppm	Brown Clayey SILT, with a trace amount of f. Sand, low plasticity to non-plastic, (ML)(wet).		
6	SS-4	2-2 4-6	2'	2.0/2.0	0.0 ppm	Gray Silty CLAY, highly plastic, also almost fluid like/liquified (wet) - laminated with thin bands of silt. (CH)(wet).		∠ - 8 inch casing installed @ a depth of 8 ft.
8	SS-5	7-7 7-9	2'	2.0/2.0	0.0 ppm	SAME:		
10	SS-6	6-7 21-20	2'	2.0/1.9	∠1 ppm	SAME: 10.5ft Gray Silty Gravelly CLAY, tr. (-) silt, mf gravel subangular to subrounded, (CL)(moist).		
12	SS-7	9-12 18-23	2'	2.0/1.5	∠1 ppm	SAME:		
14	SS-8	8-13 21-25	2'	2.0/1.7	∠1 ppm	Dark Gray Silty GRAVEL AND CLAY, trace (-) silt, gravel is mostly subrounded to subangular, moderate plasticity. (GC-CL), (moist).		∠ - borehole OVA readings 100-300 ppm; Ambient air ∠ 0.1 ppm 1 ft. Above borehole
16	SS-9	15-23 38-39	2'	2.0/0.8	∠1 ppm	Dark Gray Silty Clayey Sandy GRAVEL, trace (-) silt, trace (-) cmf Sand, trace (+) Clay, Gravel is subangular to subrounded, (GC-GM)(moist).		
18	SS-10	23-37 53-59	2'	2.0/1.2	∠1 ppm	Brownish Gray Silty Clayey Gravelly SAND, trace (-) Clay/Silt, lithic mf gravel, poorly sorted, (SW-SP)(wet).		
20	SS-11	100/4"	2'	2.0/0.3	∠1 ppm	Weathered Bedrock (Black Dolomite) with clay, trace (-) silt (wet).		
22	SS-12	100/1"	2'	2.0/0.1	∠1 ppm	SAME		
24		3 1/2 3 1/2				Light Gray massive DOLOMITE, large 1/2 inch "horizontal fracture" @ 24.8ft, 100-150 bedding planes, extensive micro-fractures with calcite infilling, occasional pods of calcite, broken.		∠ - NX casing is seated in @ a depth 27 ft. Rock coring commences from 24 to 34 ft.
26		4 1/2 6 1/2						

SOIL BORING LOG

ICF TECHNOLOGY

Well No DMW-2

Sheet 2 of 2

Depth (feet)	Samp No.	Blows per 6" ____ lbs.	Sample Interval	Adv./ Recov.	Org Vap. - PPM	Sample Description	Lith Log	Remarks
		Run time per foot						
28		7				27.8 - 30.0 ft - Possible fault zone, brecciated dark Gray DOLOMITE with calcium carbonate replacement, off-set calcite veins, extensively fractured, distinct bedding plains, SAME - some iron staining 1/2" fracture At 30.5 ft.		Rec - 96% RQD - 0
		7 1/2						
30		6 1/2						
		3 1/2						
32		6 1/2				SAME: calcite healing along bedding plains @ 33.0 ft.		
		5						
34						B.O.H. - 34.0 ft		

SOIL BORING LOG

ICF TECHNOLOGY

Well No DMW-3

Sheet 1 of 2

01530

Client U.S.E.P.A. Site Pinette's Salvage Job No 117-03 Surveyed Elevation: Ground ____

Date Started 11/3/87 Date Completed 11/14/87 Top of Casing ____ Screen Length 8 ft

Total Depth 31.0 ft Drilling Method Used Auger Drilling Contractor Layne-Northern Rig Type Gus Peck BRAT-22

Field Geologist T.T. Moore Organic Vapor Instruments Used OVA / HNU Static Water Level ____

Depth (feet)	Samp No.	Blows per 6" 140 lbs.	Sample Interval	Adv./ Recov.	Org Vap. - PPM	Sample Description	Lith Log	Remarks
0	SS-1	4-4 7-9	2.0 ft	2.0/1.5	<1.0	TOPSOIL- Brown Sandy SILT, tr. Organic Material (MOIST).		
						Light Brown Clayey SILT, trace f. gravel, poorly sorted, (CL-ML) (moist). 0.4 ft		
2	SS-2	5-8 8-10	2.0 ft	2.0/0.9	<1.0	Light Brown Clayey SILT and GRAVEL, rounded to sub rounded, poor sorted, trace organic material, (GM-ML)(Moist)		
4	SS-3	6-7 9-11	2.0 ft	2.0/	<1.0	Light to Dark Brown Sandy SILT, with clay laminae (ML)(wet).		< - Static water level observed at 4.2 ft.
6	SS-4	5-5 5-7	2.0 ft	2.0/2.0	<1.0	SAME: Highly plastic, mottled. 6.7		
8	SS-5	4-4 4-4	2.0 ft	2.0/1.1	<1.0	Brown Silty CLAY, trace f. Sand, well sorted, (CL) (wet).		
						Greyish Brown, Silty CLAY, highly plastic, well-sorted, mottled, (CL) (moist) SAME 10.5 ft		
10	SS-6	4-5 7-9	2.0 ft	2.0/2.0	<1.0	Gray Clayey SILT, well sorted, low plasticity (MH/OH) (wet).		< - 8 inch casing installed to a depth of 10.0 feet.
12	SS-7	3-7 8-13	2.0 ft	2.0/2.0	<1.0	SAME: 12.9		
						Dark Gray Silty Sandy Gravelly CLAY, tr. (-) cmf Sand, trace (-) f. gravel, little (-) silt, poorly sorted, low plasticity (CL) (moist). 14.3 ft		
14	SS-8	8-11 19-25	2.0 ft	2.0/2.2	<1.0			
16	SS-9	6-11 14-16	2.0 ft	2.0/1.7	<1.0	Dark Gray Sandy Silty Gravelly CLAY, trace (+) silt, trace cmf Sand, trace f. gravel (CL) (moist to wet). 16.7		< - gravel/rock fragments are Angular to sub-angular.
18	SS-10	8-16 33-93	2.0 ft	2.0/1.9	<1.0	Dark Gray Silty Gravelly CLAY, trace silt, trace mf gravel, mostly angular to sub rounded with some large rock fragments, low plasticity, (CL)(moist)		
20	SS-11	22-93 50-18	2.0 ft	2.0/1.3	8.0	Brown Sandy GRAVEL, trace (-) Silt and Clay, increasing percentage (%) of course rock fragments with depth. mostly angular to sub-angular rock fragments, (GP) (wet) 19.1		< - peak ambient air readings down wind of borehole & 10 ppm.
22	SS-12	21-100/5"	2.0 ft	2.0/0.4	1.0	Brown Gravelly CLAY and weathered bedrock (dolomite), alternating lens of weathered rock and clay (CL) (wet).		
24		2						
		2						
26		2				Dark Grey, massive, DOLOMITE, SOME micro fractures with calcite infilling (low angle), tr. pyrite, nearly horizontal bedding (0° to 10°).		
		3				SAME - 27.5 - 27.9 ft - 1/2 inch fractures, high angle with calcite infilling, fractured		

ICF TECHNOLOGY

SOIL BORING LOG

Well No DMW-3

Sheet 2 of 2

Depth (feet)	Samp No.	Blows per 6" ____ lbs.	Sample Interval	Adv./ Recov.	Org Vap. - PPM	Sample Description	Lith Log	Remarks
28						Accross bedding plane, unusual bedding pod @ 28.0ft: Dark Gray massive DOLOMITE, with alternating light Gray bands of high $CaCO_3$ content (Mg replacement), small offset microfractures.		← higher Angle bedding plains (25°)
30						29.5 - 31.0 ft. - Dk. Gray massive DOLOMITE, low ANGLE bedding plains (29 - 30.5 ft), large nearly vertical fractures healed with calcite infilling? becomes soft at 30.5 to 30.8 ft (shaley) with a schistose texture, platey angular fragments		RQD - 46% Rec - 96.0% - Total length of coring run was five foot.
32						B.O.H - 31.0 ft		

ICF

Well No DMW-7

Sheet 1 of 2

Client U.S.E.P.A. Site Pinette's Salvage Job No 01630-117-03 Surveyed Elevation Ground ____

Date Started 11/4/87 Date Completed 11/9/87 Top of Casing ____ Screen Length 8.0 ft

Total Depth 34.0 ft Drilling Method Used Auger Drilling Contractor Layne-Northern Rig Type Gus Peck DEDR-22

Field Geologist J.T. Mooke / S. Cox Organic Vapor Instruments Used OVA / HNU Static Water Level ____

Depth (feet)	Sample No.	Blows per 6" 140 lbs.	Sample Interval	Adv. / Recov.	Org Vap. - PPM	Sample Description	Lith Log	Remarks
0								
	SS-1	4-4 / 18-18	2.0ft	2.0 / 1.3	<1.0	Reddish Brown Gravelly Clayey SAND, trace (-) clay, gravel is medium to fine, subrounded to angular, poorly sorted, (dry to moist), (SP-SW).		N.A.
2	SS-2	10-19 / 25-25	2.0ft	2.0 / 0.4	<1.0	SAME:		
4	SS-3	6-18 / 15-20	2.0ft	2.0 / 0.5	<1.0	Brown Gravelly Silty CLAY, trace (-) silt, mf gravel subangular to subrounded, poorly sorted, (ML-CL) (wet).		< - clay content increases with depth.
6	SS-4	14-18 / 19-17	2.0ft	2.0 / 1.8	<1.0	Brown Silty CLAY, mottled, well sorted, moderate to high plasticity, (CL) (moist). 8.3		
8	SS-5	2-2 / 1-1	2.0ft	2.0 / 1.2	<1.0	Gray Silty CLAY, trace (-) silt, mottled, highly plastic, well sorted, (CL) (moist).		
10	SS-6	2-2 / 1-1	2.0ft	2.0 / 2.0	<1.0	SAME: 11.4		< - 8 inch casing installed @ 10.4ft depth
12	SS-7	8-18 / 28-40	2.0ft	2.0 / 1.2	<1.0	Gray Gravelly Silty CLAY, trace (+) f gravel, subangular to subrounded, mostly elongated, trace (-) silt (CL) (moist). 12.0		
14	SS-8	8-28 / 13-10	2.0ft	2.0 / 0.9	<1.0	Gray Silty CLAY, little (-) silt, moderate plasticity (CL) (moist) 13.0		
16	SS-9	14-27 / 38-100/2"	2.0ft	2.0 / 0.6	<1.0	DK. Gray Gravelly Silty CLAY, tr. (-) silt, trace mf gravel, moderate to low plasticity, (CL) (moist).		
18	SS-10	100/2"	2.0ft	2.0 / 0.15	2.0	SAME: 17.5		
20	SS-11	100/5"	2.0ft	2.0 / 0.4	60±	Brown Gravelly SILT and CLAY, poorly sorted, low to non-plastic, gravel is angular to subrounded (ML-CL) (moist to wet)		< - Ambient Air OVA readings are 2 to 3 ppm.
22	SS-12	100/1"	2.0ft	2.0 / 0.0	N.A.	Brown Gravelly Sandy Silty CLAY, tr. (-) mf Sand, trace (-) Silt, mf gravel subangular to subrounded, (CL), (moist to wet).		
24						Brown Gravelly Clayey SAND, tr. (+) clay, some (+) mf gravel, poorly sorted (SM-SP) (moist)		
26						No recovery		< - NX casing is seated into bedrock.
						Dark Gray massive DOLOMITE, extensive large fractures, newly verticed with brown gray clay infilling, extremely high angle bedding plane fracture.		
						(26-34 see next page)		

SOIL BORING LOG

ICF TECHNOLOGY

Well No DMW-4

Sheet 2 of 2

Depth (feet)	Samp No.	Blows per 6" ____ lbs.	Sample Interval	Adv./ Recov.	Org Vap. - PPM	Sample Description	Lith Log	Remarks
		Run time per foot						
28		2				Dark Gray to light Gray massive DOLOMITE, extensively fractured 1/4" to 1/2", vertical fractures @ 29.5 ft, with calcite infilling		↙ - weathered zone from 29.5 to 30 ft depth.
		2 1/2						
30		2				SAME - 30 - 32.5 extensive micro fractures in radial and splay patterns, possible slickenslides or contortion of bedding plains (high angle) @ 32 ft		RQD - 31%
		2 1/2						Rec - 100%
32		3						
		2 1/2				SAME		
34						B.O.H. @ 34.0 ft		

ICF KLEINFELDER

Well No DPIW -

Sheet 1 of 2

01530-

Client U.S.E.P.A. Site Parkette's Salvage Yard Job No 17-03 Surveyed Elevation: Ground ____

Date Started 11/4/87 Date Completed 11/13/87 Top of Casing ____ Screen Length 8.0 ft

Total Depth 34.5 ft Drilling Method Used Auger Drilling Contractor Layne-Northern Rig Type Gus Peck Bunt-22

Field Geologist J.T. Moore / S Cox Organic Vapor Instruments Used OVA / HNU Static Water Level ____

Depth (feet)	Samp No.	Blows per 6" 140 lbs.	Sample Interval	Rec. / Recov.	Org Vap. - PPM	Sample Description	Lith Log	Remarks
0								
	SS-1	6-12 18-18	2.0 ft	2.0/0.9	<1.0	TOPSOIL- organic material, (moist) 0.2ft Dk. Brown Silty Clayey Gravelly SAND, trace clay, little (+) silt, trace (+) mf gravel rounded to subrounded, poorly sorted, (SW-SP) (dry to moist). SAME: 4.0		
2	SS-2	9-8 7-9	2.0 ft	2.0/0.2	<1.0			
4	SS-3	8-9 9-12	2.0 ft	2.0/1.4	<1.0	Blackish Gray Gravelly Silty SAND, mf gravel mostly subangular to angular, trace (-) silts, poorly sorted (fill) (SW-SP) (wet) 4.9 ft Brown Clayey SILT, low plasticity, well sorted, (ML) (moist to wet). 6.0 ft		< - OVA readings @ borehole peaked @ 30 ppm, <1 ppm Amb. ant air reading in workspace.
6	SS-4	4-4 6-12	2.0 ft	2.0/1.2	<1.0			
8	SS-5	5-6 10-12	2.0 ft	2.0/2.0	<1.0	Gray Silty CLAY, trace (-) silt, highly plastic, (CL) (moist). 9.5 ft		< - 8 inch steel casing installed at 10.0 ft depth
10	SS-6	5-12 18-20	2.0 ft	2.0/1.1	<1.0	Dk. Gray Gravelly Silty CLAY, trace (-) silt, trace (+) mf gravel subangular to subrounded, (CL) (moist). SAME - contains bedrock fragments.		
12	SS-7	9-16 14-13	2.0 ft	2.0/0.7	<1.0	SAME: Dark Gray color between 13.5 and 14 ft.		
14	SS-8	2-4 4-19	2.0 ft	2.0/0.5	<1.0	Dark Gray CLAY & SILT, tr. (-) rock fragments, some plasticity, (CL-ML) (moist to wet).		
16	SS-9	26-25 34-39	2.0 ft	2.0/2.0	<1.0	Gray Gravelly Silty CLAY, trace (+) silt, little (-) mf gravel, mostly subangular to subrounded particles, low plasticity to NON-plastic, (CL) (moist to wet). 18.1 ft		< - NX casing was seated @ 18.5 ft.
18	SS-10	100/5"	2.0 ft	2.0/0.3	<1.0	Brownish-Gray Gravelly Sandy CLAY, trace (-) cmf Sand, some (+) mf gravel, rounded to subangular (dry to moist) (CL)		< - top of weathered bedrock (Auger refusal).
20					19.3	Dk. Gray DOLOMITE, extensively fractured, abundant microfractures, calcite infilling 20.9		< - boulder
22		Run #1				Lt. Gray f. grained MUDSTONE, with sandy laminations, cross bedded, streaked w/ calcite. 21.1		
24						Gray Silty Gravelly CLAY, (TILL), trace silt, little mf gravel, angular to subrounded fragments, very dense, low plasticity, (CL) (dry). SAME: with increasing percentage of rock fragments (DOLOMITE) with depth. 26.2		
26						Dk. Gray Interbedded fractured DOLOMITE, with large calcite veins w/ frequent sandy shale seams, horizontal bedding planes.		

SOIL BORING LOG

ICF TECHNOLOGY

Well No DMW-5

Sheet 2 of 2

Depth (feet)	Samp No.	Blows per 6" ____ lbs.	Sample Interval	Adv./ Recov.	Org Vap. - PPM	Sample Description	Lith Log	Remarks
28		RUN #1 ↓				SAME		Recovery-
		↑						Run #1 - 46%
30						SAME: 30.7 to 34.5 ft: Alternating Light to Dark Gray DOLOMITE; 20° bedding planes, extensive microfractures, with calcite infilling, some radial, mostly high angle to vertical, cleavage along bedding planes, bedding plains clean.		Run #2 - 96%
		RUN #2						RQD -
32								Run #1 - 0%
								Run #2 - 12%
34		↓						
						B.O.H. - 34.5 ft		

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard JOB NO. 148-1434
LOCATION Washburn, Maine BORING NO. BMW5
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 7-14-88 DATE COMPLETED 7-20-88
FIELD SUPERVISOR Robert J. Melvin PAGE 1 of 2

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
26		min				For 0 to 28.5 feet refer to log BMW5	c - CME 55 d - drillers Norman Phillips and John Carrizo
28							
30	Run #1	0.8 0.8 1.0 1.0	4.2	7.9	Missing	Dark gray dolomitic limestone, bedding and fracturing at 45° faint trace vertical fractures, slight amount of recalcification along fractures, residual gray clay along fractures micritic in appearance. When (dry) core is banded with alternating layers of light gray and medium gray.	
32							
34							
36	Run #2	0.5 4.0 6.3 8.4 12.0	4.3	9.6	fragmented	Dark gray dolomitic limestone, highly fractured and fragmented along 45° bedding and vertical fractures, ~~large zone~~ ~~area of~~ white calcite between 35.0 to 35.7 feet	
38							
40	Run #3	1.3 1.3 2.5 1.45 3.8	5.0	56.7		Same as core run #1, with thin white calcite veins at 40.5 to 43.0 feet, increase fracturing at 43.0 feet, displacement of ¼ inch at 44 feet	
42							
44							
46	Run #4	2.0 2.1 1.75 1.9 1.75	5.0	58.3		Same as core run #1, with thin white calcite veins at 45.0 to 49	
48							
50	Run #5	1.66 1.9 1.75 2.0 1.4	5.0	61.7		Same as core run #1, with thin white calcite veins throughout core, healed fractured -fragmented area between 49.4 to 49.9 feet one inch recalcification at 51.6 and 51.9 feet	
52							

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PROJECT Pinellas Salvage Yard Site PAGE 2 of 2

BORING NO. BMW5 JOB NO. 148-1C34

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
		min					
54							
56	Run #6	1.6 1.8 2.8 1.7 1.6	5.0	80.8		Same as core run #1, one inch thick calcite at 54.0, 54.9 and 58.7 feet, 5 to 10% of rock exhibit perpendicular fractures to bedding, slight amount of fracturing at 58.2 feet - healed, at 58.8 beds slightly rippled	
58							
60	Run #7	2.0 2.0 2.25 2.0 2.0	5.0	92.0		same as core run #1, with fracture area between 61.9 to 63.8 feet, fracture area healed with recalcification, at 59.6 and 60.1 beds slightly rippled	
62							
64							
66	Run #8	2.0 2.25 1.75 2.0 2.0	5.0	68.0		Same as core run #1, 1/8 inch calcite filling perpendicular to core from 64.1 to 65.2 feet, calcite filling displaced by 1/8 to 1/4 inch along bedding planes, slight trace of fracturing at 65.5 feet, healed	
68							
70	Run #9	1.7 2.0 1.9 2.3 2.0	5.0	74.2		Same as core run #1, slight amount of fracturing at 70.0 and 70.2 feet, both healed	
72							
74						B.O.B. 74 feet	
76							
78							

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PROJECT Pinette's Salvage Yard JOB NO. 148-1134
LOCATION WASHBURN, ME BORING NO. DMW-6
DRILLING COMPANY Layne-Northern
DRILLING METHOD Hollow Stem Augers ELEVATION
DATE STARTED 6/18/88 DATE COMPLETED 6/20/88
FIELD SUPERVISOR James T. Moore PAGE 1 of 2

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
2	SS-DMW6-1	1 1 1 1	0.5 FT	NA	NA	Brown Organic material and SILT, very loose, soft, saturated marsh deposits, wet	← Driller - S. Underwood Rig #1 Mobile B-57 using a 2 inch s/spoon, 140lb hammer with 30 inch drop ← 13:23 OVA reading - 0.0ppm
4	SS-DMW6-2	3 3 5 6	1.8 FT	NA	NA	Grey SILTY CLAY, well sorted, moderate to high plasticity, trace organics, wet 2.3 FT Light Brown Silty CLAY, little (-) silt, well sorted, high plasticity, moist to wet	← 13:41 OVA - soil sample 0.0ppm
	SS-DMW6-3	95 9 10	1.9 FT	NA	NA	SAME TO 4.9 FT Grey Gravelly SILT, little (-) mF gravel, subrounded to subangular, trace (-) clay, poorly sorted, low plasticity to non-plastic, moist 4.9 FT	← 14:03 OVA - soil - 0.0ppm
6	SS-DMW6-4	5 12 14 15	1.7 FT	NA	NA	Grey Gravelly SILT, little mF Gravel, subrounded to subangular, trace (-) clay, poorly sorted, firm, Non-plastic, moist	← 14:09 OVA - 0.0ppm
8							
10	SS-DMW6-7	5 7 7 11	1.0 FT	NA	NA	Grey Gravelly Clayey SILT, little mF gravel, Angular to subrounded, trace (+) clay, low plasticity to Non-plastic, poorly sorted, moist SAME	← 6/27/88 1033 - OVA - 0.0ppm ← 10:54 OVA - 1.2ppm
12	SS-DMW6-8	17 18 28 28	0.7 FT	NA	NA	Brown Gravelly Clayey SILT, little (+) mF subangular to subrained gravel, trace (-) clay, low plasticity to Non-plastic, moist, plus bed rock fragments	
14	SS-DMW6-9	11 100/2"	0.3 FT	NA	NA	SAME: WEATHERED BEDROCK 13.7 FT	← 11:22 OVA - Air - 0.0 ppm soil - 1.0 ppm boring 3.6 ppm ← top of rock @ 13.7 ft.

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PROJECT Pinettes Salvage Yard PAGE 2 of 2

BORING NO. DMW-6 JOB NO. 148-1L34

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=4FT)	REMARKS (ORG. VAP.)
						15.5	← Augers seated to a depth of 15.5 ft
16	Run #1	1 MIN/FT	4.0 FT	0%		Blackish-Grey DOLOSTONE, weathered, highly fractured @ angles of 45° to 60°, with calcite and pyrite recrystallization, with bedding planes visible, and voids that are filled in with silt,	← HX rock coring will be done in five foot runs.
		3 MIN/FT					
18		3½ MIN/FT					
		3½ MIN/FT					
20						Blackish-Grey Crystalline DOLOSTONE with lens of shale and fractured @ Angles of 65° to 70°. Calcite recrystallization has healed some fractures.	← Core barrel jammed @ 19.5 FT
22	Run #2		0.0 FT	0%			2nd Run was attempted but corebarrel jammed @ 24.0FT Recovery - 0% ← drilling was stopped and well was installed
24						Bottom of Boring 24.0 F	

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1234
LOCATION Washburn, Maine BORING NO. DMW-7
DRILLING COMPANY Layne Northern, N. Phillips CME-55
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6/23/88 DATE COMPLETED 7/7/88
FIELD SUPERVISOR Robert J. Melvin (0 to 10 ft) PAGE 1 of 3
James T. Moore and Mike Riordinock (10 to ft)

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY FT	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
2	SS-DMW7-1	7 6 6 6	1.25	N.A.	N.A.	Light Tan silty gravelly fine sand, trace clay, organics, dry 0.6ft Brown gravelly, medium to fine sandy silts, dry Brown silty clay and fine to medium sand dry	140# hammer / 30" fall
4	SS-DMW7-2	3 6 8 7	1.0	N.A	N.A.	same Gray silts	< - poor recovery and disturbed by sampling
6	SS-DMW7-3	NA (Shelby Tube)	2.0	N.A.	N.A.	Gray Brown silty clay, slightly moist	< - between 4.25 To 5.75 not viewed - Shelby Tube
8	SS-DMW7-4	3 3 3 6	2.0	N.A.	N.A	Brown silty clay, laminae, wet, firm Gray clay, trace silt, laminae, firm, slightly wet to damp (decreasing moisture with depth)	
10	SS-DMW7-5	2 5 5 6	1.0	N.A.	N.A.		
12	SS-DMW7-6	2 2 3 4	2.0	N.A	N.A	Gray clayey silt (trace of clay), well sorted, low plasticity, trace (-) small gravel, moist to wet	< - Casing set @ 10 feet (June 26, 1988) < - July 6, 1988 Geologist - J. Moore Driller - N. Phillips, J. Carrozzi CME-55
14	SS-DMW7-7	13 5 9 10	1.3	N.A	N.A	Gray gravelly silt, low plasticity, poorly sorted, gravels (rock fragments) angular to subangular, moist to wet	< HNu = 0.2ppm soil, air, and borehole ▼

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PROJECT Pinettes Salvage Yard Site PAGE 2 of 3

BORING NO. DMW-7 JOB NO. 148-1434

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
14							< HNu = 0.2 ppm air/sample/borehole from 14 to 24 feet
	SS-DMW7-8	4 4 9 10	0.5	N.A.	N.A.	Same as SS-DMW7-9	
16							
	SS-DMW7-9	9 17 38 46	1.8	N.A.	N.A.	Gray gravelly silt, little medium to fine gravel (angular to subangular), low plasticity, dry to moist, with moisture increasing with depth	
18							
	SS-DMW7-10	6 42 100/3"	0.8	N.A	N.A	Same as SS-DMW7-9	
20							
	SS-DMW7-11	100/3"		N.A	N.A	Same as SS-DMW7-9	
22							
	SS-DMW7-12	100/2"		N.A.	N.A.	Dark gray bedrock and silt, hard, compact and dry	
24							
	Run #1	2 min 2 min 2 min 2 min 3.5 min	5.0	82	N.A.	Medium to Dark Gray dolomitic limestone (dolostone), weathered, calcite replacement along fractures, faint healed fracture at 45°, core breaks along vertical fractures, dry	
26							
28							

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PROJECT Pinettes Salvage Yard Site PAGE 3 of 3

BORING NO. DMW-7 JOB NO. 148-1234

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
30	Run #2	3min	5.0	40	N.A.	Same as Run #1 with more 45° fractures and small, faint, horizontal lineaments, and at 33.5 feet guage (clay and rock fragment) material, dry	
		3min					
32		2min					
		2min					
34		2min					
						Cored to 34.5 feet	

01530-117-03

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage Yard JOB NO. 148-1134
LOCATION Washburn, Maine BORING NO. DMW-8
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6-17-88 DATE COMPLETED 6-24-88
FIELD SUPERVISOR James T. Moore PAGE 1 of 2

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY FT	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
1.0	SS-DMW8-1	5 6 9 6	0.9	N.A	N.A	Topsoil: Brown organic sandy silt, with trace organic material and dry — 0.4ft Blackish brown silty gravelly SAND, trace f. gravel, angular to subrounded, trace silt dry	L-SFS-DMW8-1 is marked in sample log sheet as SFS-A10-1 (collected on 6/16/88) L-OVA: background - 1.0 ppm/borehole -1.0 ppm/sample - 0.0 ppm (above background) L-14:39
2.0						Same: to 3.4ft	
	SS-DMW8-2	6 9 4 10	1.3	N.A	N.A	Brown Clayey SILT, Moderate plasticity, Soft moist	L-OVA -0.0 ppm L-Drillers S. Underwood T. Nuaamson L-Rig #1 - Mobile B-57 140 lb hammer, with 30 inch drop
4.0	SS-DMW8-3	1 3 5 5	2.0	N.A	N.A	Greyish Brown Clayey SILT, bedding planes visible, moderate plasticity, moist	L-14:51 - L-OVA-Air-0.0ppm borehole -0.0ppm sample -0.0ppm L-LEL - placed under rig, values will be recorded if alarm sounds.
6	SS-DMW8-4	3 5 7 8	1.2	N.A.	N.A	Grey Clayey SILT with trace amount of f. gravel (angular to sub rounded) moist	L-15:10 L-OVA - 0.0ppm (sample) No other readings
8	SS-DMW8-5	15 17 18 38	1.5	N.A	N.A	Same: with trace amount of sand, moist to dry	L-Casing set @ 10Ft. (8 inch steel) L-OVA-Soil-0.0ppm Ambient air -1.0ppm Date 6/20/88 Time 1135
10	SS-DMW8-6	10 11 16 50	1.5	N.A	N.A	Gray Gravelly clayey silt, moderate to low plasticity, poorly sorted, wet to moist	L-1150 L-OVA sample background 0.0 ppm 1.0 ppm, boring-0.0 ppm L-Date - 6/20/88
12	SS-DMW8-7	47 70 37 40	0.8	N.A	N.A	Dark gray clayey Gravelly SILT (Gravels well rounded to subrounded) very hard, moist	L-13.5 ft reached refusal L-6/21/88
14							

ICF TECHNOLOGY INCORPORATED

PROJECT Pinette's Salvage Yard Site PAGE 2 of 2

BORING NO. DMW-8 JOB NO. 148-1L34
01530-117-03

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	RECOVERY % / feet	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2FT)	REMARKS (ORG. VAP.)
16	SS-DMW8-8	23 51 57 69	0.7	N.A	N.A.	Same: 12 to 14 feet with minor amount of c m f sand	< - 6/21/88 -
18	SS-DMW8-9	20 55 64 67	1.0	N.A	N.A		
20	SS-DMW8-10	100/4"	0.3	N.A	N.A	Gray Gravelly SILT, gravels angular to subangular of decomposed rock fragments, poorly sorted, wet	< - 6/23/88 - 1003 < - OVM - 0.0 ppm borehole - 0.6 to 1 ppm background - 1.0 ppm
22	Run #1		2.0	0.0	NA	Light to medium gray limestone/dolomite, white calcite along bedding planes, fractures and vugs, weathered and dry. (At 23.5 ft unweathered) Fractures at 45°.	< - 6/24/88 - 1416 HNu = 0.2 ppm air, sample HX core Driller - Norman Phillips John Carrozzi Geologist - Robert J. Malvin
24						Light to medium gray limestone/dolomite, micritic to spartic, trace microbedding, one small micro slump feature, some sediment displacement prior to lithification, fractures and fracture zones at 45°, most fractures healed (filled with calcite), white calcite veinlets, dry	< - 1525 HNu = 0.2 ppm air, sample HX core
26	Run #2		5.0	84.2	NA		
28							
30							

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site JOB NO. 148-1434
LOCATION Washburn Maine BORING NO. DMW-9
DRILLING COMPANY Layne Northern
DRILLING METHOD Hollow Stem Auger ELEVATION
DATE STARTED 6/29/88 DATE COMPLETED 7/10/88
FIELD SUPERVISOR Denise Page (0 to 10 feet) PAGE 1 of 3
Robert J. Melvin (10 to 36.7 feet)

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"=2 FT)	REMARKS (ORG. VAP.)
						Dark brown medium fine sand and organic silts, dry	1 - June 29, 1988 - Phillips & Carrozzi drillers - Jim Moore, Denise Page and Max Bateman ICF Regs. - CME 55
	SFS-DMW9-1 SS-DMW9-1	NA		NA	NA	Yellow brown c mf sand, some fm gravel-angular to subangular, trace silt, dry	
2						Yellow brown ≤ mf sand, some mf gravel-angular to subangular, trace clay (between 3.2 to 3.9 clay content increases)	< OVA (0 to 2 feet) 0.2 to 0.6 ppm for background sample/boring
	SS-DMW9-2	NA		NA	NA		< OVA = 0.2 to 0.6 ppm for background/sample/boring
4						Grayish ≤ mf sand some angular gravel, trace to little clay, trace silt dry (moist at 5 feet)	
	SS-DMW9-3	NA		NA	NA		< OVA = 0.2 to 0.6 background/sample/boring
6						Gray clayey silt with mf gravel, subangular to subround, trace amount of clay, nonplastic, poorly sorted and moist to wet	
	SS-DMW9-4	NA		NA	NA		< OVA = 0.2 to 0.6 background/sample/boring
8							
		NA		NA	NA		
10							
	SS-DMW9-5	6 15 24 13	1.13	N.A	N.A.	Gray gravelly silt (trace clay), gravels fine to medium in size, angular to subangular, poorly sorted, firm, moist	2 - July 10, 1988 - Drillers: Norman Phillips and John Carrozzi - Geologist: Robert J Melvin < OVA sample = 2.0 ppm background = 0.8 ppm
12							
	SS-DMW9-6	17 5 13 24	0.96	N.A.	N.A.	Medium to Dark Gray gravelly clayey silt to gravelly silty clay, gravels <20% upper Y3, angular to subangular, occasional lens of light tan clayey silt, firm, moist	< OVA sample/background 0.3 ppm
14							

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PROJECT Pinettes Salvage Yard Site PAGE 2 of 3

BORING NO. DMW9 JOB NO. 148-1634

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	ROD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"= 2FT)	REMARKS (ORG. VAP.)
	See page 1						
14	SS-DMW9-7	14 16 21 20	1.08	N.A	N.A	Gray slightly brown gravelly clayey silt, some cmf sand ~20%, faint laminae, 30% gravel, poorly sorted, dry to slightly moist, hard/dense.	< OVA 1.2ppm air/sample
16	SS-DMW9-8	11 24 27 29	1.08	N.A.	N.A.	Brown with gray tint sandy clayey silt, gravels <10% (subround to sub angular), sands coarse, fine and medium in size, firm, dry to slightly moist.	< OVA 0.9ppm air/sample
18	SS-DMW9-9	23 35 27 43	1.13	N.A.	N.A.	Dark gray gravelly clayey silt, poorly sorted rock fragments, hard/dense, dry	< OVA 0.9ppm air/sample
20	SS-DMW9-10	12 5 12 32	0.67	N.A	N.A	75% Rock fragments (Dolomitic limestone) avg. 1/8 to 1/4 inch in length. Matrix gray silt and brown medium to fine sandy, clayey silt, poorly sorted, slightly firm, moist	< OVA 0.9 ppm air/sample
22	SS-DMW9-11	19 25 30 28	1.17	N.A	N.A	Gray silty gravelly sand, sand coarse, medium and fine, gravels 30 to 40% of material (rock fragments) - weathered, poorly sorted, slightly firm, slightly moist	< OVA 0.9 ppm air/sample
24						Boulder	
26	SS-DMW9 12	22 21	0.35	N.A	N.A.	Dark gray dolomitic limestone fragments intermixed with fine to medium sand (possible fracture).	< OVA 0.9 ppm air/sample
28	Run #1	2min 3min 3min	4.3	9.6	N.A	Dolomitic limestone, highly fractured older fractures 45°, displacement up to one inch, healed, newer fractures vertical, thin faint occassional bedding, calcite replacement, dry	< OVA 0.9ppm air/sample

ICF TECHNOLOGY INCORPORATED

PROJECT Pinettes Salvage Yard Site PAGE 3 of 3

BORING NO. DMW 9 JOB NO. 148-1434

DEPTH	SAMPLE NUMBER	BLOW/6" or CORE RECOVERY	% RECOVERY	RQD %	PROFILE	LITHOLOGY DESCRIPTION (SCALE 1"= 2 FT)	REMARKS (ORG. VAP.)
28							
		see page 2				see description on page 2	
30		5 min					
		1.5 min					
32	Run #2	0.25 min	1.25	9.7	N.A	Gray dolomitic limestone, old healed 45° fracture, calcite replacement, occassional thin faint bedding, small slump feature, dry	OVA 0.9
		1.5 min				Sample Not Recovered	
34		1.25 min					
		3 min				cored to 35.7 feet	
36							

APPENDIX E

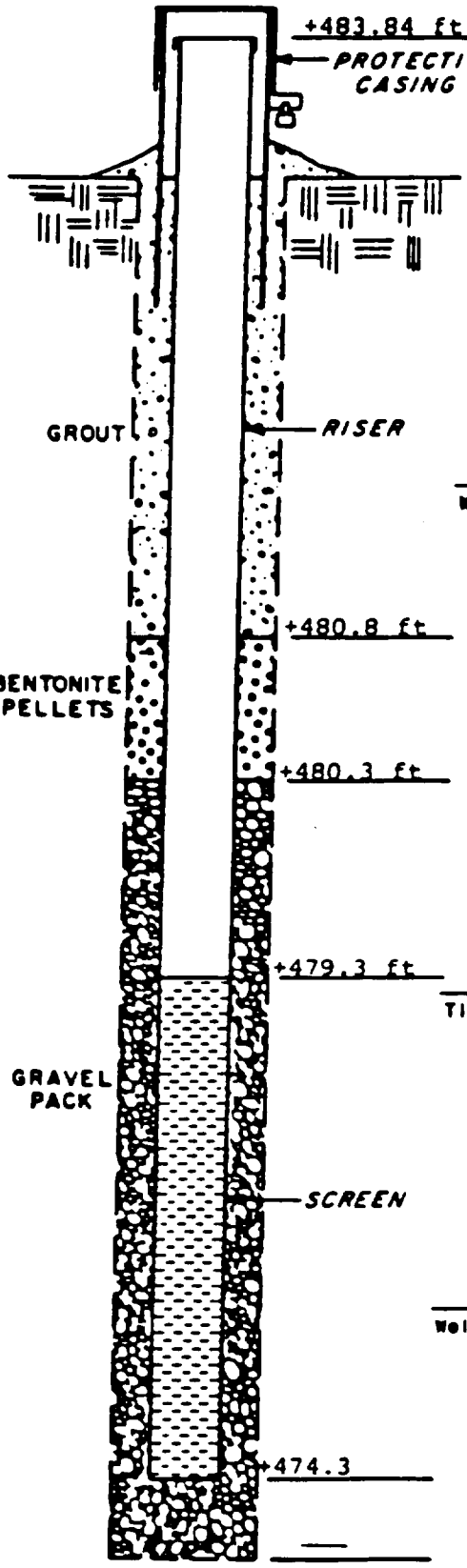
MONITORING WELL CONSTRUCTION LOGS

INCORPORATED
[illegible]
[illegible] Thornall Street
Edison NJ
[illegible]
201 [illegible]

MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Owner: U.S.E.P.A. Well No.: SMW-

Drilling Summary:



Total Depth: 7.0 ft Driller: E. Gaynor

Borehole Diameter(s): 8 inch = +481.3 ft to +474.3 ft

Rig Type: Gus Peck Brat - 22 Bits: 7 5/8" Auger Bit

Elevation: Land Surface: +481.3 ft Water Level: +479.34 ft

Top of Inner Casing: +483.35 ft Drilling Fluid Type: N/A

Supervisory Geologist: James T. Moore

Well Design:

Casing Material: SCH 80 S/S Diameter: 2 inch Length: 4.05 ft

Screen Material: SCH 80 S/S Diameter: 2 inch Length: 5 ft

Slot Size: 0.010" Setting: +474.3 ft to +479.3 ft

Filter Material: #1 Sand Setting: +474.3 ft to +480.3 ft

Seals Material: Bentonite Pellets Setting: +480.3 ft to +480.8 ft

Grout Type: Portland Cement/ Bentonite Setting: +480.8 ft to +481.3 ft

Surface Casing Material: 4" Mild Steel Setting: +483.35 ft to +483.84 ft

Time Log:

	Started	Completed
Drilling:	1030 hrs 11/2/87	1045 hrs 11/2/87
Installation:	1045 hrs 11/2/87	1130 hrs 11/2/87
Water Level Reading:	0723 hrs 11/23/87	0723 hrs 11/23/87
Development:	1103 hrs 11/16/87	1136 hrs 11/16/87

Well Development:

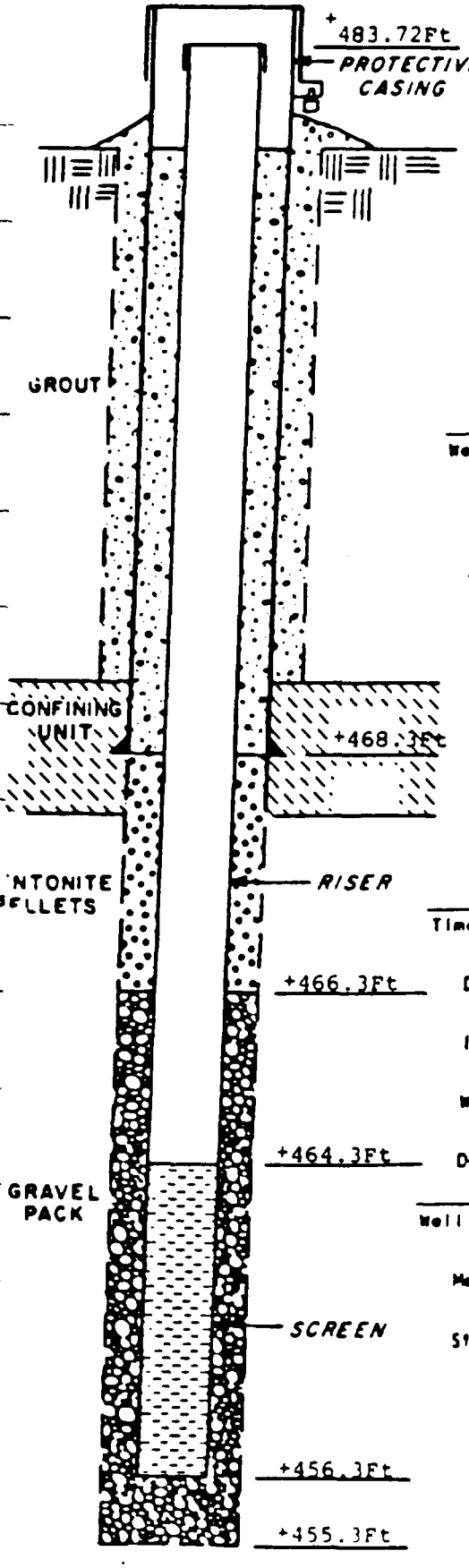
Method/Equipment: Bailing/1¼" Bailer

Static Depth to Water: +479.34 ft

REPORATED
Edison, NJ
201 906-2100

DOUBLE CASED MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: U.S.E.P.A. Well No.: DMW-



Drilling Summary:

Total Depth: 34.0Ft Driller: E. Gaynor

Borehole Diameter(s): 12 inch= +481.3 Ft to +473.3 Ft NX Hole= +455.3 Ft to +447.3 Ft 8 inch= +473.3 Ft to +455.3Ft

Rig Type: Gus Peck Brat-22 Bits: 7 5/8" Auger BIT

Elevation: Land Surface: +481.3Ft Water Level: +481.77Ft

Top of Inner Casing: +483.20Ft Drilling Fluid Type: N/A

Supervisory Geologist: James Moore

Well Design:

Casing Material: SCH 80 PVC Diameter: 2 inch Length 18.9Ft

Screen Material: SCH 80 PVC Diameter: 2 inch Length 8Ft

Slot Size: 0.010" Setting: +456.3Ft to +464.3Ft

Filter Material: #1 Sand Setting: +455.3Ft to +466.3Ft

Seals Material: Bentonite Pellets Setting: +447.3Ft to +455.3Ft / +466.3Ft to 468.3Ft

Grout Type: Portland Cement/ Bentonite Setting: +468.3Ft to +481.3Ft

Surface Casing Material: 8" Mild Steel Setting: +483.20Ft to +483.72Ft

Time Log:	Started	Completed
Drilling:	1519 Hrs. 10/28/87	1430 Hrs. 11/1/87
Installation:	1510 Hrs. 11/1/87	1015 Hrs. 11/2/87
Water Level Reading:	0720 Hrs. 11/23/87	0720 Hrs. 11/23/87
Development:	1245 Hrs. 11/15/87	1338 Hrs. 11/15/87

Well Development:

Method/Equipment: Air Lift Method / PVC Pipe (1 1/4") + Compressor

Static Depth to Water: +481.77

ICF TECHNOLOGY
INCORPORATED
Metro Park III
1000 Thomall Street
Edison NJ
08837-0001
201 906-2400

MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: U.S.E.P.A. Well No.: SMW

Drilling Summary:

Total Depth: 8.0 ft Driller: E. Gaynor

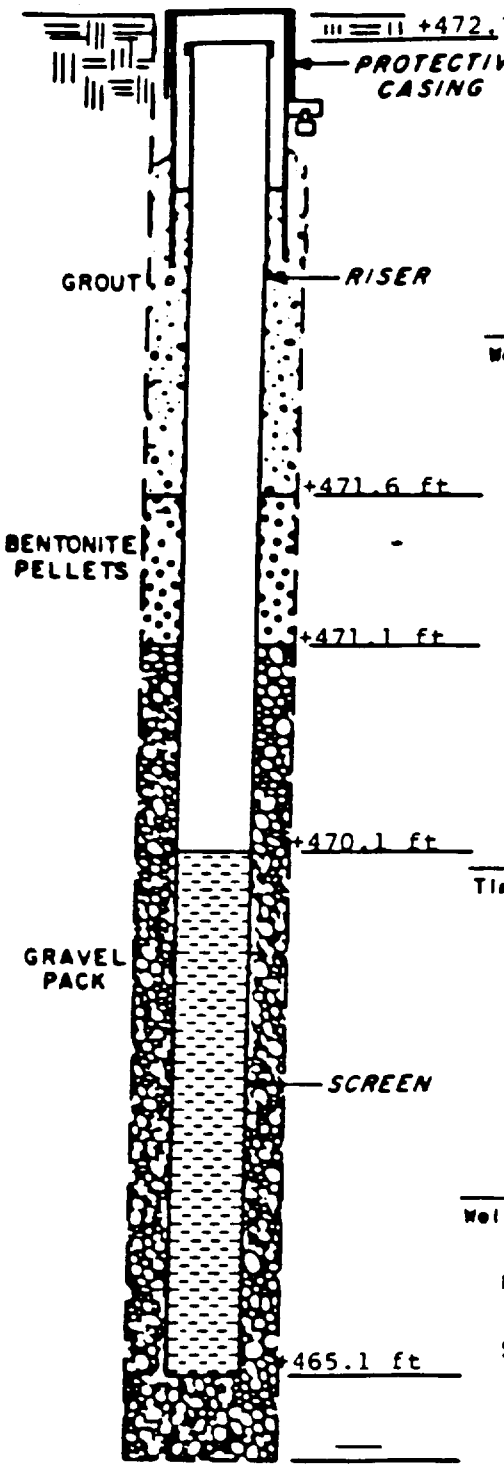
Borehole Diameter(s): 8 inch = +473.1 ft to +465.1 ft

Rig Type: Gus Peck Brat - 22 Bits: 7 5/8" Auger

Elevation: Land Surface: +473.1 ft Water Level: +471.02 ft

Top of Inner Casing: +472.43 ft Drilling Fluid Type: N/A

Supervisory Geologist: James T. Moore



Well Design:

Casing Material: SCH 80 S/S Diameter: 2 inch Length: 2.33

Screen Material: SCH80 S/S Diameter: 2 inch Length: 5 ft

Slot Size: 0.010" Setting: +465.1 ft to +470.1 ft

Filter Material: #1 Sand Setting: +465.1 ft to +471.1 ft

Seals Material: Bentonite Pellets Setting: +471.1 ft to +471.6 ft

Grout Type: Portland Cement/ Bentonite Setting: +471.6 ft to +472.1 ft

Surface Casing Material: 4" Mild Steel Setting: +472.43 ft to +472.78 f

Time Log:	Started	Completed
Drilling:	0928 hrs 11/13/87	1249 hrs 11/13/87
Installation:	1249 hrs 11/13/87	1650 hrs 11/13/87
Water Level Reading:	0731 hrs 11/23/87	0731 hrs 11/23/87
Development:	1311 hrs 11/16/87	1339 hrs 11/16/87

Well Development:

Method/Equipment: Bailing/1¼" Bailer

Static Depth to Water: +471.02 ft

REPORTED
399 Thornall Street
Edison NJ
0883740001
201 906-2400

DOUBLE CASED MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: U.S.E.P.A. Well No.: DMW-2

Drilling Summary: Flush Mounted Well-DMW-2

Total Depth: 34.0Ft Driller : E. Gaynor

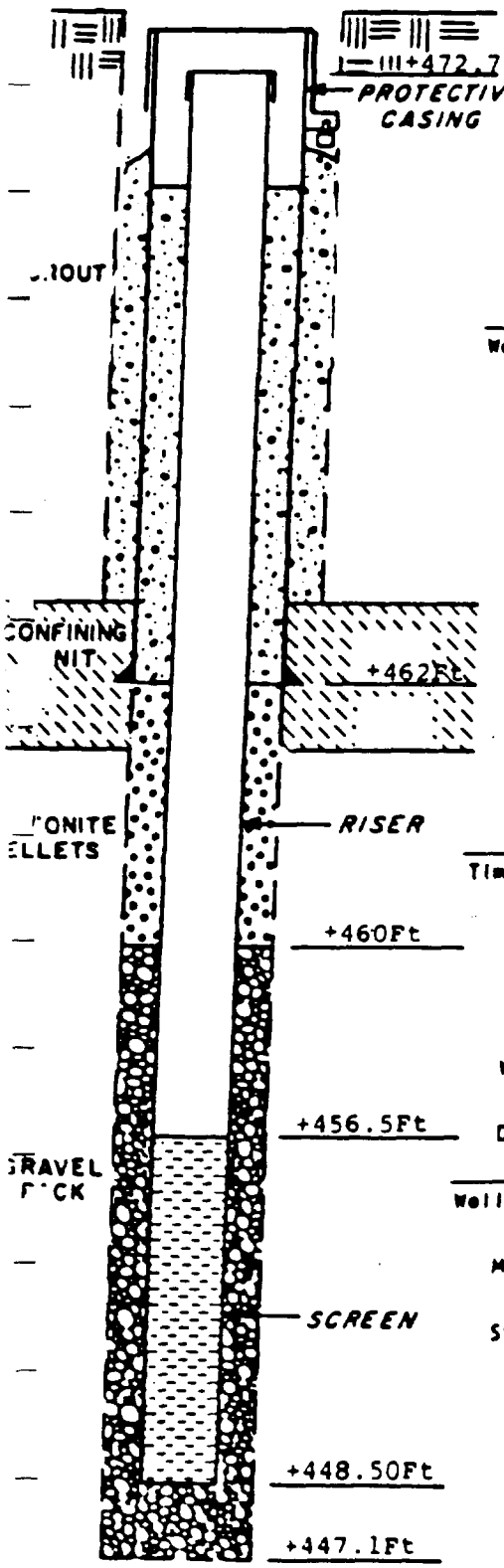
Borehole Diameter(s): 12 inch=+473Ft to +465 Ft NX Hole=+449Ft to +439Ft 8 inch=+465Ft to +449Ft

Rig Type: Gus Peck Brat-22 Bits: 7 5/8" Auger BIT

Elevation: Land Surface: +473.0Ft Water Level: +453.97Ft

Top of Inner Casing: +472.60Ft Drilling Fluid Type: N/A

Supervisory Geologist: James T. Moore



Well Design:

Casing Material: SCH 80 PVC Diameter: 2 inch Length 16.1Ft

Screen Material: SCH 80 PVC Diameter: 2 inch Length 8.0Ft

Slot Size: 0.010" Setting: +448.50Ft to +456.5Ft

Filter Material: #1 Sand Setting: +447.1Ft to +460Ft

Seals Material: Bentonite Pellets Setting: +439Ft to +447.1Ft/ +460Ft to +462Ft

Grout Type: Portland Cement Setting: +462Ft to +472Ft

Surface Casing Material: 8" Mild Steel Setting: +472.60Ft to +472.77Ft

Time Log:	Started	Completed
Drilling:	1442 Hrs. 10/29/87	1700 Hrs. 11/5/87
Installation:	1153 Hrs. 11/6/87	0730 Hrs. 11/7/87
Water Level Reading:	0728 Hrs. 11/23/87	0728 Hrs. 11/23/87
Development:	1600 Hrs. 11/16/87	1630 Hrs. 11/18/87

Well Development:

Method/Equipment: Bailing / 1 1/2 inch Bailers

Static Depth to Water: +453.97Ft

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MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: U.S.E.P.A. Well No.: SMW-3

Drilling Summary:

Total Depth: 7.5 ft Driller: E. Gaynor

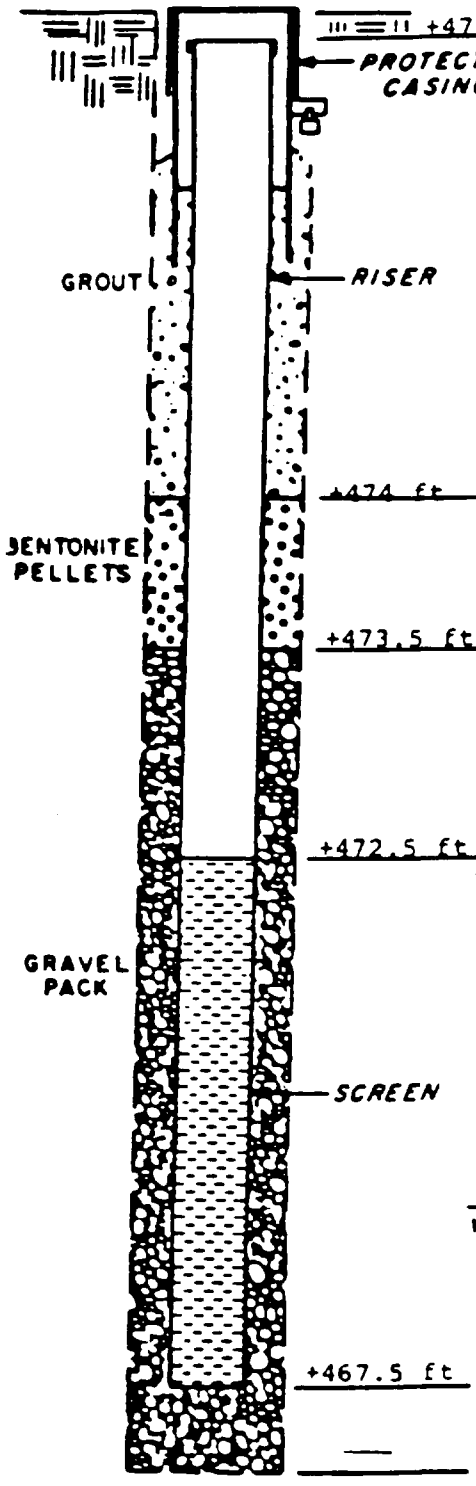
Borehole Diameter(s): 8 inch = +475 ft to +467.5 ft

Rig Type: Gus Peck Brat - 22 Bits: 7 5/8" Auger Bit

Elevation: Land Surface: +475.0 ft Water Level: +471 ft

Top of Inner Casing: +474.48 ft Drilling Fluid Type: N/A

Supervisory Geologist: James T. Moore



Well Design:

Casing Material: SCH 80 S/S Diameter: 2 inch Length: 1.98

Screen Material: SCH 80 S/S Diameter: 2 inch Length: 5 ft

Slot Size: 0.010" Setting: +467.5 ft to +472.5 ft

Filter Material: #1 Sand Setting: +467.5 ft to +473.5 ft

Seals Material: Bentonite Pellets Setting: +473.5 ft to +474 ft

Grout Type: Portland Cement/ Bentonite Setting: +474 ft to +474.5 ft

Surface Casing Material: 4" Mild Steel Setting: +474.48 ft to +474.83

Time Log:

	Started	Completed
Drilling:	1402 hrs 11/15/87	1402 hrs 11/15/87
Installation:	1402 hrs 11/15/87	1458 hrs 11/15/87
Water Level Reading:	0748 hrs 11/23/87	0748 hrs 11/23/87
Development:	1342 hrs 11/17/87	1406 hrs 11/17/87

Well Development:

Method/Equipment: Bailing/1¼" Bailer

Static Depth to Water: +471 ft

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DOUBLE CASED MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinettes Salvage Yard Site Owner: U.S.E.P.A. Well No.: DMW-

Drilling Summary: Flush Mounted Well-DMW-3

Total Depth: 31.0Ft Driller: E. Gaynor

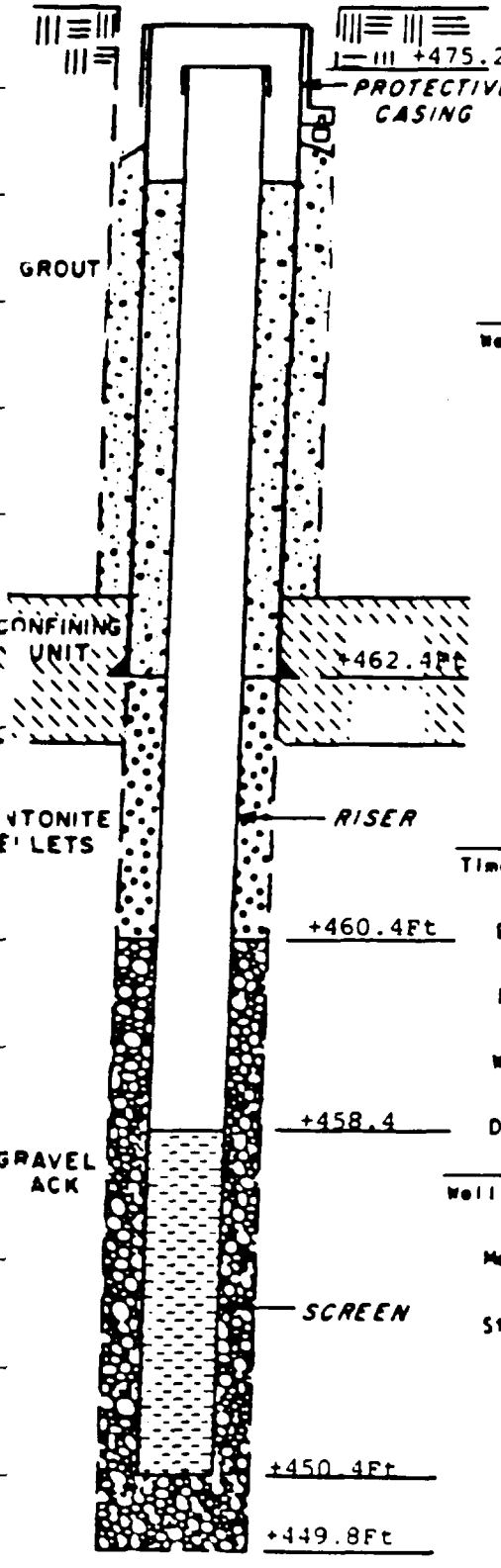
Borehole Diameter(s): 12 inch=+475.4Ft to +467.4Ft NX Hole=+451.4F
8 inch=+467.4Ft to +451.4Ft to +446.4F

Rig Type: Gus Peck Brat-22 Bits: 7 5/8" Auger BIT

Elevation: Land Surface: +475.4Ft Water Level: +451.51Ft

Top of Inner Casing: +475.10Ft Drilling Fluid Type: N/A

Supervisory Geologist: James T. Moore



Well Design:

Casing Material: SCH 80 PVC Diameter: 2 inch Length 16.7Ft

Screen Material: SCH 80 PVC Diameter: 2 inch Length 8Ft

Slot Size: 0.010" Setting: +450.4Ft to +458.4Ft

Filter Material: #1 Sand Setting: +449.8Ft to +460.4Ft

Seals Material: Bentonite Pellets Setting: +440.8Ft to +449.8Ft
+460.4Ft to +462.4Ft

Grout Type: Portland Cement / Bentonite Setting: +462.4Ft to 475.4Ft

Surface Casing Material: 8" Mild Steel Setting: +475.10Ft to +475.24Ft

Time Log:	Started	Completed
Drilling:	0927 Hrs. 11/3/87	1941 Hrs. 11/14/87
Installation:	1950 Hrs. 11/14/87	1339 Hrs. 11/15/87
Water Level Reading:	0741 Hrs. 11/23/87	0741 Hrs. 11/23/87
Development:	0803 Hrs. 11/17/87	0834 Hrs. 11/18/87

Well Development:

Method/Equipment: Bailing / 1 1/2" Bailers

Static Depth to Water: +451.51Ft

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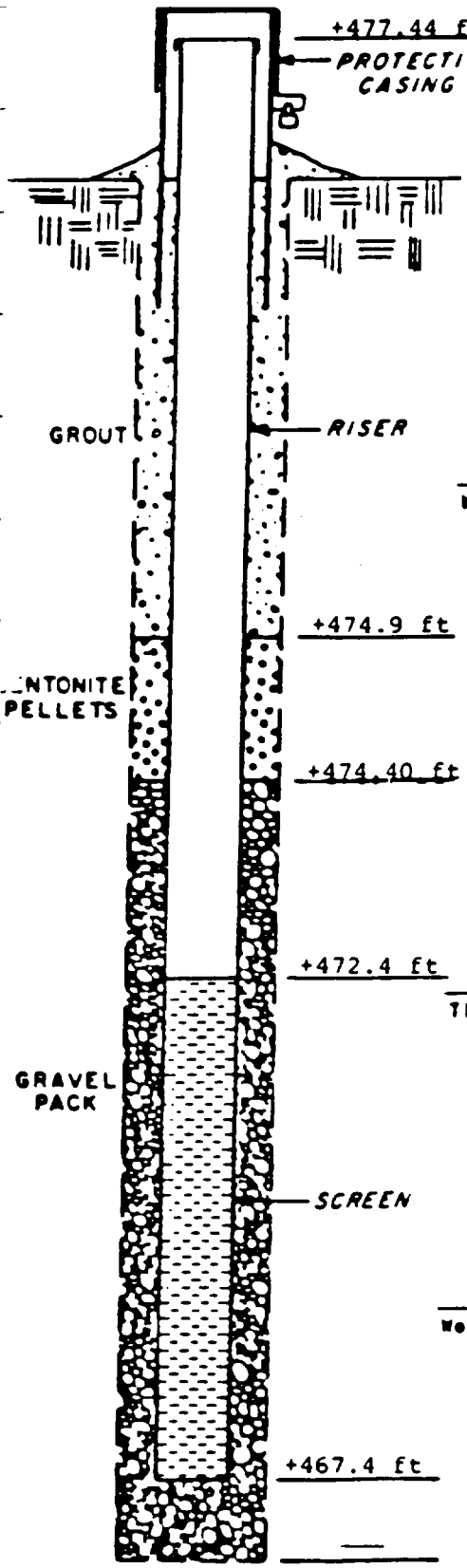
MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: U.S.E.P.A. Well No.: SMW-4



Drilling Summary:

Total Depth: 8.0 ft Driller: E. Gaynor

Borehole Diameter(s): 8 inch = +475.4 ft to +467.4 ft

Rig Type: Gus Peck Brat - 22 Bits: 7 5/8" Auger Bit

Elevation: Land Surface: +475.4 ft Water Level: +471.19 ft

Top of Inner Casing: +477.08 ft Drilling Fluid Type: N/A

Supervisory Geologist: James T. Moore

Well Design:

Casing Material: SCH 80 S/S Diameter: 2 inch Length: 4.68 f

Screen Material: SCH 80 S/S Diameter: 2 inch Length: 5 ft

Slot Size: 0.010" Setting: +467.4 ft to +472.4 ft

Filter Material: #1 Sand Setting: +467.4 ft to +474.40 ft

Seals Material: Bentonite Pellets Setting: +474.40 ft to +474.9 ft

Grout Type: Portland Cement/ Bentonite Setting: +474.9 ft to +475.4 ft

Surface Casing Material: 4" Mild Steel Setting: +477.08 ft to +477.44 ft

Time Log:

	Started	Completed
Drilling:	1201 hrs 11/9/87	1209 hrs 11/9/87
Installation:	1219 hrs 11/9/87	1239 hrs 11/9/87
Water Level Reading:	0809 hrs 11/23/87	0809 hrs 11/23/87
Development:	1418 hrs 11/16/87	1438 hrs 11/16/87

Well Development:

Method/Equipment: Bailing/1¼ Bailer

Static Depth to Water: +471.9 ft

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DOUBLE CASED MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: U.S.E.P.A. Well No.: DMW-4

Drilling Summary:

Total Depth: 34.0 ft. Driller: E. Gaynor

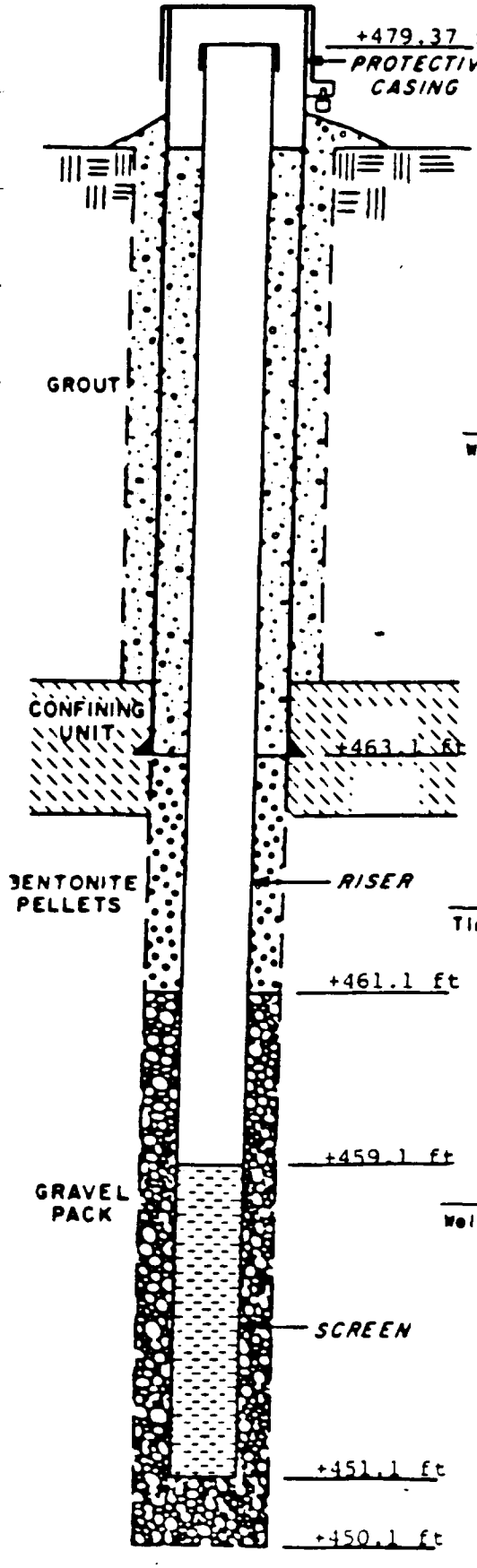
Borehole Diameter(s): 12 inch=+476.1Ft to +466.1 NX Hole=+452.1Ft to +442.1Ft 8 inch=+466.1Ft to +452.6Ft

Rig Type: Gus Peck Brat - 22 Bits: 7 5/8" Auger Bit

Elevation: Land Surface: +476.1 ft. Water Level: +454.13 ft.

Top of Inner Casing: +478.97 ft. Drilling Fluid Type: N/A

Supervisory Geologist: James T. Moore



Well Design:

Casing Material: SCH 80 PVC Diameter: 8 inch Length: 19.87

Screen Material: SCH 80 PVC Diameter: 2 inch Length: 8 ft.

Slot Size: 0.010" Setting: +451.1 ft to +459.1 ft

Filter Material: #1 Sand Setting: +450.1 ft to +461.1 ft

Seals Material: Bentonite Pellets Setting: +442.1Ft to +450.1Ft/ +461.1Ft to +463.1Ft

Grout Type: Portland Cement/ Bentonite Setting: +463.1 ft to +476.1 ft

Surface Casing Material: 8" Mild Steel Setting: +478.97 ft to +479.37 ft

Time Log:	Started	Completed
Drilling:	0807 hrs 11/4/87	1533 hrs 11/8/87
Installation:	0757 hrs 11/9/87	1146 hrs 11/9/87
Water Level Reading:	0756 hrs 11/23/87	0756 hrs 11/23/87
Development:	0900 hrs 11/15/87	0933 hrs 11/18/87

Well Development:

Method/Equipment: Bailing/1½ inch bailers

Static Depth to Water: +454.13 ft

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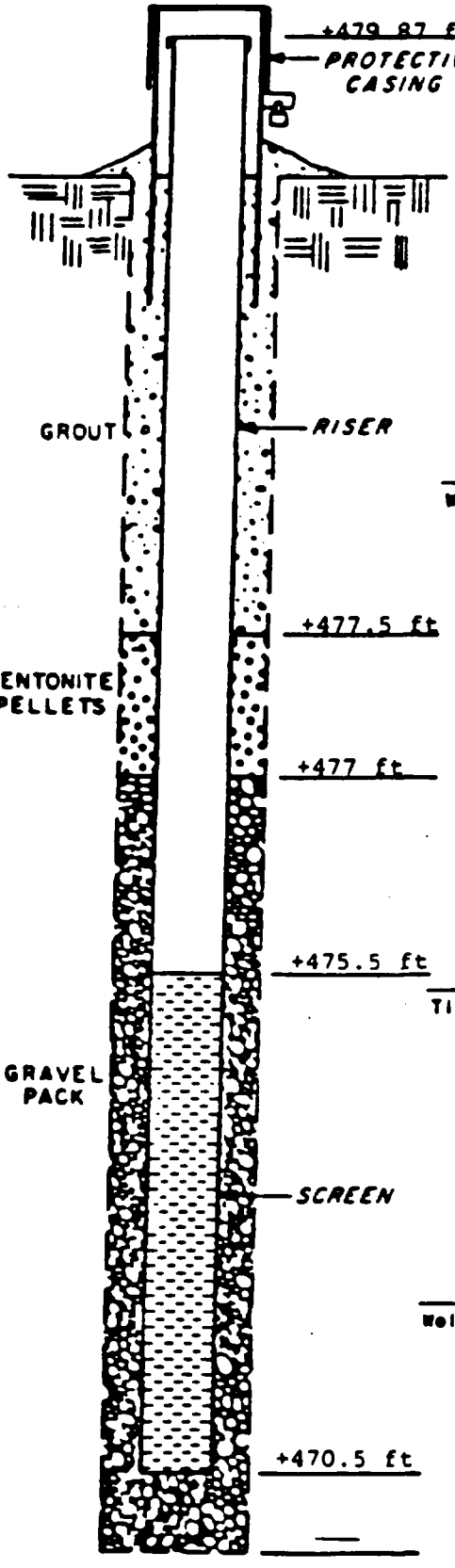
MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: U.S.E.P.A. Well No.: SMW-5

Drilling Summary:



Total Depth: 7.5 ft Driller: E. Gaynor

Borehole Diameter(s): 8 inch = +478 ft to +470.5 ft

Rig Type: Gus Peck Brat - 22 Bits: 7 5/8" Auger Bit

Elevation: Land Surface: 478 ft Water Level: 475.42 ft

Top of Inner Casing: 479.13 ft Drilling Fluid Type: N/A

Supervisory Geologist: James T. Moore

Well Design:

Casing Material: SCH 80 S/S Diameter: 2 inch Length: 3.63 ft

Screen Material: SCH 80 S/S Diameter: 2 inch Length: 5 ft

Slot Size: 0.010" Setting: +470.5 ft to +475.5 ft

Filter Material: #1 Sand Setting: +470.5 ft to +477 ft

Seals Material: Bentonite Pellets Setting: +477 ft to +477.5 ft

Grout Type: Portland Cement/ Bentonite Setting: +477.5 ft to +478 ft

Surface Casing Material: 4" Mild Steel Setting: +479.13 ft to +479.87

Time Log:	Started	Completed
Drilling:	1600 hrs 11/13/87	1611 hrs 11/13/87
Installation:	1614 hrs 11/13/87	1636 hrs 11/13/87
Water Level Reading:	0826 hrs 11/23/87	0826 hrs 11/23/87
Development:	1452 hrs 11/17/87	1523 hrs 11/17/87

Well Development:

Method/Equipment: Bailing/1¼" Bailer

Static Depth to Water: +475.42 ft

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DOUBLE CASED MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: U.S.E.P.A. Well No.: DMW-5

Drilling Summary:

Total Depth: 34.5 ft Driller: E. Gaynor

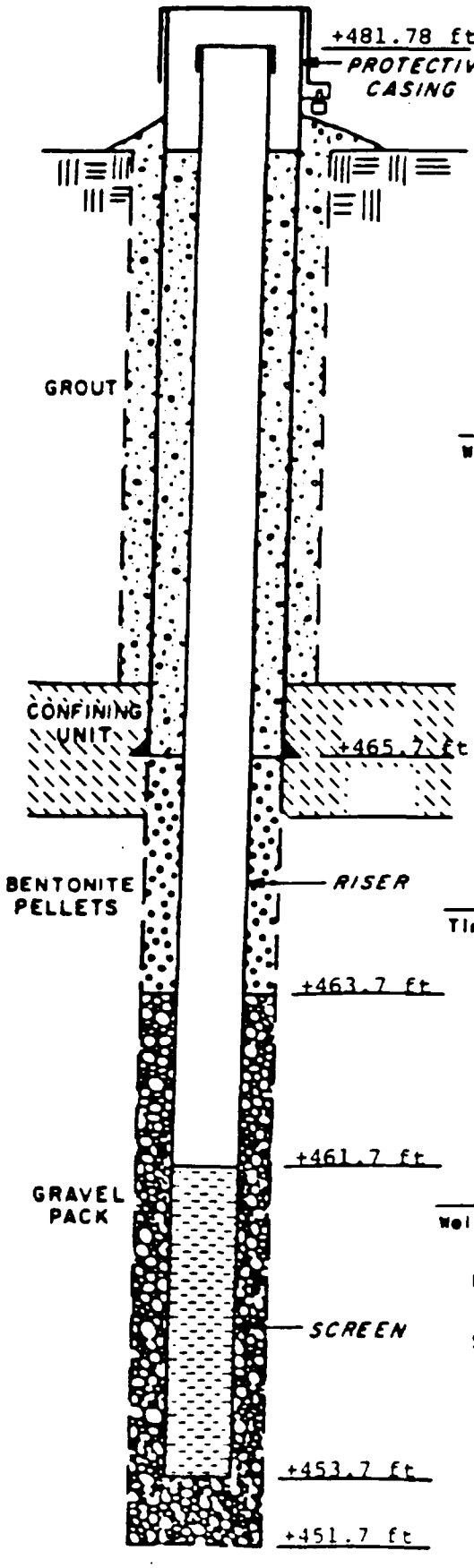
Borehole Diameter(s): 12 inch = +477.7 ft to +467.7 ft
8 inch = +467.7 ft to +449.7 ft
NX Hole = +449.7 ft to +442.7 ft

Rig Type: Gus Peck Brat - 22 Bits: 7 5/8" Auger Bit

Elevation: Land Surface: +477.7 ft Water Level: +457.67 ft

Top of Inner Casing: +481.43 ft Drilling Fluid Type: N/A

Supervisory Geologist: James T. Moore



Well Design:

Casing Material: SCH 80 PVC Diameter: 8 inch Length: 19.7

Screen Material: SCH 80 PVC Diameter: 2 inch Length: 8 ft

Slot Size: 0.010" Setting: +453.7 ft to +461.7 ft

Filter Material: #1 Sand Setting: +451.7 ft to +463.7 ft

Seals Material: Bentonite Pellets Setting: +443.2Ft to +451.7Ft/ +463.7Ft to +465.7Ft

Grout Type: Portland Cement/ Bentonite Setting: +465.7 ft to +477.7 ft

Surface Casing Material: 8" Mild Steel Setting: +481.43 ft to +481.78 ft

Time Log:	Started	Completed
Drilling:	1515 hrs 11/4/87	1302 hrs 11/11/87
Installation:	1528 hrs 11/11/87	1520 hrs 11/13/87
Water Level Reading:	0821 hrs 11/23/87	0821 hrs 11/23/87
Development:	0938 hrs 11/17/87	1008 hrs 11/18/87

Well Development:

Method/Equipment: Bailing/1¼" Bailer

Static Depth to Water: +457.67 ft

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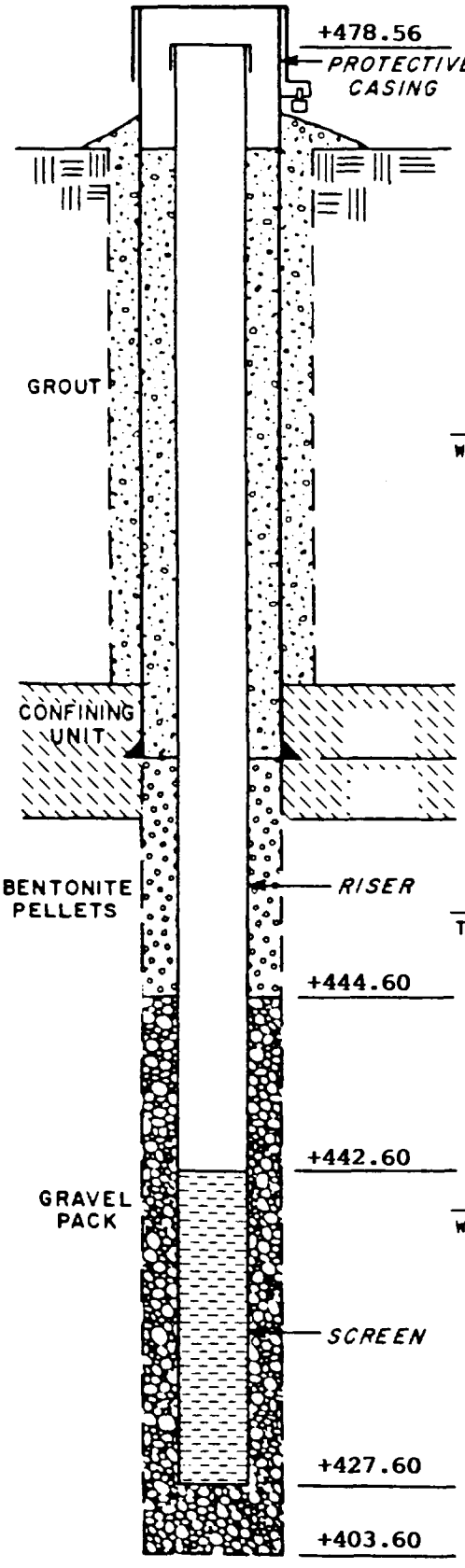
DOUBLE CASED MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: USEPA Region I Well No.: BMW-



Drilling Summary:

Total Depth: 74.0 Ft Driller: Norman Phillips

Borehole Diameter(s): 12 1/4" = to +467.60 to +454.10; HX core hole = +454.10 to +403.60

Rig Type: CME 55 Bits: 12 1/4" auger bit/HX coring bit

Elevation: Land Surface: +477.60 Water Level: +455.30

Top of Inner Casing: +477.63 Drilling Fluid Type: water

Supervisory Geologist: Robert J. Melvin

Well Design:

Casing Material: SCH. 80 PVC Diameter: 2 inch Length: 35.0 F

Screen Material: SCH. 80 PVC Diameter: 2 inch Length: 15.0 F

Slot Size: 0.010" Setting: +427.60 Ft to +452.70

Filter Material: #1 sand Setting: +423.60 to +444.60

Seals Material: Bentonite Pellets Setting: +444.60 to +450.10

Grout Type: Portland cement / bentonite Setting: +450.10 to +477.60

Surface Casing Material: 8" mild steel Setting: +467.60 to +477.60

Time Log:

	Started	Completed
Drilling:	0836 Hrs 7/14/88	1552 Hrs. 7/10/88
Installation:	1552 Hrs 7/20/88	2042 Hrs. 7/22/88
Water Level Reading:	1500 Hrs 8/01/88	1503 Hrs. 8/01/88
Development:	0910 Hrs 7/23/88	1055 Hrs. 7/23/88

Well Development:

Method/Equipment: Bailing/1-1/2 stainless steel bailer

Static Depth to Water: +455.3

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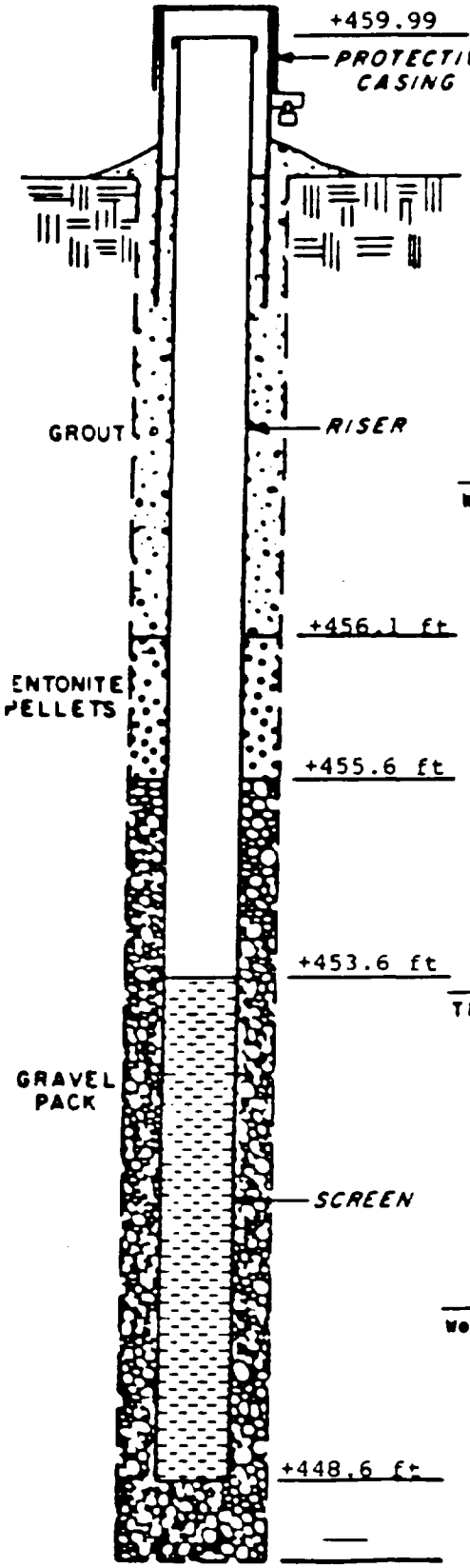
MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: U.S.E.P.A. Well No.: SMW-6

Drilling Summary:



Total Depth: 8.0 ft Driller: E. Gaynor/R. Bamford

Borehole Diameter(s): 8 inch = +456.6 ft to +448.6 ft

Rig Type: Tripod w/140 lb hammer Bits: 7 5/8" Auger Bit

Elevation: Land Surface: +456.6 ft Water Level: +455.64 ft

Top of Inner Casing: +459.40 ft Drilling Fluid Type: N/A

Supervisory Geologist: J. Moore/M. Pierdinock

Well Design:

Casing Material: SCH 80 S/S Diameter: 2 inch Length: 5.8 ft

Screen Material: SCH 80 S/S Diameter: 2 inch Length: 5 ft

Slot Size: 0.010" Setting: +448.6 ft to +453.6 ft

Filter Material: None Setting: N/A

Seals Material: Bentonite Pellets Setting: +455.6 ft to +456.1 ft

Grout Type: Portland Cement/Bentonite Setting: +456.1 to +456.6 ft

Surface Casing Material: 4" Mild Steel Setting: +459.40 ft to +459.99 ft

Time Log:	Started	Completed
Drilling:	1339 hrs 11/12/87	1446 hrs 11/12/87
Installation:	1452 hrs 11/12/87	1524 hrs 11/12/87
Water Level Reading:	0828 hrs 11/23/87	0838 hrs 11/23/87
Development:	1530 hrs 11/17/87	1604 hrs 11/17/87

Well Development:

Method/Equipment: Bailing/1¼" Bailer

Static Depth to Water: +455.64 ft

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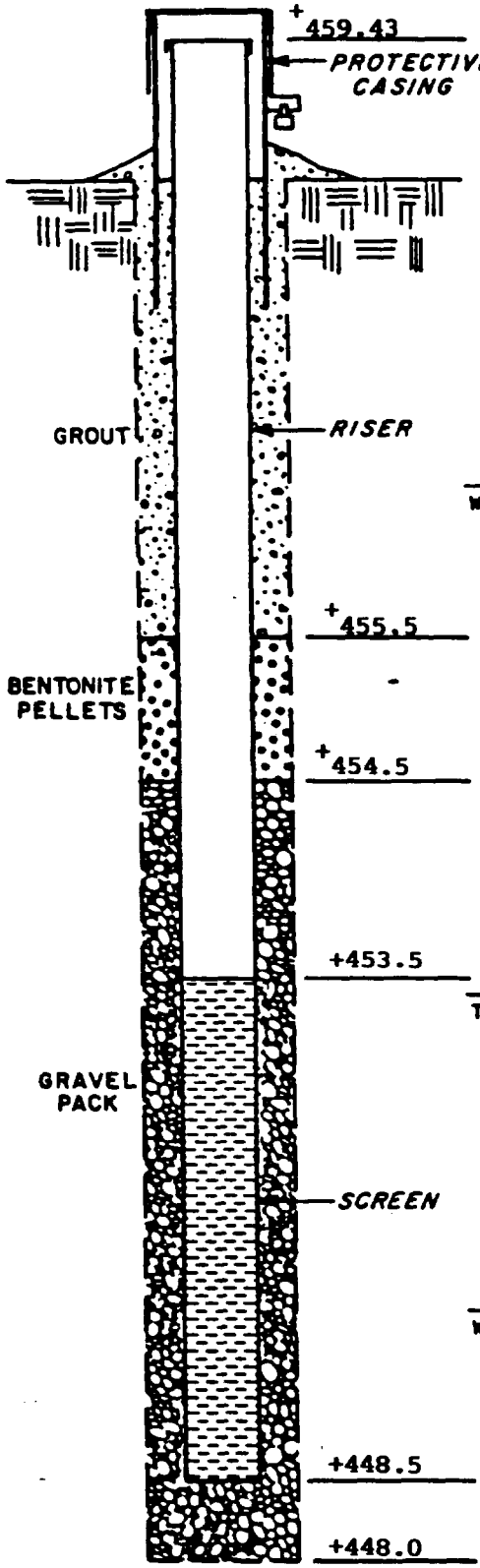
MONITORING WELL CONSTRUCTION SUMMARY

Project: PINETTE SALVAGE YARD SITE Owner: USEPA REGION I Well No. SMW-6



Drilling Summary:

Total Depth: 8.5 Ft Driller: S. Underwood

Borehole Diameter(s): 81/4 inch= 456.5Ft to 448.0Ft

Rig Type: Mobile B-57 Bits: 8 1/4 auger bit

Elevation: Land Surface: +456.5 Water Level: +452.63

Top of Inner Casing: +458.24 Drilling Fluid Type: N/A

Supervisory Geologist: James T. Moore

Well Design:

Casing Material: SCH 80 S/S Diameter: 2 inch Length 4.75Ft

Screen Material: SCH 80 S/S Diameter: 2 inch Length 5.0Ft

Slot Size: 0.010" Setting: +448.5 to +453.5

Filter Material: # 1 Sand Setting: +448.0 to +454.5

Seals Material: Benitonite Pellets Setting: +454.5 to +455.5

Grout Type: Portland cement/ bentonite Setting: +455.5 to +456.5

Surface Casing Material: 4" mild steel Setting: +458.24 to +459.43

Time Log:	Started	Completed
Drilling:	1300 Hrs 7/15/88	1310 Hrs 7/15/88
Installation:	1310 Hrs 7/15/88	1330 Hrs 7/15/88
Water Level Reading:	1730 Hrs 7/15/88	1730 Hrs 7/15/88
Development:	1126 Hrs 7/16/88	1226 Hrs 7/16/88

Well Development:

Method/Equipment: Bailer/1-1/2 inch stainless steel bailer

Static Depth to Water: +452.63

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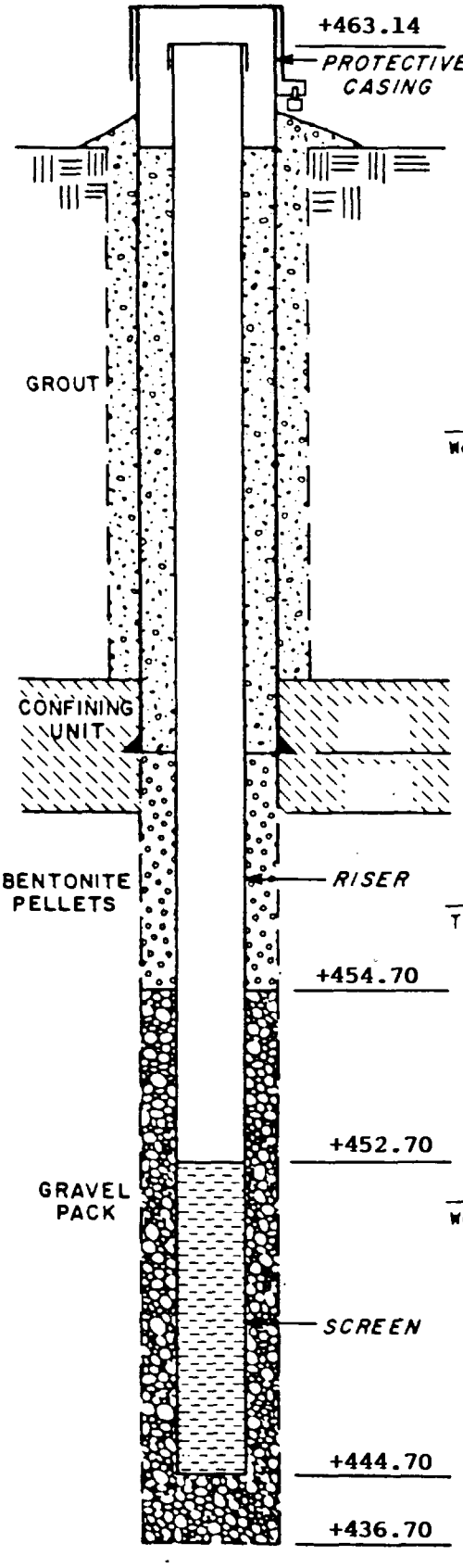
DOUBLE CASED MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: USEPA Region I Well No.: DMW-



Drilling Summary:

Total Depth: 24.0 Ft Driller: S. Underwood

Borehole Diameter(s): 8 1/4 inch - +460.70 to +445.20

Rig Type: Mobile B-57 Bits: 8 1/4 inch auger

Elevation: Land Surface: +460.70 Water Level: +452.26

Top of Inner Casing: +462.91 Drilling Fluid Type: NA

Supervisory Geologist: James T. Moore

Well Design:

Casing Material: SCH 80 PVC Diameter: 2 inch Length 10.0 F

Screen Material: SCH 80 PVC Diameter: 2 inch Length 8.0 F

Slot Size: 0.010" Setting: +444.70 to +452.70

Filter Material: #1 sand Setting: +444.20 to +454.70
+436.70 to +444.20

Seals Material: Bentonite Pellets Setting: +454.70 to +456.70

Grout Type: Portland Cement/ Bentonite Setting: +456.70 to +460.70

Surface Casing Material: 8" steel Setting: +452.70 to +463.14

Time Log:

	Started	Completed
Drilling:	1323 Hrs. 6/18/88	1615 Hrs. 6/28/88
Installation:	1615 Hrs. 6/28/88	1100 Hrs. 7/06/88
Water Level Reading:	0910 Hrs. 8/01/88	0914 Hrs. 8/01/88
Development:	1516 Hrs. 7/13/88	1619 Hrs. 7/13/88

Well Development:

Method/Equipment: Bailer / 1-1/2 inch stainless steel Bailer

Static Depth to Water: +452.26

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MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinettes Salvage Yard Site Owner: USEPA Region I Well No.: SMW7

Drilling Summary:

Total Depth: 7.33 Ft Driller: Norman Phillips

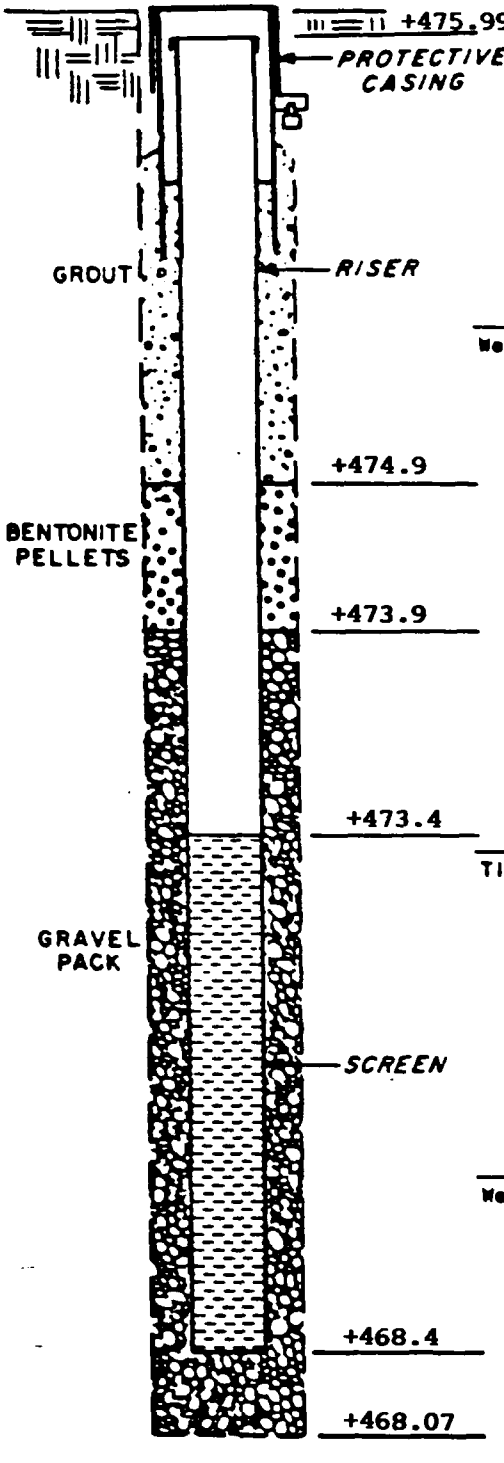
Borehole Diameter(s): * 1/4 inch = +475.4 to +468.07

Rig Type: CME 55 Bits: 8 1/4" auger bit

Elevation: Land Surface: +475.4 Water Level: +427.23

Top of Inner Casing: +475.29 Drilling Fluid Type: N/A

Supervisory Geologist: Robert J. Melvin



Well Design:

Casing Material: SCH 80 S/S Diameter: 2 inch Length: 1.89 F

Screen Material: SCH 80 S/S Diameter: 2 inch Length: 5 Ft

Slot Size: 0.010" Setting: +468.07 to +473.9

Filter Material: #1 sand Setting: +468.07 to +473.9

Seals Material: Bentonite pellets Setting: +473.9 to +474.9

Grout Type: Portland cement/ bentonite Setting: +474.9 to 475.4

Surface Casing Material: 4" mild steel Setting: +475.29 to +475.59

Time Log:

	Started	Completed
Drilling:	1004 Hrs 6/26/88	1012 Hrs 6/26/88
Installation:	1015 Hrs 6/26/88	1055 Hrs 6/26/88
Water Level Reading:	0915 Hrs 8/05/88	0917 Hrs 8/05/88
Development:	1035 Hrs 7/12/88	1442 Hrs 7/12/88

Well Development:

Method/Equipment: Bailer/1-1/2 inch stainless steel bailer

Static Depth to Water: +472.23

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DOUBLE CASED MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: USEPA Region I Well No. DMW-7

Drilling Summary:

Total Depth: 29.0 Ft Driller: Norman Phillips

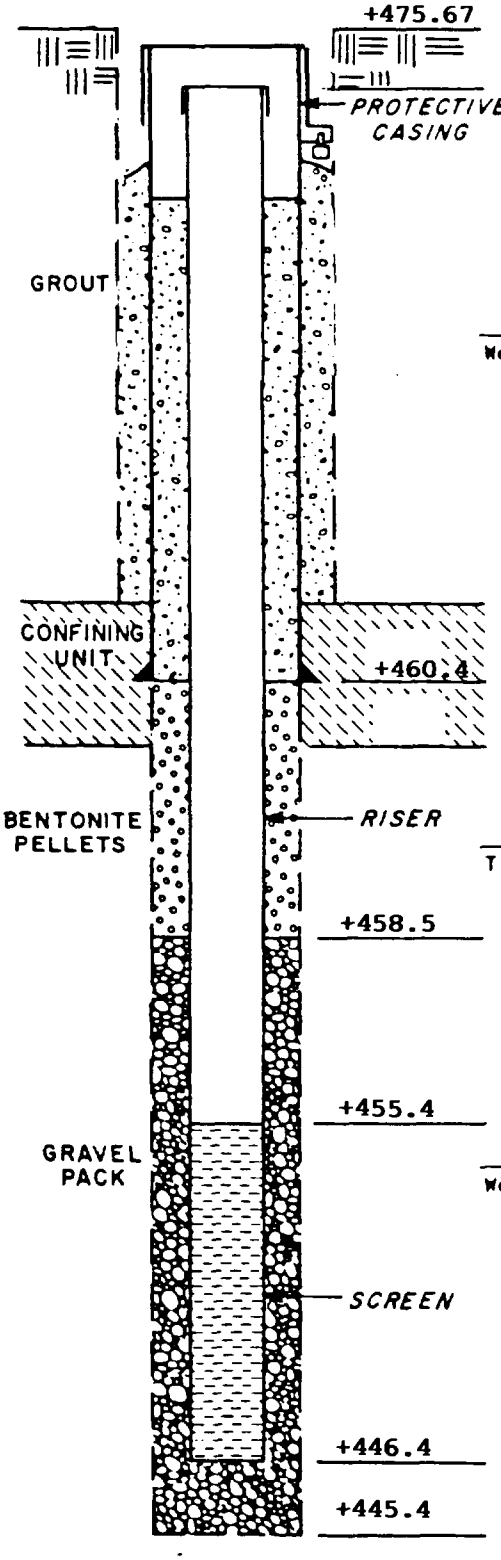
Borehole Diameter(s): 12 1/4" +475 to +460.4
8 1/4" = 460.4 to +450.9 HX hole = +450.9 Ft to +440.9 Ft

Rig Type: Mobile B-57 Bits: 8 1/4" and 12 1/4" auger b

Elevation: Land Surface: +475.4 Water Level: (initial) +457.58

Top of Inner Casing: +475.08 Drilling Fluid Type: N/A

Supervisory Geologist: Michael J. Pierdinock



Well Design:

Casing Material: SCH 80 PVC Diameter: 2 inch Length 9.68

Screen Material: SCH 80 PVC Diameter: 2 inch Length 10 Ft

Slot Size: 0.010" Setting: +445.4 to +455.4

Filter Material: #1 sand Setting: +445.4 to +458.4

Seals Material: Bentonite pellets Setting: +458.5 to +460.4

Grout Type: Portland cement/ bentonite Setting: +460.4 to +475.08

Surface Casing Material: 8" mild steel Setting: +475.08 to +475.67

Time Log:	Started	Completed
Drilling:	1535 Hrs 6/25/88	1300 Hrs 7/07/88
Installation:	1300 Hrs 7/07/88	1633 Hrs 7/07/88
Water Level Reading:	1140 Hrs 8/01/88	1142 Hrs 8/01/88
Development:	1035 Hrs 7/12/88	1142 Hrs 7/12/88

Well Development:

Method/Equipment: Bailer/1-1/2 stainless steel bailer

Static Depth to Water: +456.42 (stabilized) @ 8/05/88

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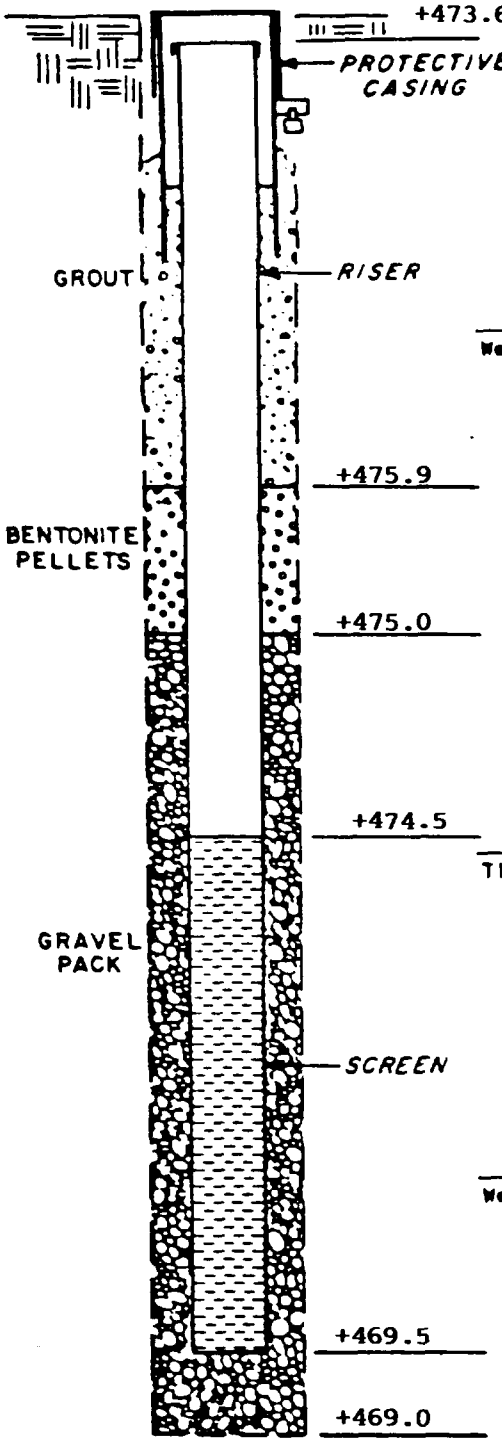
Edison NJ
08837-0001
201 906-2400

MONITORING WELL CONSTRUCTION SUMMARY

Project: Pintte Salvage Yard Site Owner: USEPA Region I Well No. SMW-



Drilling Summary:

Total Depth: 7.5 Ft Driller: Norman Phillips

Borehole Diameter(s): 8 1/4 inch = +476.5 to +469.54

Rig Type: CME 55 Bits: 8 1/4" auger bit

Elevation: Land Surface: +476.5 Water Level: +472.54

Top of Inner Casing: +476.34 Drilling Fluid Type: N/A

Supervisory Geologist: Robert J. Melvin

Well Design:

Casing Material: SCH 80 S/S Diameter: 2 inch Length 1.84

Screen Material: SCH 80 S/S Diameter: 2 inch Length 5 Ft

Slot Size: 0.010" Setting: +469.5 Ft to +474.5 Ft

Filter Material: #1 sand Setting: +469.0 to +475.0

Seals Material: Bentonite pellets Setting: +475.0 to +475.9

Grout Type: Portland cement/ Bentonite Setting: +475.9 to +476.5

Surface Casing Material: 4" mild steel Setting: +476.34 to 476.63

Time Log:

	Started	Completed
Drilling:	1017 Hrs 6/25/88	1029 Hrs 6/25/88
Installation:	1029 Hrs 6/25/88	1129 Hrs 6/25/88
Water Level Reading:	1130 Hrs 8/01/88	1133 Hrs 6/25/88
Development:	1444 Hrs 7/12/88	1012 Hrs 7/13/88

Well Development:

Method/Equipment: Bailer/1-1/2 inch stainless steel bailer

Static Depth to Water: +472.54 Ft

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DOUBLE CASED MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: USEPA Region I Well No. PMW-8

Drilling Summary:

Total Depth: 30.0 Ft Driller: Norman Phillips

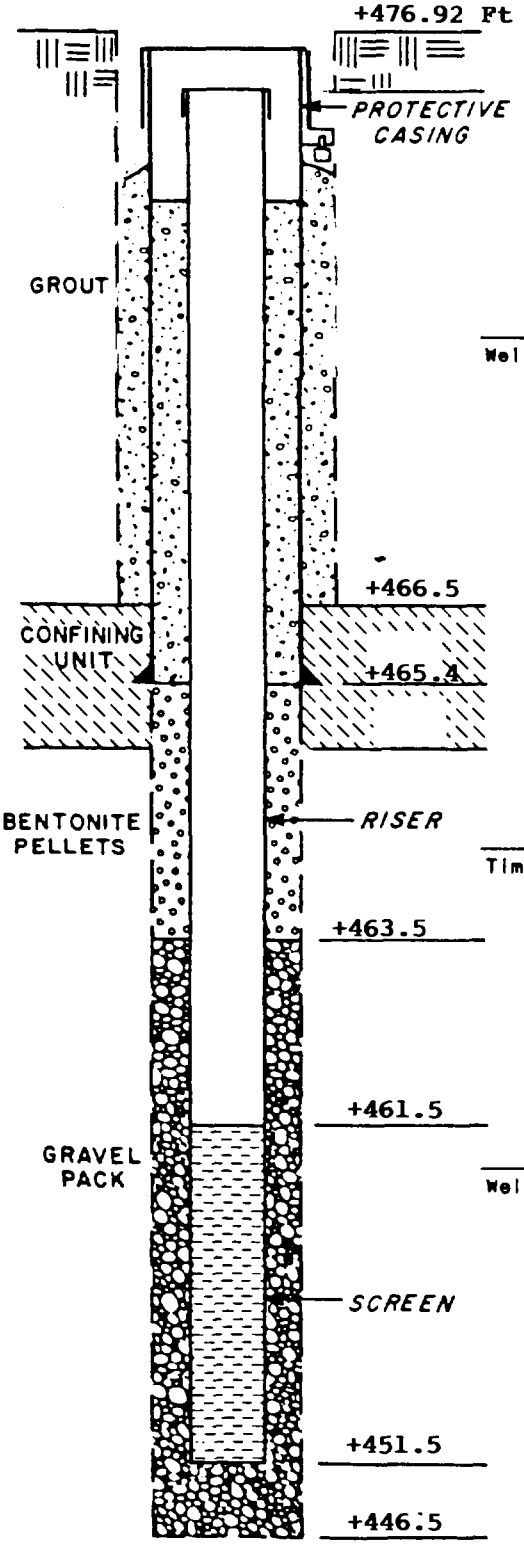
Borehole Diameter(s): 12 1/4" = +466.5 to +476.5; 8 1/4 " = +466.5 to 451.5; HX Hole = +451.5 to +441.5

Rig Type: CME 55 Bits: 8 1/4" and 12 1/4" auger bi

Elevation: Land Surface: +476.5 Water Level: +455.76

Top of Inner Casing: +476.49 Drilling Fluid Type: N/A

Supervisory Geologist: Robert J. Melvin



Well Design:

Casing Material: SCH 80 PVC Diameter: 2 inch Length: 14.99

Screen Material: SCH 80 PVC Diameter: 2 inch Length: 10 Ft

Slot Size: 0.010" Setting: +451.5 Ft to +461.5 Ft

Filter Material: #1 sand Setting: +446.5 to +463.5

Seals Material: Bentonite pellets Setting: +463.5 to +465.4

Grout Type: Portland cement/ bentonite Setting: +465.4 to +476.49

Surface Casing Material: 8" mild steel Setting: +476.49 to +476.92

Time Log:	Started	Completed
Drilling:	1445 Hrs 6/23/88	1532 Hrs 6/24/88
Installation:	1543 Hrs 6/24/88	1137 Hrs 6/25/88
Water Level Reading:	1125 Hrs 8/01/88	1128 Hrs 8/01/88
Development:	1444 Hrs 7/12/88	1012 Hrs 7/13/88

Well Development:

Method/Equipment: Bailer/1-1/2 inch stainless steel bailer

Static Depth to Water: +455.76

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MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: USEPA Region I Well No: SMW-9

Drilling Summary:

Total Depth: 7.17 Ft Driller: Norman Phillips

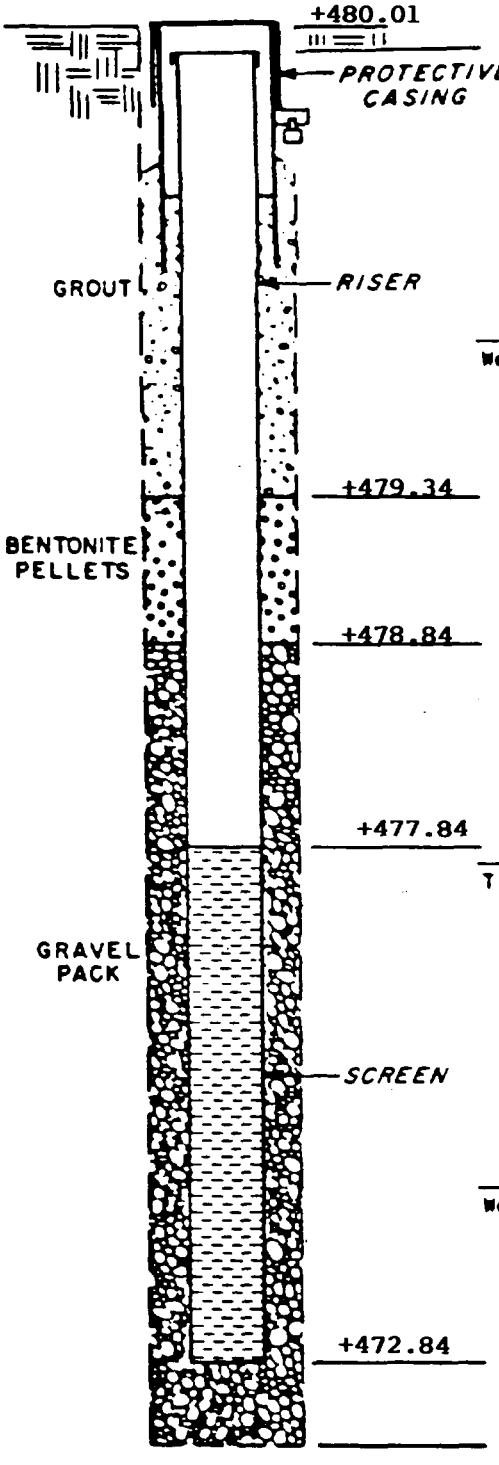
Borehole Diameter(s): 8 1/4" = +480.01 to +472.84

Rig Type: CME-55 Bits: 8 1/4" auger bit

Elevation: Land Surface: +479.8 Water Level: +476.04

Top of Inner Casing: +479.84 Drilling Fluid Type: N/A

Supervisory Geologist: J.T. Moore/Denise Page



Well Design:

Casing Material: SCH 80 S/S Diameter: 2 inch Length: 2.0 F

Screen Material: SCH 80 S/S Diameter: 2 inch Length: 5.0 F

Slot Size: 0.010" Setting: +472.84 to +477.84

Filter Material: #1 sand Setting: +472.84 to +478.84

Seals Material: Bentonite pellets Setting: +478.84 to +479.34

Grout Type: Portland cement/ bentonite Setting: +479.34 to 480.01

Surface Casing Material: 4" mild steel Setting: 479.51 to 480.01

Time Log:	Started	Completed
Drilling:	1600 Hrs 6/29/88	1630 Hrs 6/29/88
Installation:	1630 Hrs 6/29/88	1800 Hrs 6.29/88
Water Level Reading:	1050 Hrs 8/01/88	1054 Hrs 8/01/88
Development:	1112 Hrs 7/13/88	1236 Hrs 7/13/88

Well Development:

Method/Equipment: Bailer/1-1/2 inch stainless steel bailer

Static Depth to Water: +476.04

ICF TECHNOLOGY
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08837-0001
201/906-2400

DOUBLE CASED MONITORING WELL CONSTRUCTION SUMMARY

Project: Pinette Salvage Yard Site Owner: USEPA Region I Well No. PMW-9

Drilling Summary:

Total Depth: 35.7 Ft Driller: Norman Phillips

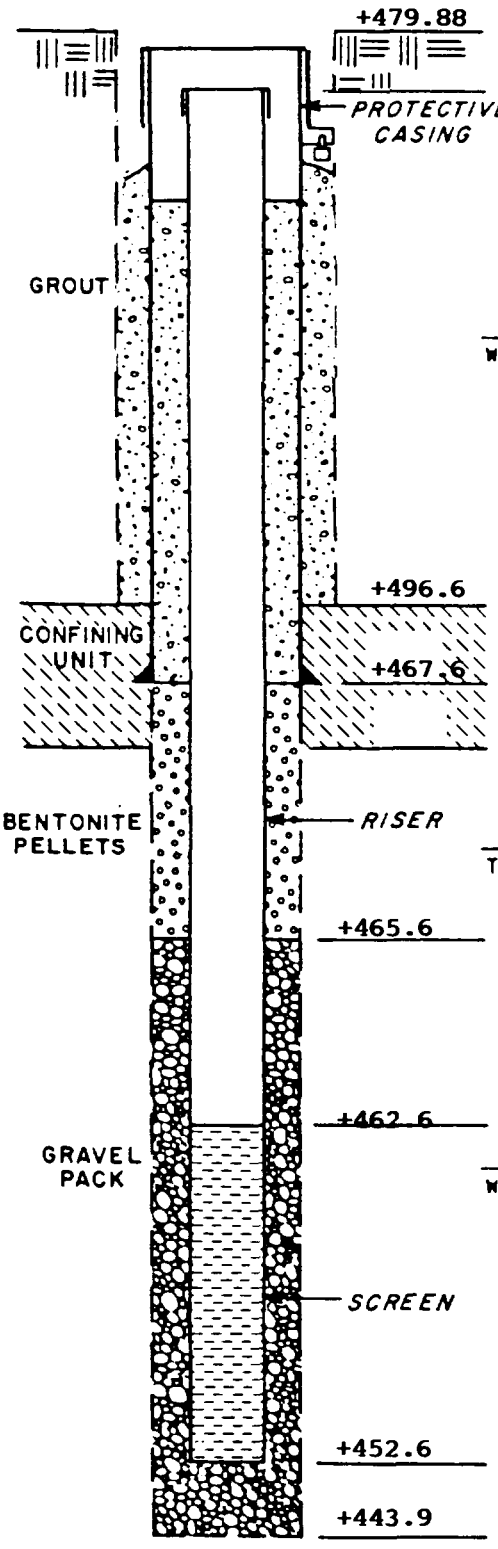
Borehole Diameter(s): 12 1/4" = + 479.6 to +469.6; 8 1/4: = +469.6 to +452.6; HX Hole = +452.6 to +442.6

Rig Type: CME-55 Bits: 8 1/4" and 12 1/4" auger bi

Elevation: Land Surface: +479.6 Water Level: +476.96

Top of Inner Casing: +479.72 Drilling Fluid Type: N/A

Supervisory Geologist: Robert J. Melvin



Well Design:

Casing Material: SCH 80 PVC Diameter: 2 inch Length 17.12

Screen Material: SCH 80 PVC Diameter: 2 inch Length 10 Ft

Slot Size: 0.010" Setting: +452.6 to +462.6

Filter Material: #1 sand Setting: +443.9 to +465.6

Seals Material: Bentonite pellets Setting: +465.6 to 467.6

Grout Type: Portland cement/ bentonite Setting: +467.6 to +479.72

Surface Casing Material: 8" mild steel Setting: +479.72 to +479.88

Time Log:	Started	Completed
Drilling:	1537 Hrs 6/29/88	1304 Hrs 7/10/88
Installation:	1415 Hrs 7/10 88	1117 Hrs 7/11/88
Water Level Reading:	0940 Hrs 8/05/88	0942 Hrs 8/05/88
Development:	1112 Hrs 7/13/88	1236 Hrs 7/13/88

Well Development:

Method/Equipment: Bailer/1-1/2 inch stainless bailer

Static Depth to Water: +476.96

APPENDIX F

RESULTS OF GEOTECHNICAL ANALYSES OF SOIL SAMPLES

GRAIN SIZE ANALYSES

SUBSURFACE SOIL AND SEDIMENT SAMPLES

GRAIN SIZE

ANALYST: JSC QC#: 87921 DATE: 7-26-88

SAMPLE ID	AIR DRY WEIGHT	MASS RETAINED ON 10 SIEVE	% OF TOTAL	MASS PASSING 10 SIEVE	% OF TOTAL
3984A-01	157.79	19.89	12.61	137.83	87.35
3984A-01D	158.63	39.95	25.18	118.56	74.74
3984A-02	210.49	96.59	45.89	113.43	53.89
3984A-03	215.14	27.87	12.58	187.84	87.31
3984A-04	245.90	125.60	51.08	120.17	48.87
3984A-05	285.68	163.41	57.20	122.08	42.73
3984A-06	191.98	0.10	0.05	191.54	99.77
3984A-07	345.98	271.20	78.41	74.33	21.48
3984A-08	207.14	0.00	0.00	206.00	99.84
3984A-09	229.99	126.20	54.91	102.69	44.65
3984A-10	268.39	125.00	46.87	139.73	52.06

GRAIN SIZE

ANALYST: JSC RMA QC#: 87921 DATE: 7-26-88

MASS OF SOIL PASSING SIEVE (grams)

SAMPLE ID	SUM	1/2"	SUM	3/8"	SUM	1/4"	SUM	#4	SUM	#10	SUM
3984A-01	157.63	12.71	144.92	1.91	143.01	2.14	140.87	0.40	140.47	2.64	137.83
3984A-01D	158.56	20.89	137.67	6.31	131.36	3.67	127.69	3.09	124.60	6.04	118.56
3984A-02	209.55	48.17	161.38	12.20	149.18	14.48	134.70	8.26	126.44	13.01	113.43
3984A-03	214.99	4.31	210.68	2.11	208.57	8.36	200.21	4.75	195.46	7.62	187.84
3984A-04	245.85	34.90	210.95	10.11	200.84	26.40	174.44	16.54	157.90	37.73	120.17
3984A-05	285.62	50.64	234.98	9.90	225.00	41.46	183.54	19.90	163.64	41.56	122.00
3984A-06	191.63	0.00	191.63	0.00	191.63	0.00	191.63	0.00	191.63	0.09	191.54
3984A-07	345.09	137.01	208.08	30.34	177.74	38.55	139.19	22.34	116.85	42.52	74.33
3984A-08	206.80	0.00	206.80	0.00	206.80	0.00	206.80	0.00	206.80	0.00	206.80
3984A-09	229.02	69.37	159.65	13.13	146.52	11.85	134.67	9.38	125.29	22.60	102.69
3984A-10	265.33	48.62	216.71	10.83	205.88	22.38	183.50	15.36	168.14	28.41	139.73

GRAIN SIZE

ANALYST: JSC RMA QC#: 87921 DATE: 7-26-88

AMOUNT OF SOIL PASSING SIEVE

SAMPLE ID	1/2" sieve grams	%	3/8" sieve grams	%	1/4" sieve grams	%	#4 sieve grams	%	#10 sieve grams	%
3984A-01	144.92	91.8	143.01	90.6	140.87	89.3	140.47	89.0	137.83	87.4
3984A-01D	137.67	86.8	131.36	82.8	127.69	80.5	124.60	78.5	118.56	74.7
3984A-02	161.38	76.7	149.18	70.9	134.70	64.0	126.44	60.1	113.43	53.9
3984A-03	210.68	97.9	208.57	96.9	200.21	93.1	195.46	90.9	187.84	87.3
3984A-04	210.95	85.8	200.84	81.7	174.44	70.9	157.90	64.2	120.17	48.9
3984A-05	234.98	82.3	225.00	78.8	183.54	64.2	163.64	57.3	122.00	42.7
3984A-06	191.63	99.8	191.63	99.8	191.63	99.8	191.63	99.8	191.54	99.8
3984A-07	200.00	60.1	177.74	51.4	139.19	40.2	116.85	33.8	74.33	21.5
3984A-08	206.00	99.8	206.00	99.8	206.00	99.8	206.00	99.8	206.00	99.8
3984A-09	159.65	69.4	146.52	63.7	134.67	58.6	125.29	54.5	102.69	44.6
3984A-10	216.71	80.7	205.00	76.7	183.50	68.4	168.14	62.6	139.73	52.1

GRAIN SIZE

ANALYST: JSC RMA QC #: 87921 DATE: 7-26-88

AMOUNT OF SOIL PASSING SIEVE

SAMPLE ID	sieve 18		sieve 35		sieve 60		sieve 100		sieve 120		sieve 170		sieve 230	
	grams	%	grams	%	grams	%	grams	%	grams	%	grams	%	grams	%
3984A-01	66.58	87.1	64.29	84.2	53.37	69.9	42.42	55.6	39.32	51.5	34.83	45.6	29.46	38.6
3984A-01D	62.35	73.1	58.16	68.2	46.16	54.1	36.32	42.6	33.48	39.2	29.77	34.9	25.36	29.7
3984A-02	52.23	53.7	48.88	50.2	43.66	44.9	39.75	40.9	38.55	39.6	36.79	37.8	34.40	35.4
3984A-03	74.57	84.8	70.96	80.7	67.35	76.6	40.06	45.5	29.03	33.0	17.72	20.1	10.00	11.5
3984A-04	43.34	35.5	21.41	17.5	9.98	8.2	7.24	5.9	6.73	5.5	6.06	5.0	5.23	4.3
3984A-05	48.15	34.5	41.72	29.9	38.67	27.7	30.26	21.7	25.82	18.5	18.76	13.4	11.44	8.2
3984A-06	56.55	101.4	56.54	101.4	56.49	101.3	56.47	101.3	56.47	101.3	56.47	101.3	56.45	101.2
3984A-07	38.12	16.8	28.78	12.7	21.62	9.5	17.77	7.8	16.39	7.2	14.42	6.3	12.24	5.4
3984A-08	59.41	100.4	59.39	100.4	59.37	100.3	59.36	100.3	59.36	100.3	59.34	100.3	59.11	99.9
3984A-09	56.65	39.5	45.70	31.8	36.40	25.4	32.22	22.4	31.04	21.6	29.30	20.4	26.97	18.8
3984A-10	52.02	46.4	45.37	40.5	37.27	33.3	33.64	30.0	32.82	29.3	31.50	28.1	30.18	26.9

GRAIN SIZE

ANALYST: JSC QC#: 87921 DATE: 7-26-88

MASS OF TOTAL SAMPLE REPRESENTED IN HYDROMETER TEST
oven dry mass = mass x HCF W = (a/b) x 100

SAMPLE ID	mass g used	hydro. corr. fac.	oven dry mass g (a)	% passing #10 (b)	g of tot sample (W)
3984A-01	67.75	0.984	66.67	87.35	76.32
3984A-01D	64.87	0.983	63.77	74.74	85.32
3984A-02	55.13	0.951	52.43	53.89	97.29
3984A-03	77.90	0.986	76.81	87.31	87.97
3984A-04	60.26	0.991	59.72	48.87	122.20
3984A-05	60.32	0.989	59.66	42.73	139.60
3984A-06	56.53	0.984	55.63	99.77	55.75
3984A-07	50.86	0.961	48.88	21.48	227.50
3984A-08	59.50	0.993	59.08	99.84	59.18
3984A-09	67.26	0.953	64.10	44.65	143.56
3984A-10	59.50	0.980	58.31	52.06	112.00

HYDROMETER ANALYSIS

QC#: 87921
CASE#: N\A

DATE: 7-26-88
ANALYST: JSC

SAMPLE ID	Initial Time	2 Min	5 Min	15 Min	30 Min	60 Min	250 Min	1440 Min
Blank	9:36	4.5	4.0	4.0	4.0	3.5	3.5	4.5
3984A-01	8:30	20.5	17.5	14.5	12.0	10.0	7.0	5.0
3984A-01D	8:36	18.5	15.5	12.0	9.5	8.0	5.0	3.5
3984A-02	8:42	27.5	23.5	19.5	16.5	14.5	10.5	7.0
3984A-03	8:48	6.5	4.5	4.0	3.0	3.0	1.5	1.5
3984A-04	9:54	4.5	4.0	3.0	2.5	2.5	1.5	1.5
3984A-05	9:00	8.5	5.0	3.5	2.5	2.5	1.5	1.5
3984A-06	9:06	48.5	47.0	40.0	34.0	29.0	17.5	10.5
3984A-07	9:12	8.5	6.0	5.0	3.0	3.0	1.5	0.5
3984A-08	9:18	47.5	38.0	23.5	14.5	10.0	4.5	3.0
3984A-09	9:24	19.5	15.0	11.0	9.0	7.5	4.0	1.5
3984A-10	9:30	25.5	22.0	18.0	15.0	13.5	9.5	7.0

GRAIN SIZE

ANALYST: JSC RMA QC#: 87921 DATE: 7-26-88

PERCENT OF SOIL REMAINING IN SUSPENSION (P) P = (Ra/W) x 100

SAMPLE ID	2 MIN	5 MIN	15 MIN	30 MIN	60 MIN	250 MIN	1440 MIN
3984A-01	26.86	22.93	19.00	15.72	13.10	9.17	6.55
3984A-01D	21.60	18.17	14.06	11.13	9.38	5.86	4.10
3984A-02	28.27	24.15	20.04	16.96	14.90	10.79	7.19
3984A-03	7.39	5.12	4.55	3.41	3.41	1.71	1.71
3984A-04	3.60	3.27	2.46	2.05	2.05	1.23	1.23
3984A-05	6.09	3.58	2.51	1.79	1.79	1.07	1.07
3984A-06	86.99	84.30	71.74	60.90	52.01	31.39	18.03
3984A-07	3.74	2.64	2.20	1.32	1.32	0.66	0.22
3984A-08	80.26	64.21	39.71	24.50	16.90	7.60	5.07
3984A-09	13.50	10.45	7.66	6.27	5.22	2.79	1.04
3984A-10	22.77	19.64	16.07	13.39	12.05	8.40	6.25

GRAIN SIZE

ANALYST: JSC RMA QC #: 87921 DATE: 7-26-88

SAMPLE ID	DIAMETER (mm) D = K (L/T) K = 0.01382						
	2 MIN	5 MIN	15 MIN	30 MIN	60 MIN	250 MIN	1440 MIN
3984A-01	0.0344	0.0221	0.0130	0.0093	0.0067	0.0032	0.0014
3984A-01D	0.0348	0.0224	0.0132	0.0095	0.0067	0.0033	0.0014
3984A-02	0.0327	0.0215	0.0126	0.0091	0.0065	0.0032	0.0014
3984A-03	0.0375	0.0240	0.0137	0.0098	0.0069	0.0033	0.0015
3984A-04	0.0376	0.0238	0.0138	0.0098	0.0069	0.0033	0.0015
3984A-05	0.0368	0.0237	0.0138	0.0098	0.0069	0.0033	0.0015
3984A-06	0.0276	0.0177	0.0100	0.0081	0.0059	0.0030	0.0014
3984A-07	0.0368	0.0236	0.0137	0.0098	0.0069	0.0033	0.0015
3984A-08	0.0278	0.0192	0.0123	0.0092	0.0066	0.0033	0.0014
3984A-09	0.0345	0.0224	0.0133	0.0094	0.0067	0.0033	0.0015
3984A-10	0.0332	0.0215	0.0127	0.0091	0.0065	0.0032	0.0014

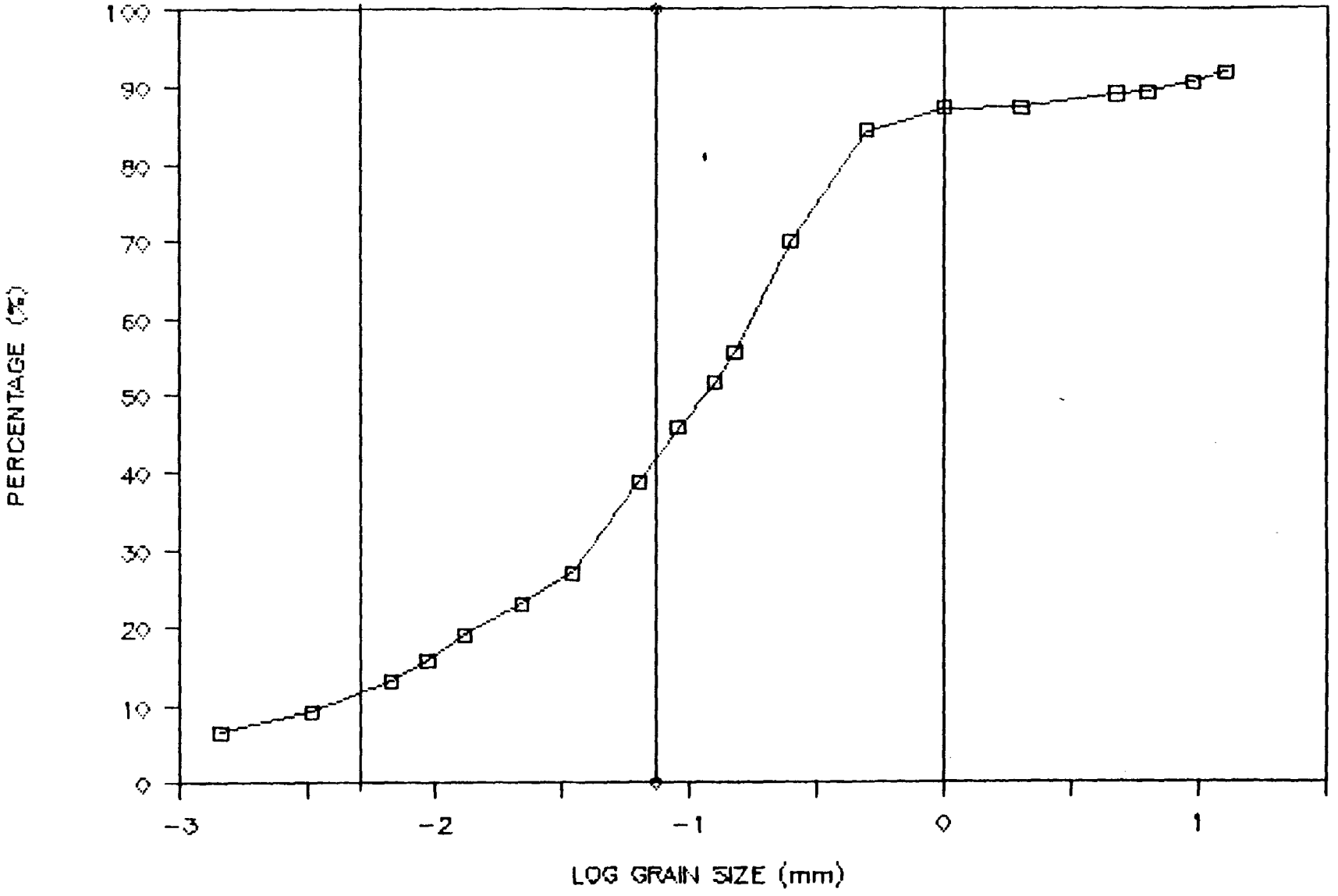
EFFECTIVE DEPTH, L cm

2 MIN	5 MIN	15 MIN	30 MIN	60 MIN	250 MIN	1440 MIN
13.0	13.4	13.9	14.3	14.7	15.2	15.5
13.3	13.8	14.3	14.8	15.0	15.5	15.7
11.8	12.5	13.1	13.6	13.9	14.6	15.2
15.3	15.6	15.6	15.8	15.8	16.1	16.1
15.6	15.6	15.8	15.9	15.9	16.1	16.1
14.9	15.5	15.7	15.9	15.9	16.1	16.1
8.4	8.6	9.7	10.7	11.5	13.4	14.6
14.9	15.3	15.5	15.8	15.8	16.1	16.2
8.5	10.1	12.5	13.9	14.7	15.6	15.8
13.1	13.8	14.5	14.8	15.1	15.6	16.1
12.1	12.7	13.3	13.8	14.1	14.8	15.2

00023

GRAIN SIZE ANALYSIS

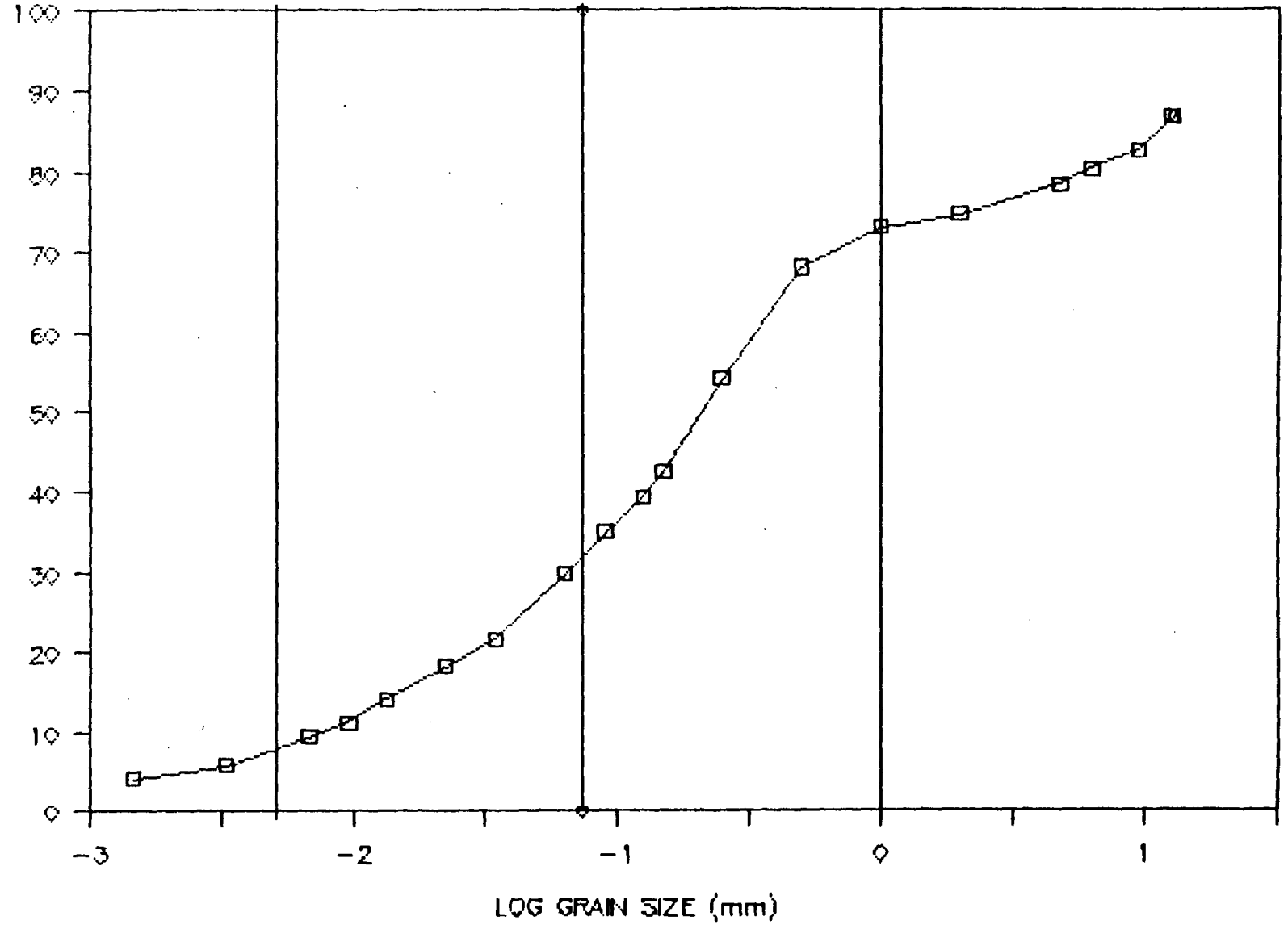
HYDROMETER METHOD SAMPLE #01



00024

GRAIN SIZE ANALYSIS

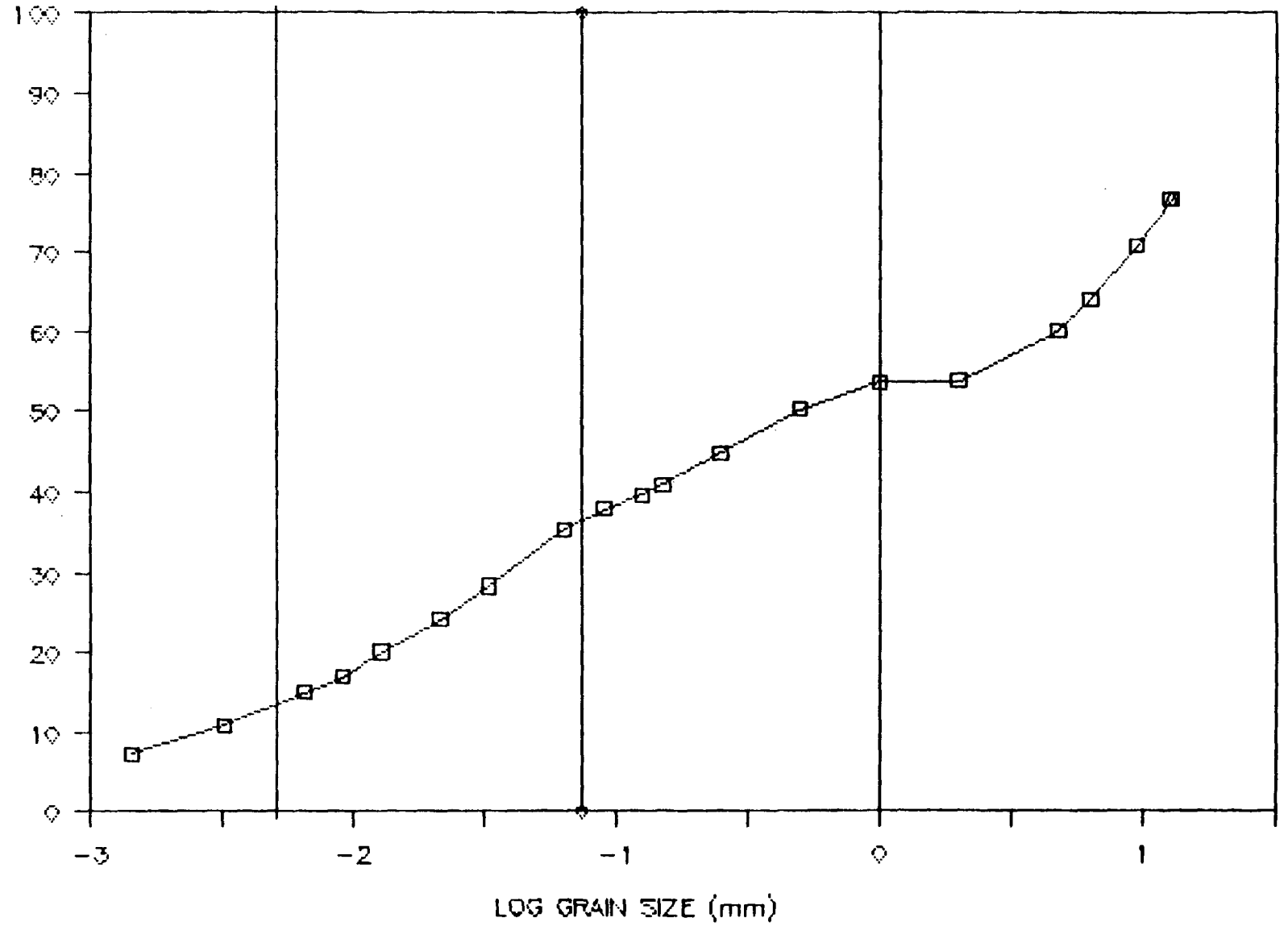
HYDROMETER METHOD SAMPLE #01D



00025

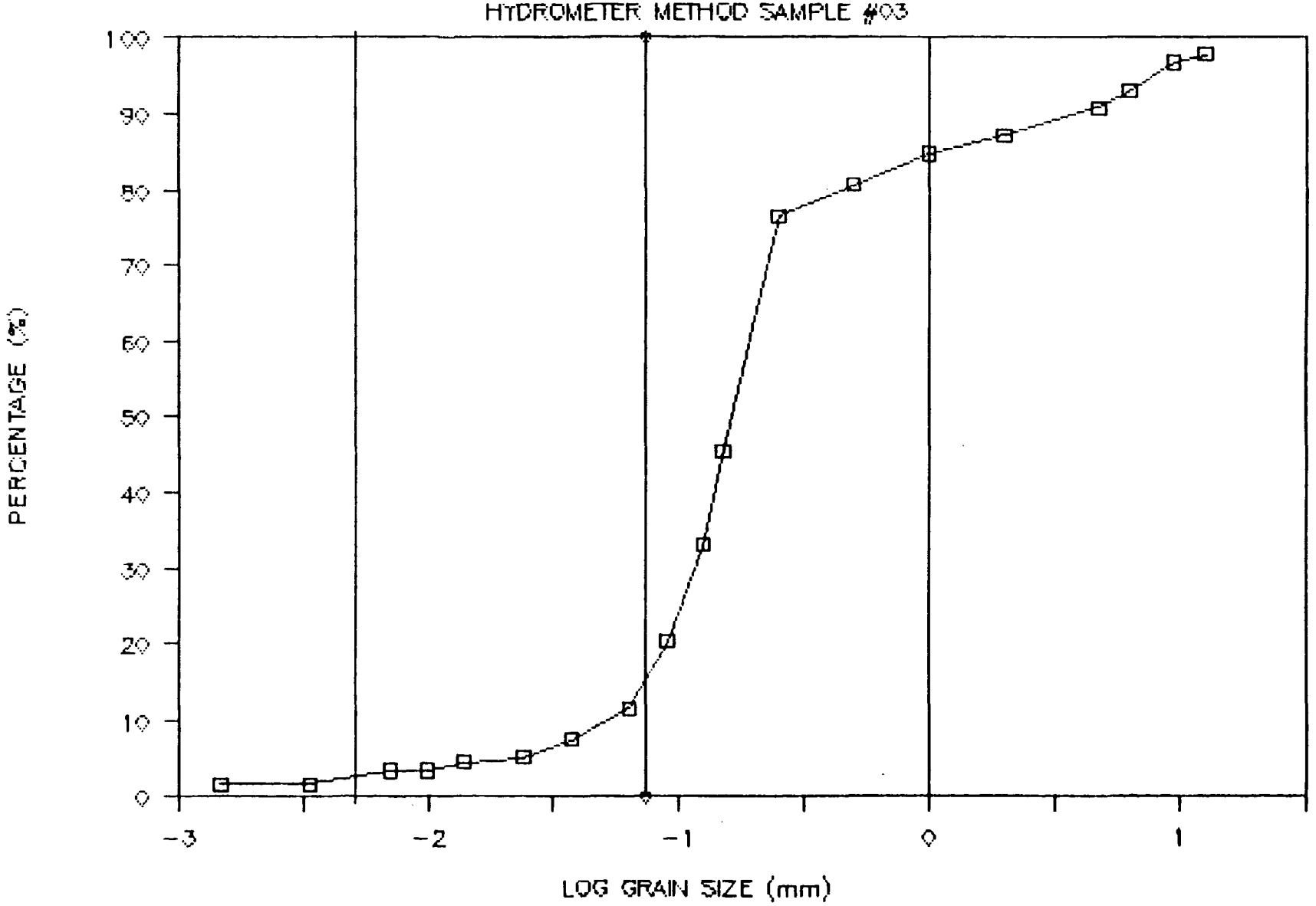
GRAIN SIZE ANALYSIS

HYDROMETER METHOD SAMPLE #02



00026

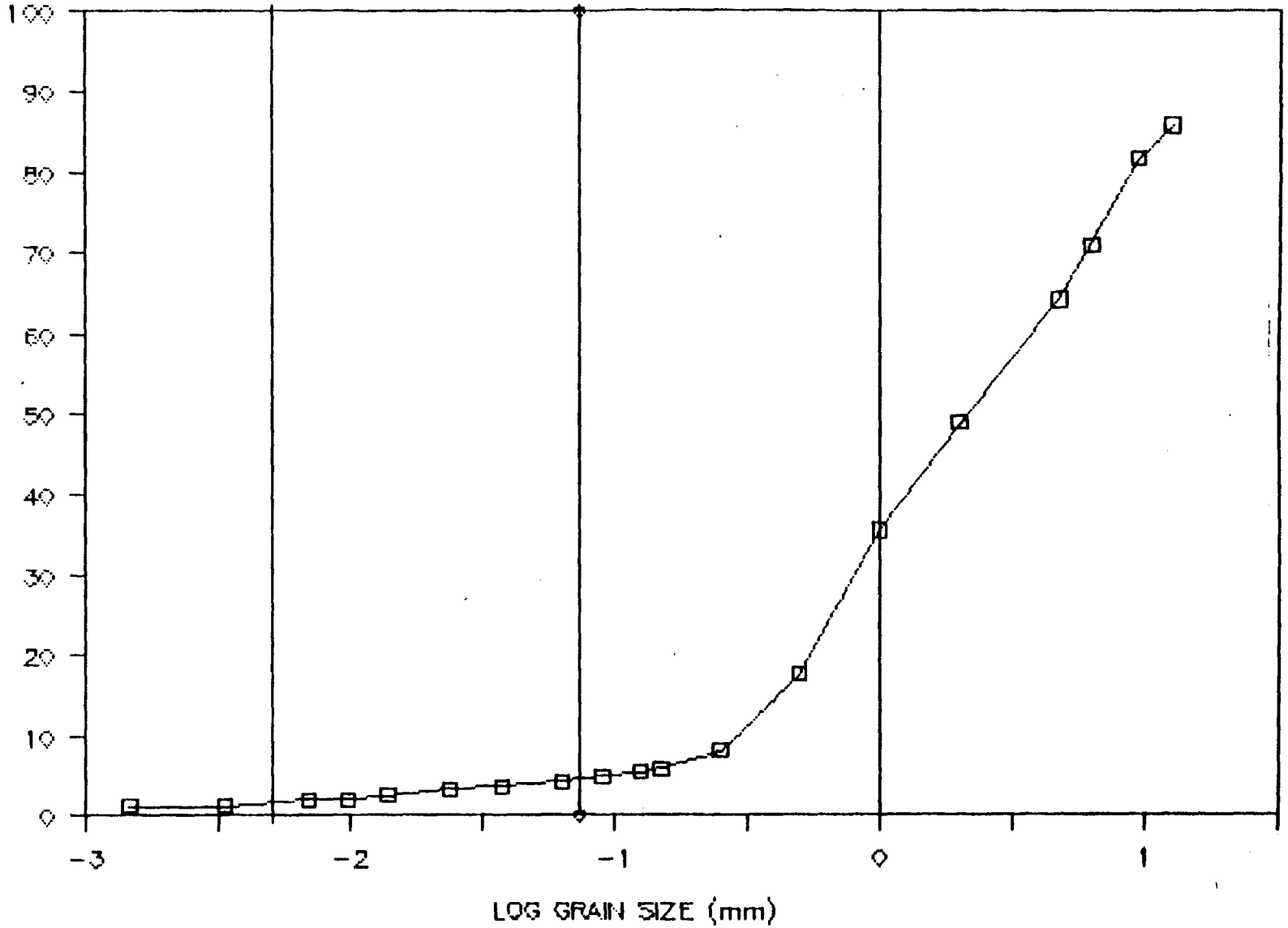
GRAIN SIZE ANALYSIS



00027

GRAIN SIZE ANALYSIS

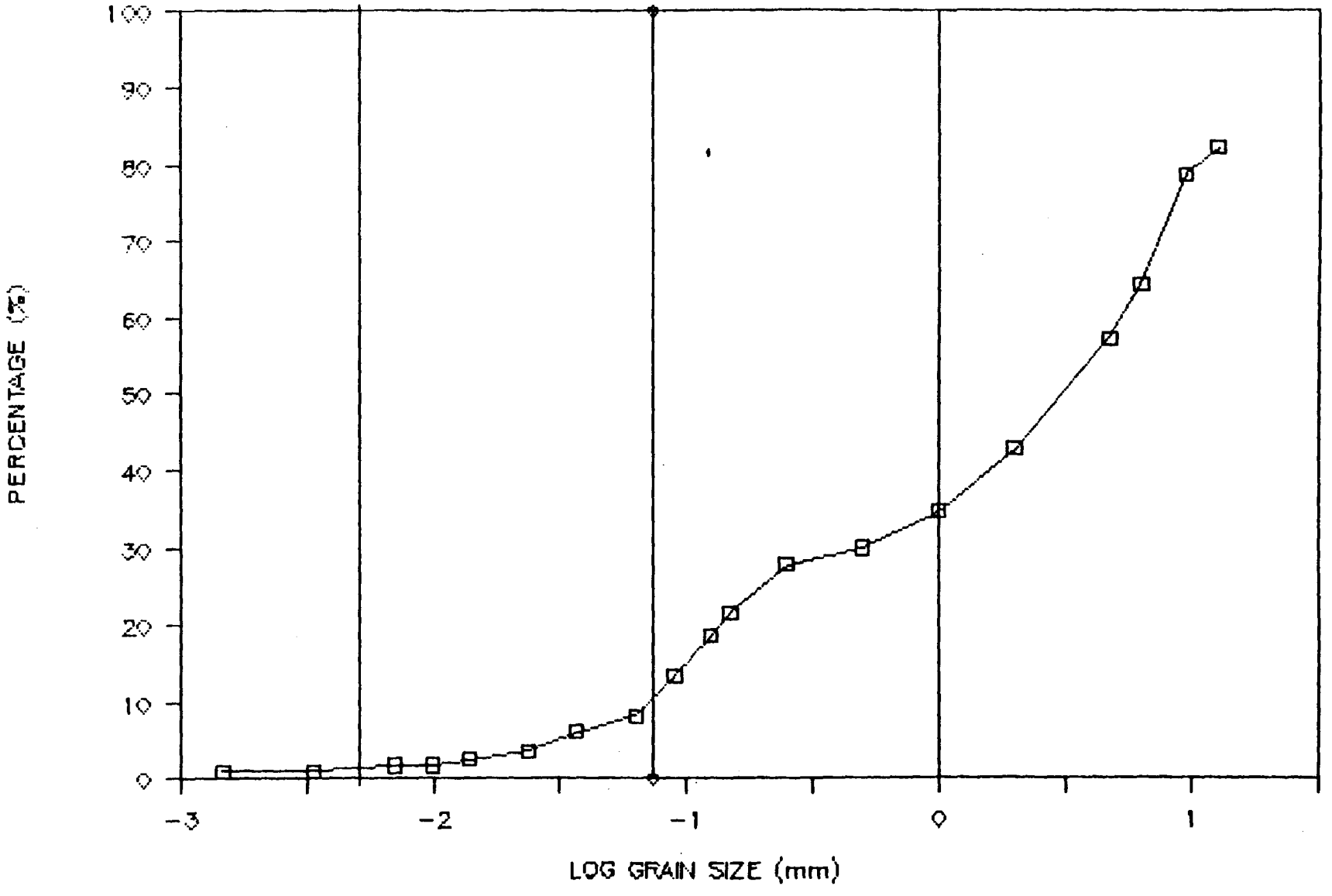
HYDROMETER METHOD SAMPLE #04



00028

GRAIN SIZE ANALYSIS

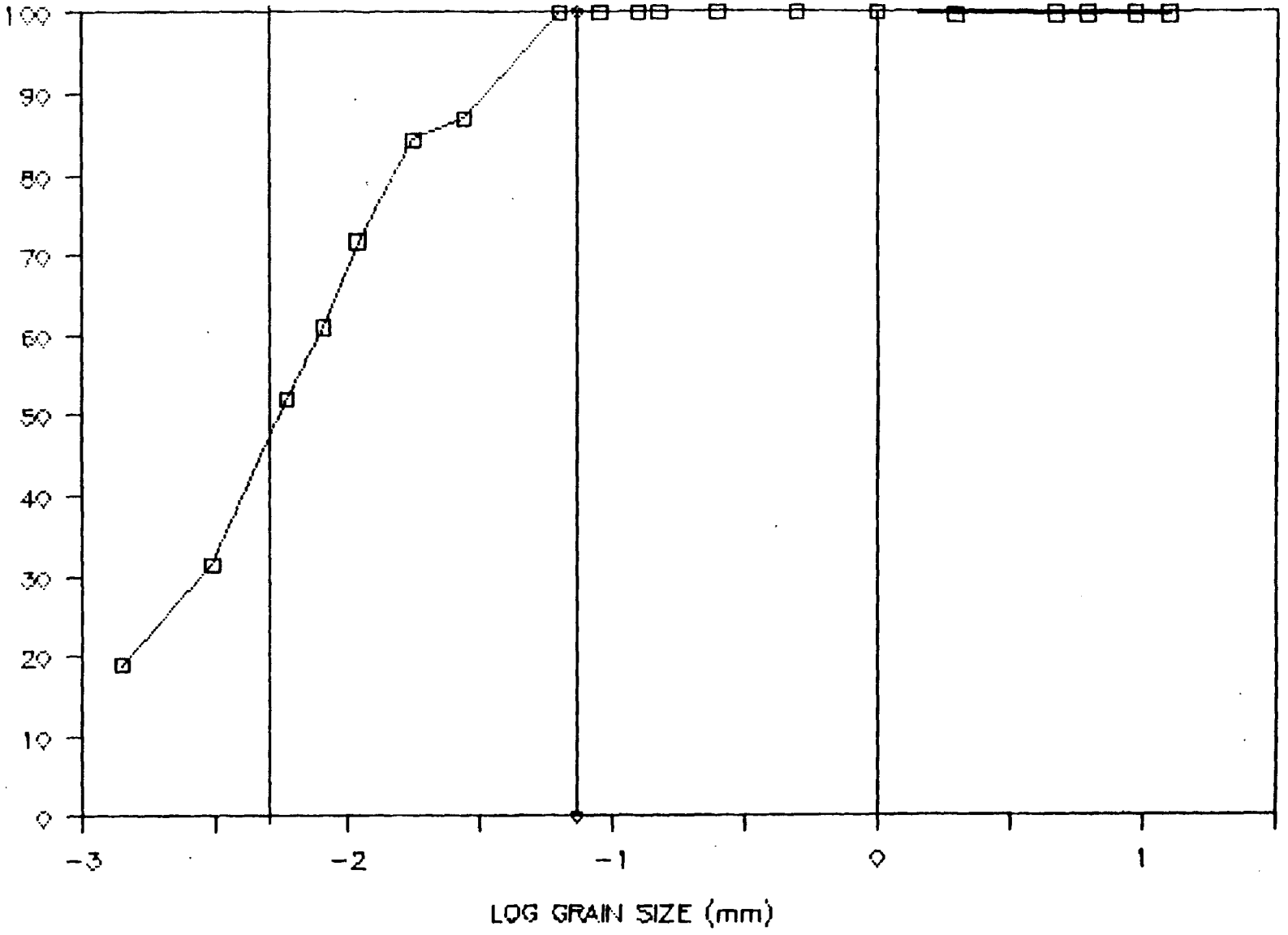
HYDROMETER METHOD SAMPLE #05



00029

GRAIN SIZE ANALYSIS

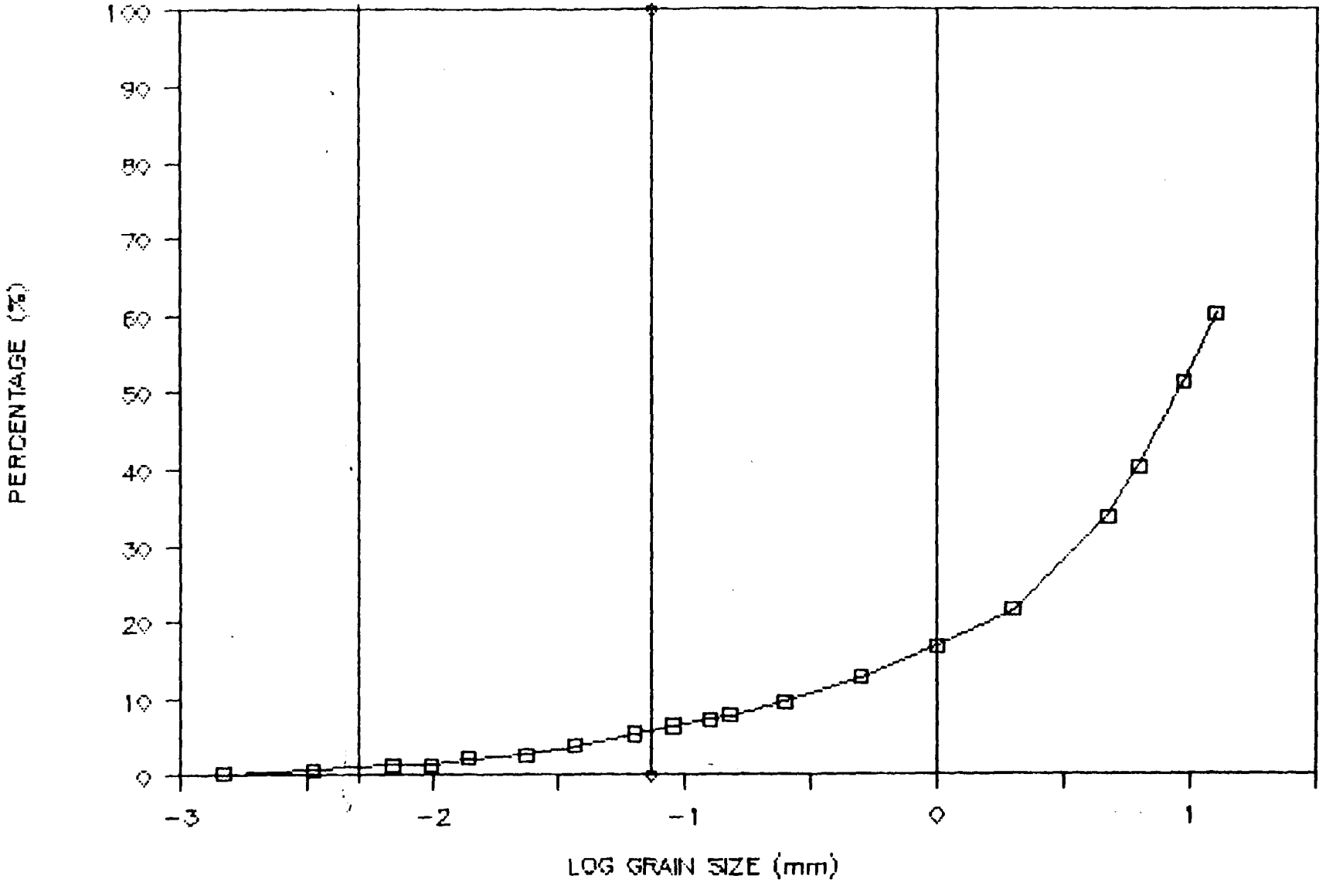
HYDROMETER METHOD SAMPLE #06



00030

GRAIN SIZE ANALYSIS

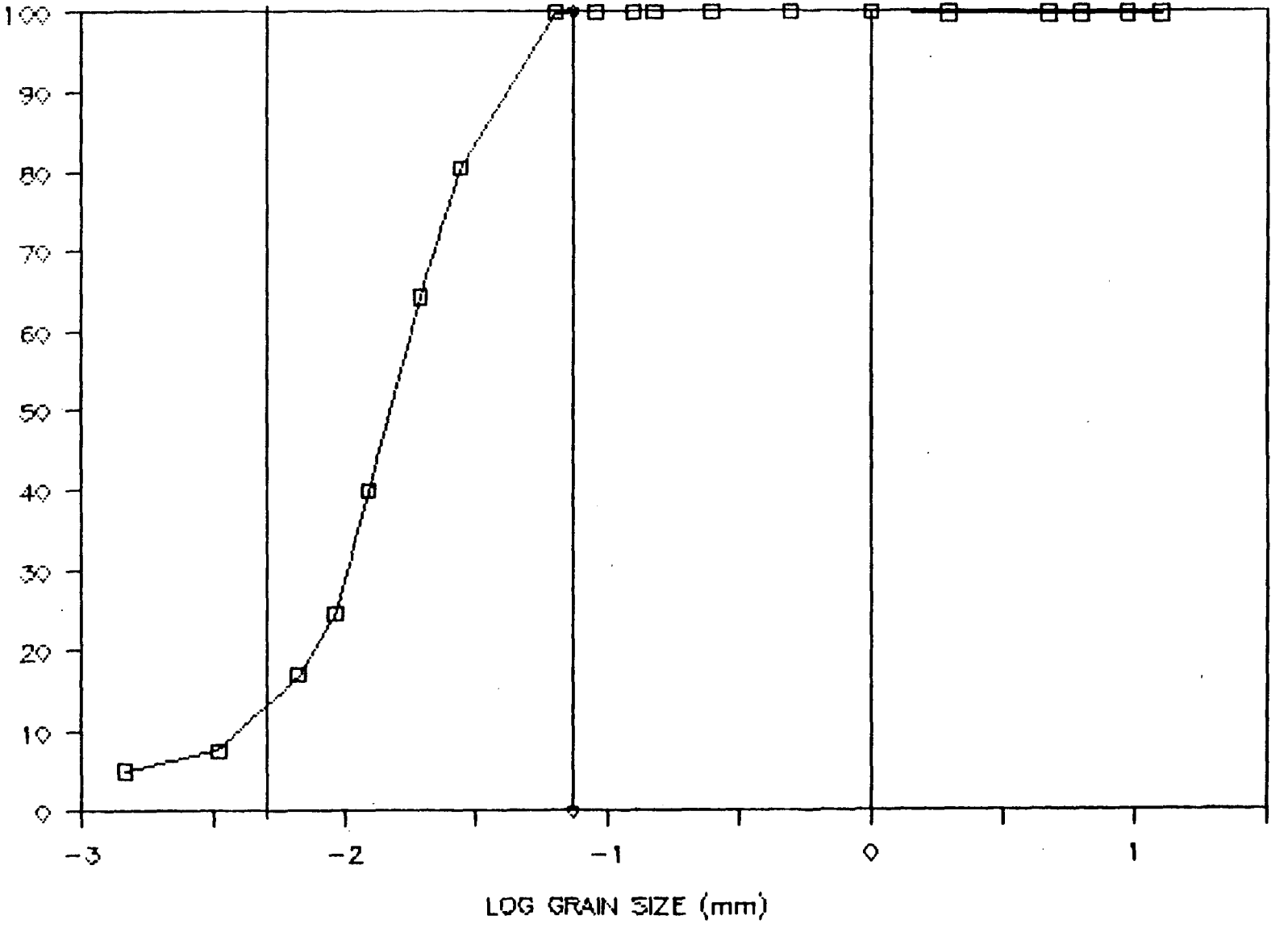
HYDROMETER METHOD SAMPLE #07



00031

GRAIN SIZE ANALYSIS

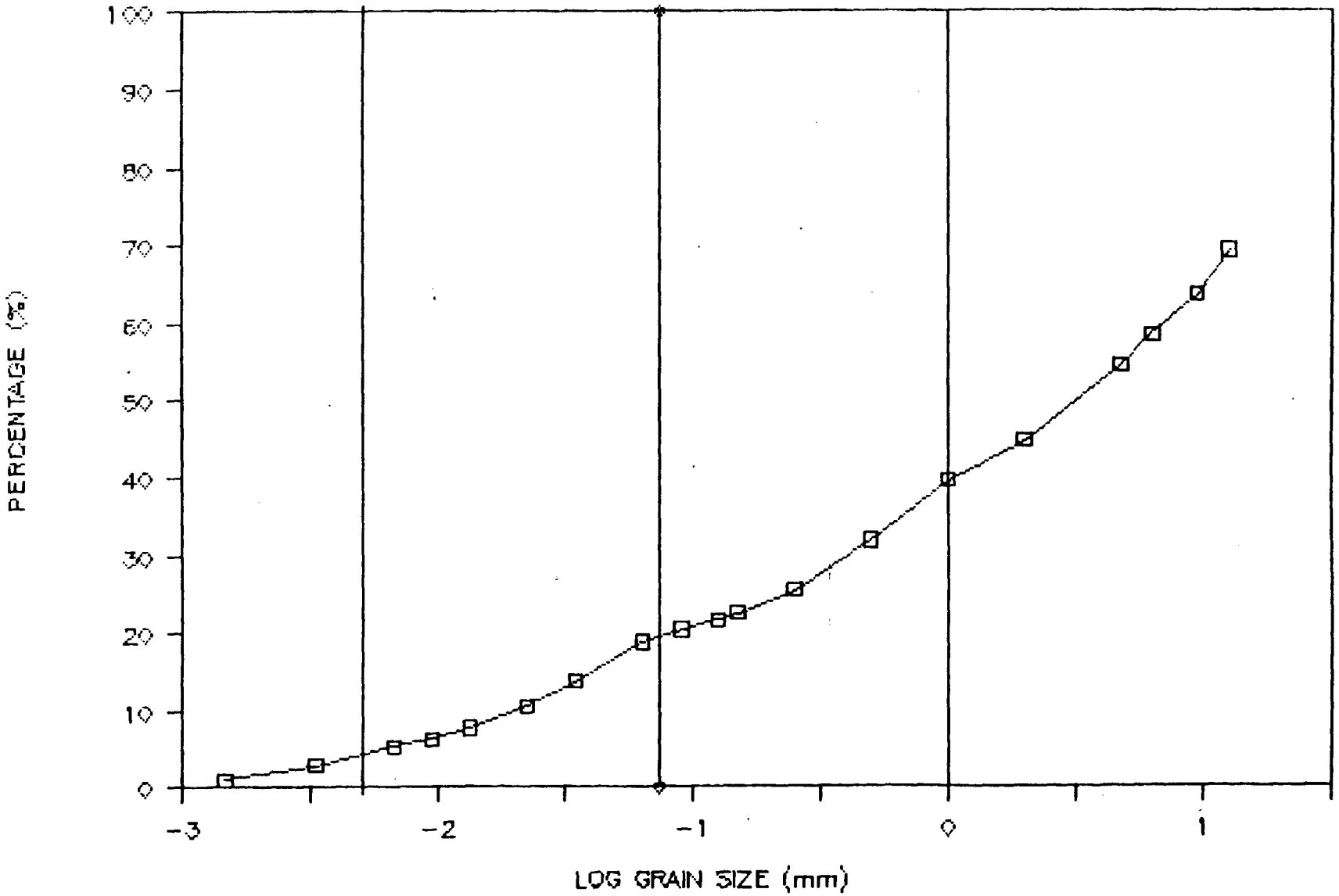
HYDROMETER METHOD SAMPLE #08



00032

GRAIN SIZE ANALYSIS

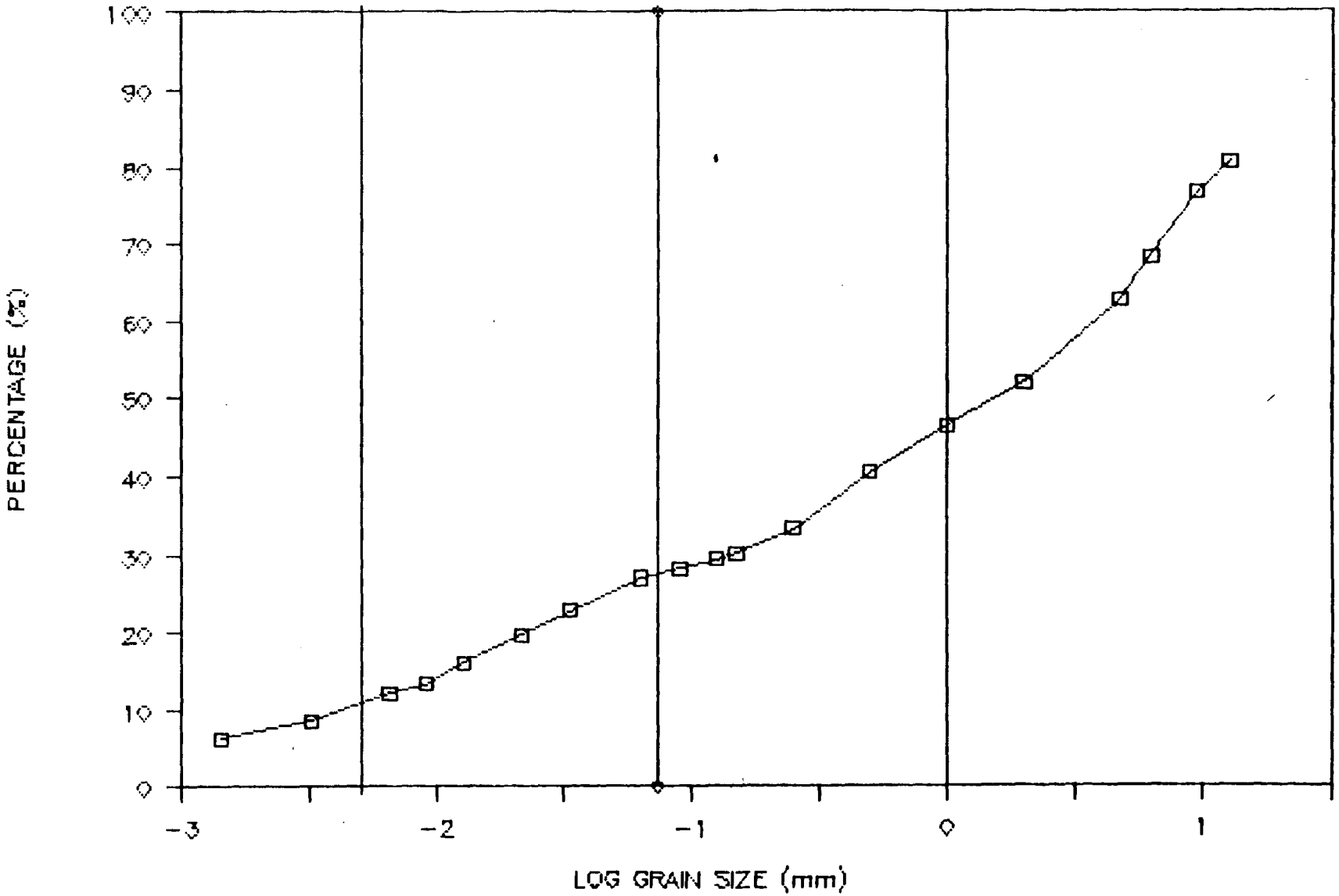
HYDROMETER METHOD SAMPLE #09



00033

GRAIN SIZE ANALYSIS

HYDROMETER METHOD SAMPLE #10



GRAIN SIZE ANALYSES

UNDISTURBED SAMPLES

GRAIN SIZE ANALYSIS

PROJECT NAME: USEPA
BORING NO.: 3984-A

PROJECT NO.: SAS3984A
DEPTH: 7.0-7.55 FT

SAMPLE NO.: ST-11
SPEC. GRAV. 2.7 ASSUMED

==========SIEVE ANALYSIS==========

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in.	75.000	100.0
1.5 in.	37.500	100.0
0.75 in.	19.000	100.0
0.375 in.	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	100.0
NO. 20	0.850	99.9
NO. 40	0.425	99.9
NO. 60	0.250	99.9
NO. 140	0.106	99.8
NO. 200	0.075	99.8

==========HYDROMETER ANALYSIS==========

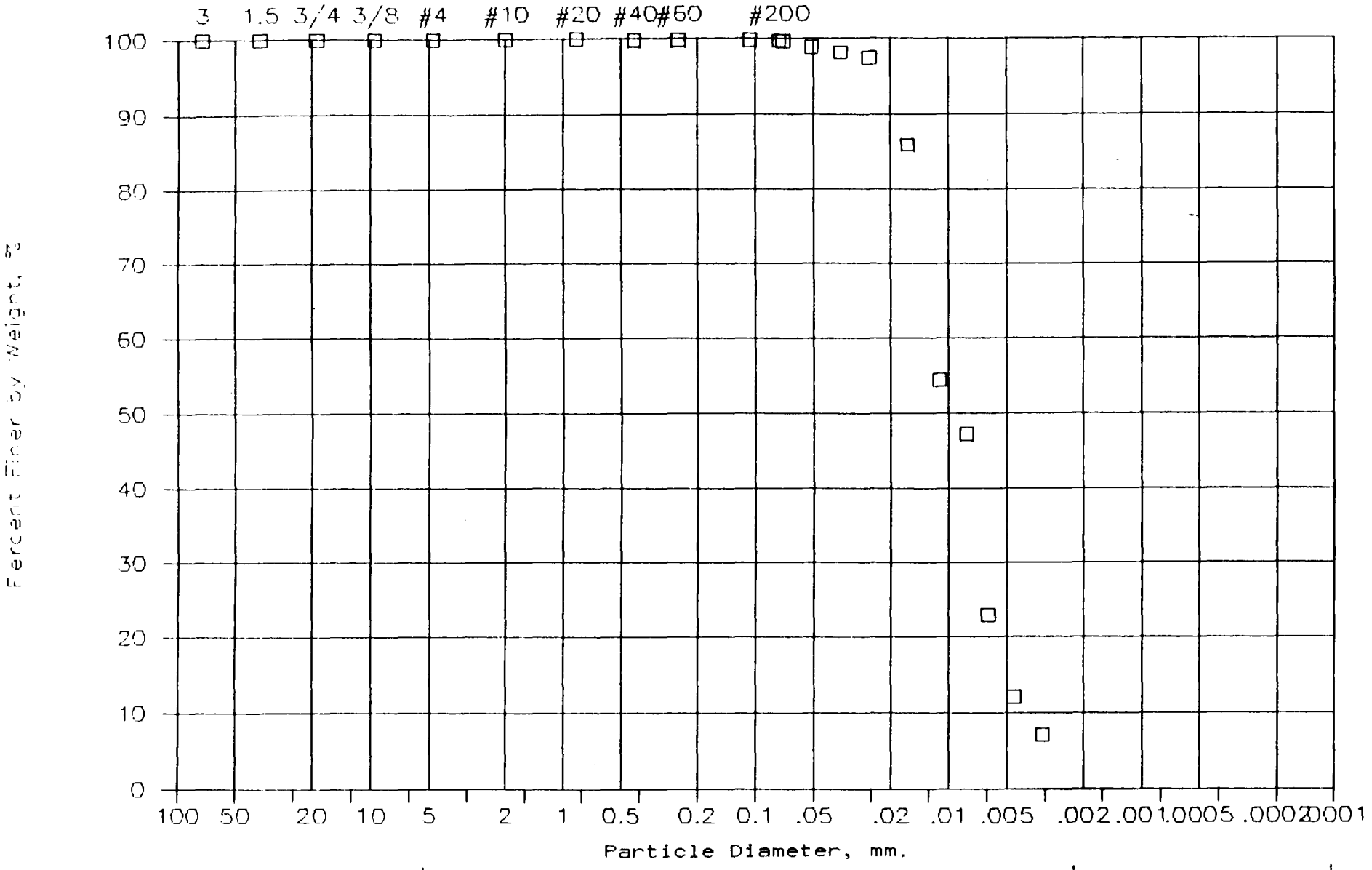
DIAMETER (mm)	PERCENT FINER %	CORRECTED PERCENT %
0.0716	83.5	99.7
0.0509	82.9	98.9
0.0361	82.3	98.2
0.0257	81.7	97.5
0.0162	72.1	86.0
0.0110	45.7	54.5
0.0080	39.6	47.3
0.0062	19.2	22.9
0.0046	10.2	12.2
0.0033	6.0	7.2
0.0014	2.4	2.9

CORRECTION FACTOR = 1.194
WEIGHT OF SOIL FOR SIEVE ANALYSIS = 603.6 (gm)
WEIGHT OF SOIL FOR HYDROMETER ANALYSIS = 66.1 (gm)
VISCOSITY OF WATER = 9.61 (millipoises)

D60= NOT CALC
D30= NOT CALC
D10= NOT CALC

CU= NOT CALC
CZ= NOT CALC

USEPA Project No.: SAS3984A



COBBLES	GRAVEL		SAND			SILT AND CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE

BORING	SAMPLE	DEPTH	SOIL DESCRIPTION	USCS	WC%	PI	LL
3984-A	ST-11	7.0-7.55	DARK GRAY CLAY		24.7		

GRAIN SIZE ANALYSIS

PROJECT NAME: USEPA
BORING NO.: 3984A

PROJECT NO.: SAS-3984A
DEPTH: 5.20-5.45 FT

SAMPLE NO.: ST-12
SPEC. GRAV. 2.68 ASSUMED

==========SIEVE ANALYSIS==========

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in.	75.000	100.0
1.5 in.	37.500	100.0
0.75 in.	19.000	100.0
0.375 in.	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	100.0
NO. 20	0.850	100.0
NO. 40	0.425	99.9
NO. 60	0.250	99.9
NO. 140	0.106	99.7
NO. 200	0.075	99.2

==========HYDROMETER ANALYSIS==========

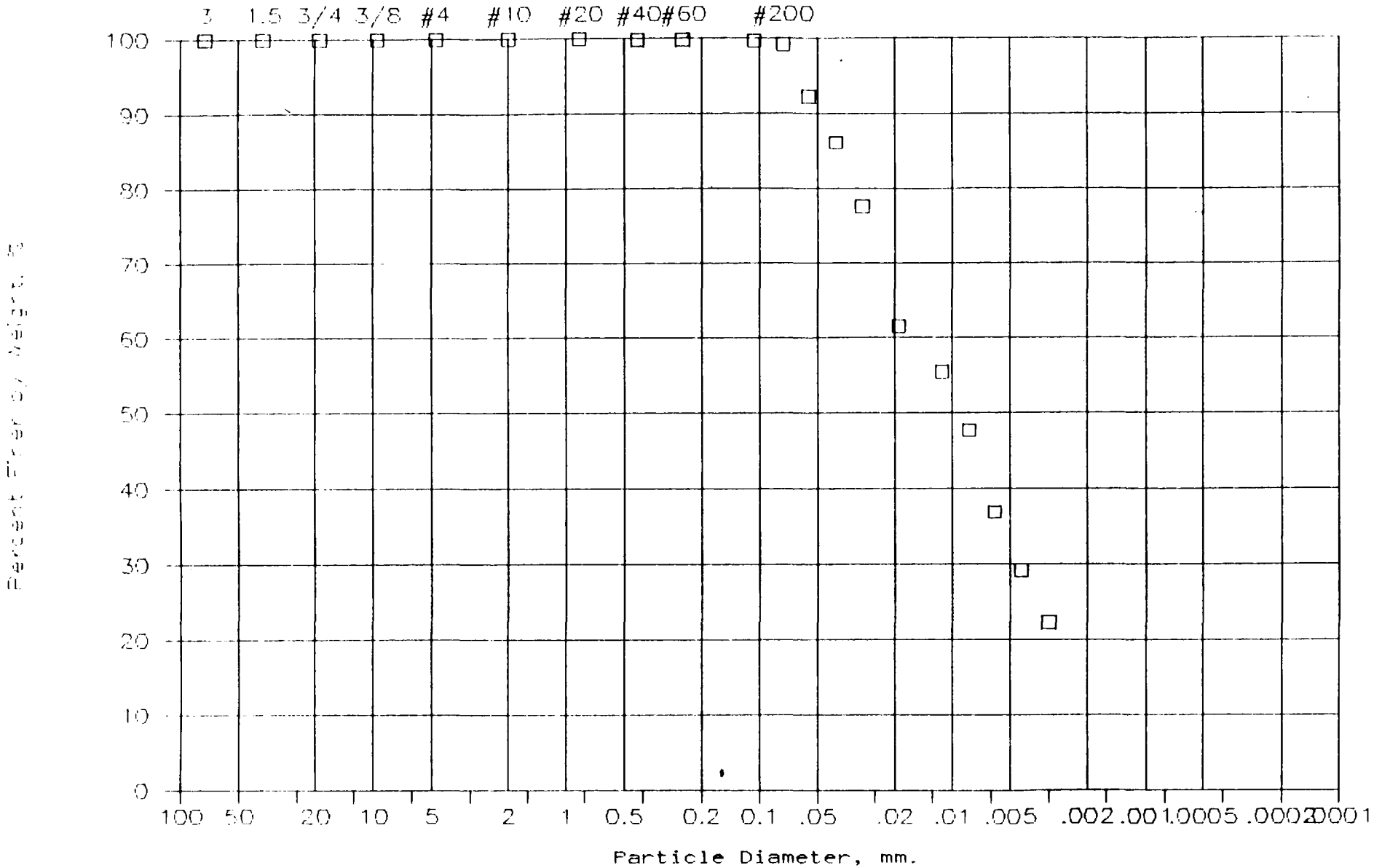
DIAMETER (mm)	PERCENT FINER %	CORRECTED PERCENT %
0.0752	79.9	99.2
0.0551	74.4	92.3
0.0401	69.4	86.2
0.0295	62.6	77.7
0.0189	49.6	61.5
0.0112	44.6	55.4
0.0082	38.4	47.7
0.0060	29.7	36.9
0.0044	23.5	29.2
0.0032	18.0	22.3
0.0013	9.9	12.3

CORRECTION FACTOR = 1.241
WEIGHT OF SOIL FOR SIEVE ANALYSIS = 327.87 (gm)
WEIGHT OF SOIL FOR HYDROMETER ANALYSIS = 64.36 (gm)
VISCOSITY OF WATER = 9.61 (millipoises)

D60= NOT CALC
D30= NOT CALC
D10= NOT CALC

CU= NOT CALC
CZ= NOT CALC

USEPA Project No.: SAS-3984A



COBBLES	GRAVEL		SAND			SILT AND CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE

BORING	SAMPLE	DEPTH	SOIL DESCRIPTION	USCS	WC%	PI	LL
3984A	ST-12	5.20-5.45	BROWN CLAYEY SILT		25.6		

GRAIN SIZE ANALYSIS

PROJECT NAME: USEPA

PROJECT NO.: SAS3984-A

SAMPLE NO.: ST-12

BORING NO.: DUP

DEPTH: 5.20-5.45

SPEC. GRAV. 2.68 ASSUMED

==========SIEVE ANALYSIS==========

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in.	75.000	100.0
1.5 in.	37.500	100.0
0.75 in.	19.000	100.0
0.375 in.	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	100.0
NO. 20	0.850	100.0
NO. 40	0.425	99.9
NO. 60	0.250	99.9
NO. 140	0.106	99.8
NO. 200	0.075	99.4

==========HYDROMETER ANALYSIS==========

DIAMETER (mm)	PERCENT FINER %	CORRECTED PERCENT %
0.0720	109.0	99.0
0.0518	105.8	96.2
0.0377	100.3	91.2
0.0268	99.5	90.5
0.0181	73.7	67.0
0.0107	67.4	61.3
0.0081	51.7	47.0
0.0060	36.1	32.8
0.0045	21.9	20.0
0.0032	13.3	12.1
0.0014	5.5	5.0

CORRECTION FACTOR = 0.909

WEIGHT OF SOIL FOR SIEVE ANALYSIS = 318.16 (gm)

WEIGHT OF SOIL FOR HYDROMETER ANALYSIS = 50.88 (gm)

VISCOSITY OF WATER = 9.61 (millipoises)

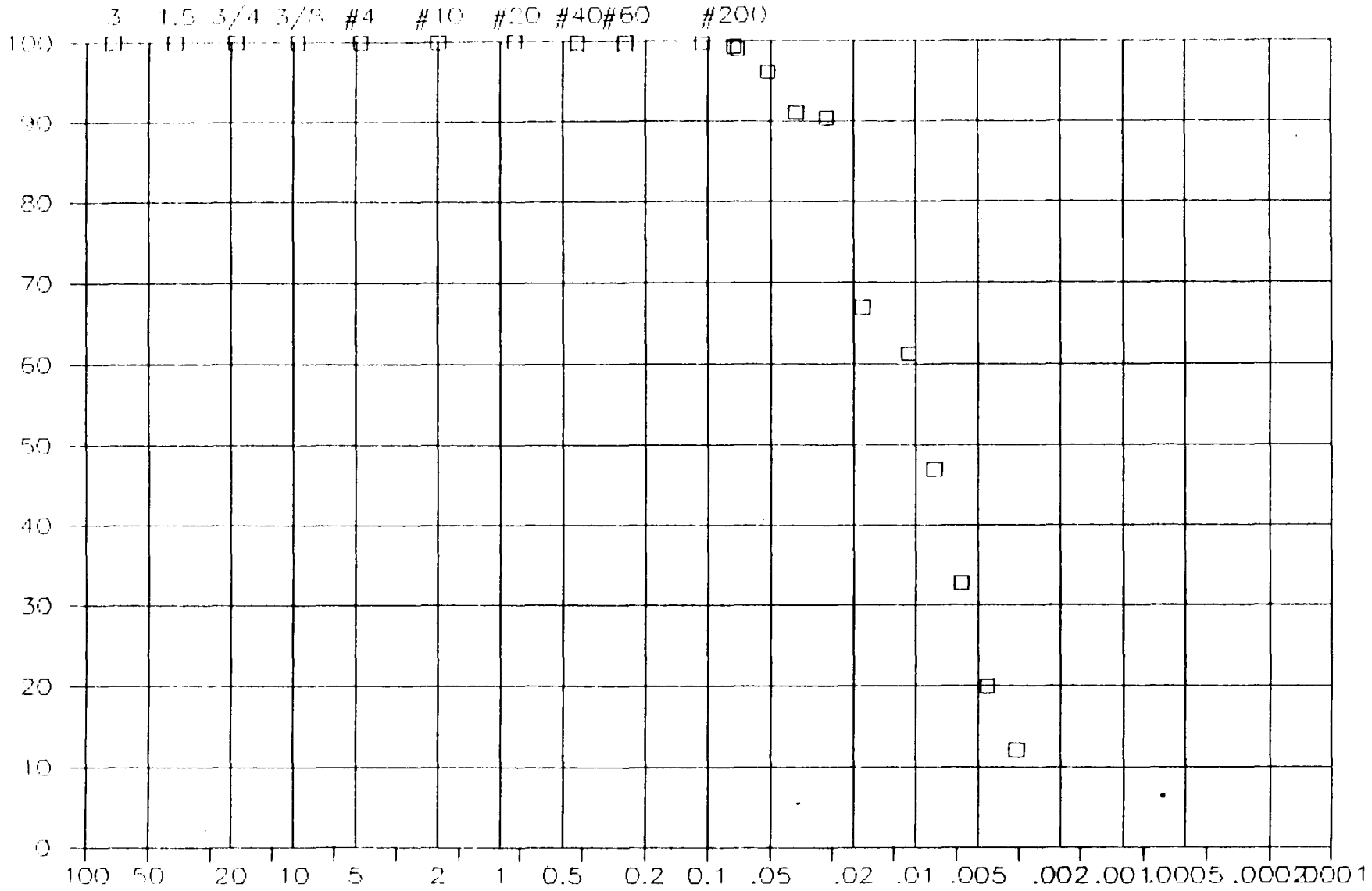
D60= NOT CALC

D30= NOT CALC

D10= NOT CALC

CU= NOT CALC

CZ= NOT CALC



COBBLES	GRAVEL		SAND			SILT AND CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE

BORING	SAMPLE	DEPTH	SOIL DESCRIPTION	USCS	WC%	PI	LL
DUP	ST-12	5.20-5.45	BROWN CLAYEY SILT		25.5		

PERMEABILITY ANALYSES

UNDISTURBED SAMPLES

PROJECT NAME [illegible]
PROJECT NO. [illegible]
PERMEABILITY TEST ON UNDISTURBED SAMPLE FROM [illegible]
BORING NO. ST-11 TEST NO. T-1
SAMPLE NO. ST-11 CELL NO. C-1
DEPTH (ft) 7.55 LOCATION IN CELL P-1

CELL PRESSURE (psi)	59.00	SPECIFIC GRAVITY	2.70
BASE PRESSURE (psi)	54.70	ASSUMED	
TOP PRESSURE (psi)	55.20	AVERAGE GRADIENT	10
AVERAGE EFFECTIVE STRESS (psi)	7.05		

INITIAL SAMPLE CONDITIONS

AVERAGE LENGTH (in)	4.136
AVERAGE DIAMETER (in)	2.870
AVERAGE AREA (in**2)	6.471
WATER CONTENT (%)	24.7
DRY DENSITY (pcf)	105.7
PORE VOLUME (cc)	163

FINAL SAMPLE CONDITIONS

AVERAGE LENGTH (in)	4.140
AVERAGE DIAMETER (in)	2.869
AVERAGE AREA (in**2)	6.465
WATER CONTENT (%)	19.9
DRY DENSITY (pcf)	105.7
PORE VOLUME (cc)	163

ELAPSED TIME (days)	TOTAL FLOW (cc)
.00	.0
.73	2.5
1.67	5.5
2.00	6.5
2.70	8.4
3.04	9.3
4.02	12.0
5.68	16.3
6.69	19.0

****ST
OK.

VISUAL DESCRIPTION *LAYERED DARK GRAY CLAY

PERMEATED WITH *0.01N CALCIUM SULFATE

PROJECT NAME USEPA

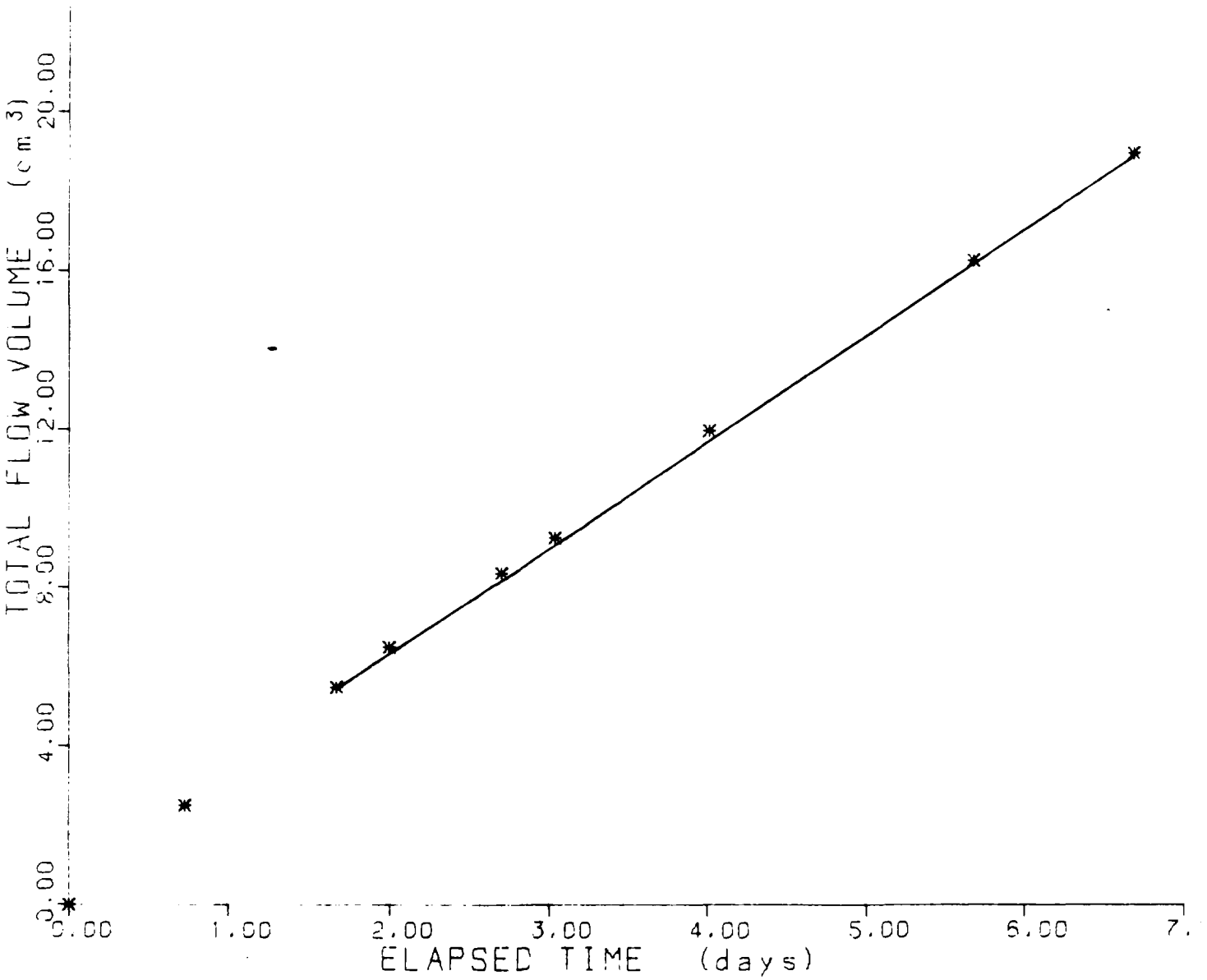
PROJECT NO. 3834A

BORING NO. ST-11

SAMPLE NO. ST-11

DEPTH (ft) 7.55

AVERAGE GRADIENT 10



K_{20} = 6.63E-08 CM/SEC FROM T1 = 1.67 TO T2 = 6.69

PROJECT NAME USEPA
PROJECT NO. 5894A
PERMEABILITY TESTING WITH *0.01N CALCIUM SULFATE
BORING NO. SI-11 TEST NO. 1-2
SAMPLE NO. SI-11 CELL NO. C-24
DEPTH (ft) 7.55 LOCATION IN CELL P-1

CELL PRESSURE (psi)	58.00	SPECIFIC GRAVITY	2.70
BASE PRESSURE (psi)	55.50	(assumed)	
TOP PRESSURE (psi)	52.60	AVERAGE GRADIENT	19
AVERAGE EFFECTIVE STRESS (psi)	3.95		

INITIAL SAMPLE CONDITIONS

AVERAGE LENGTH (in)	4.136
AVERAGE DIAMETER (in)	2.870
AVERAGE AREA (in**2)	6.471
WATER CONTENT (%)	10.1
DRY DENSITY (pcf)	119.7
PORE VOLUME (cc)	127

FINAL SAMPLE CONDITIONS

AVERAGE LENGTH (in)	4.140
AVERAGE DIAMETER (in)	2.869
AVERAGE AREA (in**2)	6.465
WATER CONTENT (%)	19.8
DRY DENSITY (pcf)	119.6
PORE VOLUME (cc)	127

ELAPSED TIME (days)	TOTAL FLOW (cc)
.00	.0
.12	1.1
.77	5.8
1.11	8.0
1.78	12.5
2.07	14.2
3.30	22.3
3.78	25.3
4.78	31.5

****ST
OK.

VISUAL DESCRIPTION LAYERED DARK GRAY CLAY

PERMEATED WITH •0.01N CALCIUM SULFATE

PROJECT NAME USEPA

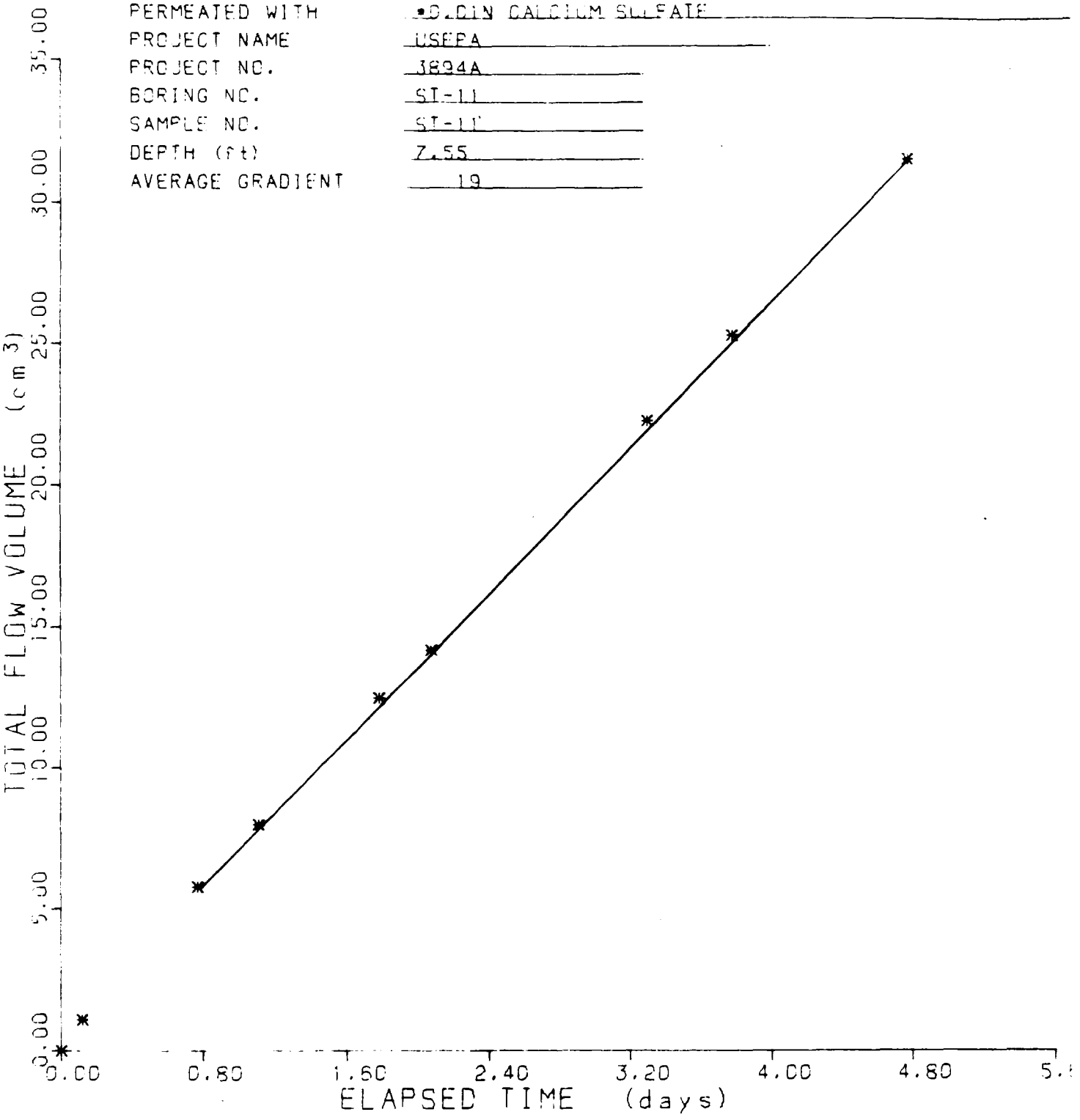
PROJECT NO. 3894A

BORING NO. SI-11

SAMPLE NO. SI-11

DEPTH (ft) 7.55

AVERAGE GRADIENT 19



K_{20} = 8.70E-08 CM/SEC FROM T1 = 0.77 TO T2 = 4.78

PROJECT NAME USEPA
PROJECT NO. 3984A
PERMEABILITY TESTING WITH *0.01N CALCIUM SULFATE
BORING NO. ST-12 TEST NO. T-1
SAMPLE NO. ST-12 CELL NO. C-16
DEPTH (ft) 5.45 LOCATION IN CELL P-1

CELL PRESSURE (psi)	58.00	SPECIFIC GRAVITY	2.70
BASE PRESSURE (psi)	56.70	(assumed)	
TOP PRESSURE (psi)	55.20	AVERAGE GRADIENT	10
AVERAGE EFFECTIVE STRESS (psi)	2.05		

INITIAL SAMPLE CONDITIONS

AVERAGE LENGTH (in)	4.086
AVERAGE DIAMETER (in)	2.860
AVERAGE AREA (in**2)	6.424
WATER CONTENT (%)	25.0
DRY DENSITY (pcf)	100.0
PORE VOLUME (cc)	175

FINAL SAMPLE CONDITIONS

AVERAGE LENGTH (in)	4.062
AVERAGE DIAMETER (in)	2.860
AVERAGE AREA (in**2)	6.423
WATER CONTENT (%)	25.9
DRY DENSITY (pcf)	100.6
PORE VOLUME (cc)	172

ELAPSED TIME (days)	TOTAL FLOW (cc)
.00	.0
.73	8.6
1.67	19.2
2.00	22.9
2.70	30.7
3.04	34.4
4.02	46.7
5.68	67.0
6.69	78.6

****ST
OK,

VISUAL DESCRIPTION •BROWN CLAYEY SILT

PERMEATED WITH •0.01N CALCIUM SULFATE

PROJECT NAME USEPA

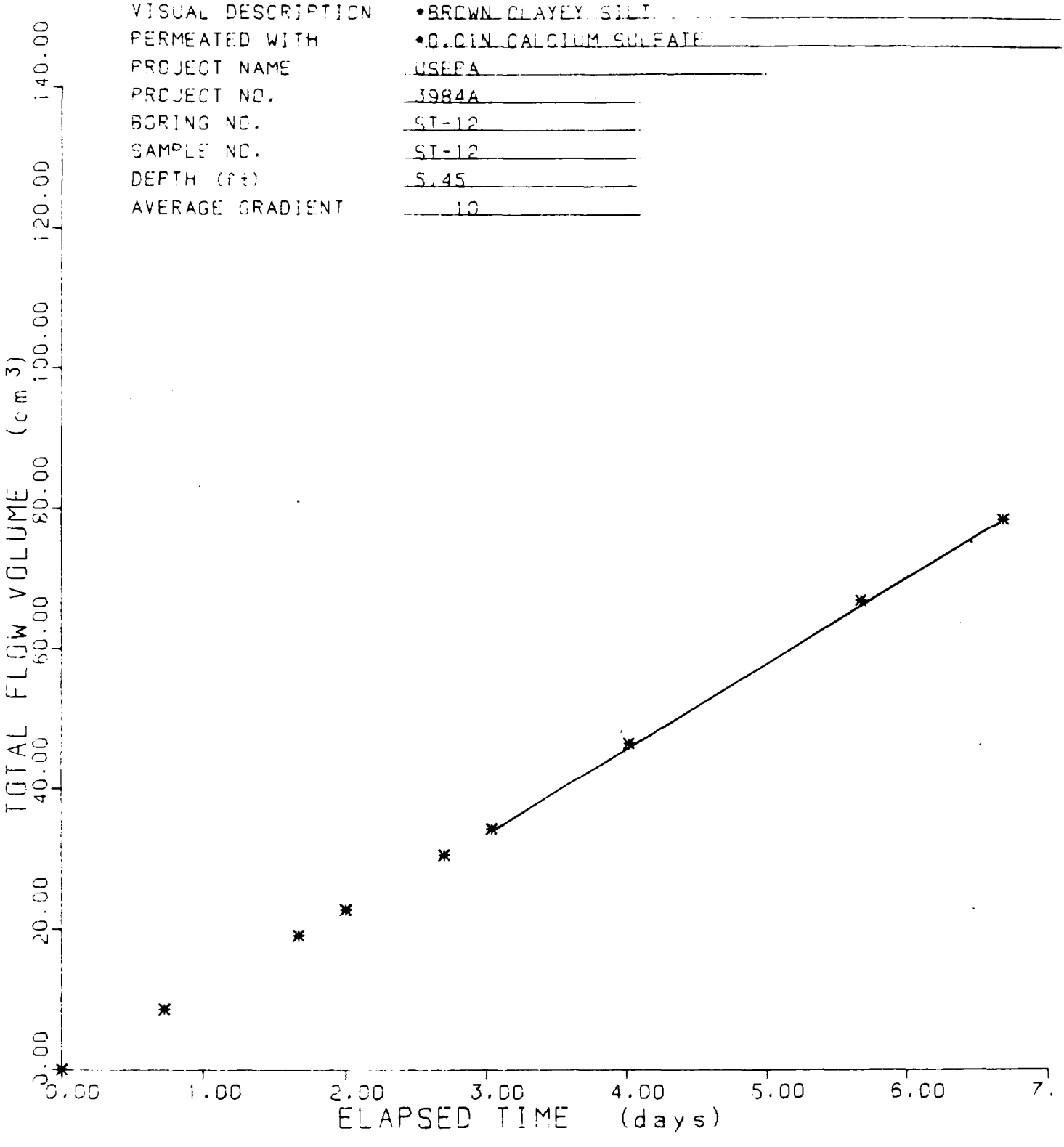
PROJECT NO. 3984A

BORING NO. ST-12

SAMPLE NO. ST-12

DEPTH (ft) 5.45

AVERAGE GRADIENT 10



K_{20} = 2.95E-07 CM/SEC FROM T1 = 3.04 TO T2 = 6.69

PROJECT NAME USEPA
PROJECT NO. 1284A
PERMEABILITY TESTING WITH 20.01N CALCIUM SULFATE
BORING NO. ST-12 TEST NO. T-2
SAMPLE NO. ST-12 CELL NO. C-1
DEPTH (ft) 5.45 LOCATION IN CELL P-1

CELL PRESSURE (psi)	58.00	SPECIFIC GRAVITY	2.70
BASE PRESSURE (psi)	55.50		(assumed)
TOP PRESSURE (psi)	52.60	AVERAGE GRADIENT	20
AVERAGE EFFECTIVE STRESS (psi)		3.95	

INITIAL SAMPLE CONDITIONS

AVERAGE LENGTH (in)	4.086
AVERAGE DIAMETER (in)	2.860
AVERAGE AREA (in**2)	6.424
WATER CONTENT (%)	25.0
DRY DENSITY (pcf)	100.0
PORE VOLUME (cc)	175

FINAL SAMPLE CONDITIONS

AVERAGE LENGTH (in)	4.062
AVERAGE DIAMETER (in)	2.860
AVERAGE AREA (in**2)	6.423
WATER CONTENT (%)	25.9
DRY DENSITY (pcf)	100.6
PORE VOLUME (cc)	172

ELAPSED TIME (days)	TOTAL FLOW (cc)
.00	.0
.12	5.2
.77	19.8
1.11	28.1
1.78	44.1
2.07	50.3
2.07	50.8
2.54	62.6
3.54	86.1

****ST
OK.

VISUAL DESCRIPTION •BROWN CLAYEY SILT

PERMEATED WITH •0.01N CALCIUM SULFATE

PROJECT NAME USEPA

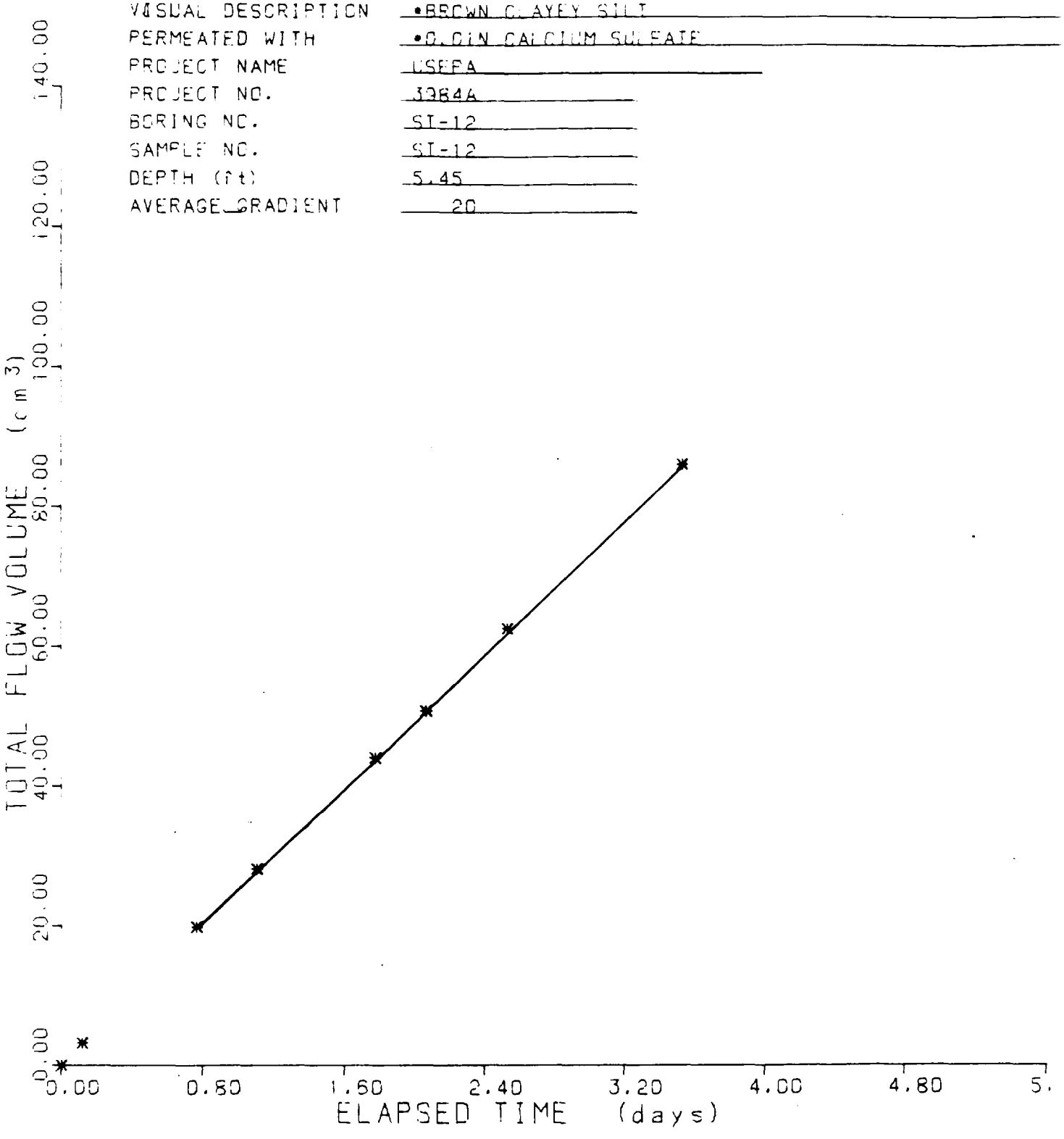
PROJECT NO. 3984A

BORING NO. SI-12

SAMPLE NO. SI-12

DEPTH (ft) 5.45

AVERAGE GRADIENT 20



K_{20} = 3.21E-07 CM/SEC FROM T1 = 0.77 TO T2 = 3.54

APPENDIX G - SUPPLEMENTAL REMEDIAL INVESTIGATION SAMPLE LOCATION MAP

PINETTE'S SALVAGE YARD SITE
USEPA REGION I
WORK ASSIGNMENT NO. 148-1L34
Prepared by
Dale R. Blackstone, RLS #1219
P.O. Box 363
Crouseville, Maine
CLIENT
USEPA REGION I
CONTRACT
68-01-7250
SCALE
1" = 20'
DATE
SEPTEMBER, 1988
SHEET 1 OF 1
DRAWING NO.
REV.
Surveyor's seal
Dale R. Blackstone
MAGNETIC NORTH
TRUE NORTH
GRID NORTH
19° 22'
3° 14' angle not to scale
LEGEND
UTILITY POLE
EDGE OF MAJOR VEGETATION
TOPOGRAPHIC CONTOUR LINE
INTERMITTENT WATER COURSE
HORIZONTAL CONTROL POINT
MONITORING WELL LOCATION
BACKGROUND SURFACE SOIL SAMPLE LOCATION
SEDIMENT SAMPLE LOCATION
SURFACE SOIL SAMPLE LOCATION
SURFACE WATER SAMPLE LOCATION
SHALLOW SOIL BORING LOCATION
20 0 20 40 60 80 100 FEET
To Azimuth Mark Ebasco II 87°57'58" 7384.93'

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APPENDIX H

TOXICITY PROFILES FOR SELECTED CHEMICALS OF CONCERN AT THE PINETTES SITE

APPENDIX H

ACETONE

Acetone is absorbed in humans and animals following oral or inhalation exposure (EPA 1984). Acetone vapors as high as 2,150 ppm produce irritation of the mucosal membranes in humans (EPA 1984). In rats, slight increases in organ weights and decreases in body weights have been observed following long-term exposure to acetone (EPA 1986).

EPA (1988) derived an oral reference dose (RfD) for acetone of 0.1 mg/kg/day based on a study sponsored by the EPA Office of Solid Waste (EPA 1986) in which increased liver and kidney weights and nephrotoxicity were observed in rats exposed orally to acetone; an uncertainty factor of 1,000 was used to derive the RfD.

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1984. Health Effects Assessment for Acetone. Environmental Criteria and Assessment Office, Cincinnati, Ohio. EPA 540/1-86-016

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1986. Ninety-Day Gavage Study in Albino Rats Using Acetone. Office of Solid Waste, Washington, DC. As cited in EPA 1988

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1988. Integrated Risk Information System (IRIS). Environmental Criteria and Assessment Office, Cincinnati, Ohio

ANTIMONY

Antimony is a metal which occurs both in the trivalent and pentavalent oxidation states (EPA 1980). Absorption of this metal via oral and inhalation routes is low (EPA 1980). Humans and animals exposed orally or through inhalation to either trivalent or pentavalent forms of antimony displayed electrocardiogram (ECG) changes and myocardial lesions (EPA 1980). Pneumoconiosis has been observed in humans exposed by inhalation and dermatitis has occurred in individuals exposed either orally or dermally. Oral administration of therapeutic doses in humans has been associated with nausea, vomiting, and hepatic necrosis (EPA 1980). A single report (Balyeava 1967) noted an increase in spontaneous abortions, premature births, and gynecological problems in 318 female workers exposed to a mixture of antimony metal, antimony trioxide, and antimony pentasulfide dusts.

EPA (1988) derived an oral RfD of 4×10^{-4} mg/kg/day for antimony based on a chronic oral study (Schroeder et al. 1970) in which rats given the metal in drinking water had altered blood glucose and blood cholesterol levels and decreased lifespan. An uncertainty factor of 1,000 was used to derive the oral RfD.

BALYAEVA, A.P. 1967. The effects of antimony on reproduction. Gig. Truda Prof. Zabol. 11:32

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1980. Ambient Water Quality Criteria for Antimony. Office of Water Regulations and Standards, Washington, D.C. EPA 440/5-80-020

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1988. Integrated Risk Information System (IRIS). Environmental Criteria and Assessment Office, Cincinnati, Ohio

SCHROEDER, H.A., MITCHNER, M., and NASAR, A.P. 1970. Zirconium, niobium, antimony, vanadium, and lead in rats: Lifetime studies. J. Nutr. 100:59-66

ARSENIC

Arsenic is readily absorbed via the oral and inhalation routes. Both inorganic and organic forms of arsenic are readily absorbed from the gastrointestinal tract; more soluble forms are more readily absorbed than the insoluble forms (EPA 1984). Approximately 95 percent of soluble inorganic arsenic administered to rats is absorbed from the gastrointestinal tract (Coulson et al. 1935, Ray-Bettley and O'Shea 1975). Approximately 70 to 80 percent of arsenic deposited in the respiratory tract of humans has been shown to be absorbed (Holland et al. 1959). Dermal absorption is not significant (EPA 1984).

Acute exposure of humans to the metal arsenic has been associated with gastrointestinal effects, hemolysis, and neuropathy. Chronic exposure of humans to this metal can produce toxic effects on both the peripheral and central nervous systems, keratosis, hyperpigmentation, precancerous dermal lesions, and cardiovascular damage (EPA 1984). Arsenic is embryotoxic, fetotoxic, and teratogenic in several animals species (EPA 1984). Arsenic is a known human carcinogen. Epidemiological studies of workers in smelters and in plants manufacturing arsenical pesticides have shown that inhalation of arsenic is strongly associated with lung cancer and perhaps with hepatic angiosarcoma (EPA 1984). Ingestion of arsenic has been linked to a form of skin cancer and more recently to bladder, liver, and lung cancer (Tseng et al. 1968, Chen et al. 1986).

EPA has classified arsenic in Group A--Human Carcinogen, and has developed inhalation and oral cancer potency factors of 50 $(mg/kg/day)^{-1}$ and 1.75 $(mg/kg/day)^{-1}$, respectively (EPA 1988a, 1988b). The inhalation potency factor is the geometric mean value of potency factors derived from four occupational exposure studies on two different exposure populations (EPA 1984). The oral cancer potency factor was based on an epidemiological study in Taiwan which indicated an increased incidence of skin cancer in individuals exposed to arsenic in drinking water (Tseng 1977). EPA (1988b) has reported an oral reference dose of $1x10^{-3}$ mg/kg/day based on the study by Tseng (1977) in which investigating blackfoot disease was observed in humans exposed to arsenic in their drinking water. An uncertainty factor of 1 was used to develop the RfD.

CHEN, C., CHUANG, Y. YOU, S., LIN, T., and WU, H. 1986. A retrospective study on malignant neoplasms of bladder, lung, and liver in blackfoot disease endemic area in Taiwan. Br. J. Cancer 53:399-405

COULSON, E.J., REMINGTON, R.E., and LYNCH, K.M. 1935. Metabolism in the rat of the naturally occurring arsenic of shrimp as compared with arsenic trioxide. J. Nutr. 10:255-270

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1984. Health Assessment Document for Inorganic Arsenic. Office of Health and Environmental Assessment, Washington D.C. EPA 600/8-83-021F

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TSENG, W.P. 1977. Effects and dose-response relationships of skin cancer and blackfoot disease with arsenic. Environ. Health Perspect. 19:109-119

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA). 1984. Health assessment document for inorganic arsenic. Final report. EPA-660/8-83-021F. Office of Health and Environmental Assessment

BENZENE

Benzene is readily absorbed following oral and inhalation (EPA 1985). The toxic effects of benzene vapors in humans and other animals following exposure by inhalation include central nervous system effects, hematological effects, and immune system depression. In humans, acute exposures to high concentrations of benzene vapors has been associated with dizziness, nausea, vomiting, headache, drowsiness, narcosis, coma, and death (NAS 1976). Chronic exposure to benzene vapors can produce reduced leukocyte, platelet, and red blood cell count (EPA 1985). Benzene induced both solid tumors and leukemias in rats exposed by gavage (Maltoni et al. 1985). Many studies have also described a causal relationship between exposure to benzene by inhalation (either alone or in combination with other chemicals) and leukemia in humans (IARC 1982).

Applying EPA's criteria for evaluating the overall evidence of carcinogenicity to humans, benzene is classified in Group A (Human Carcinogen) based on adequate evidence of carcinogenicity from epidemiological studies. EPA (1988) derived both an oral and an inhalation cancer potency factor for benzene of 2.9×10^{-2} $(mg/kg/day)^{-1}$. This value was based on several studies which increased incidences of nonlymphocytic leukemia were observed in humans occupationally exposed to benzene principally by inhalation (Rinsky 1981, Ott 1978, Wong 1983).

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RINSKY, R.A., YOUNG, R.J., and SMITH, A.B. 1981. Leukemia in benzene workers. Am. J. Ind. Med. 3:217-245

WONG, O., MORGAN, R.W., AND WHORTON, M.D. 1983. Comments on the NIOSH Study of Leukemia in Benzene Workers. Technical report submitted to Gulf Canada, Ltd. by Environmental Health Associates

BERYLLIUM

Beryllium is not readily absorbed by any route of exposure. Occupational exposure to beryllium results in high levels being seen in the bone, liver and kidney (EPA 1986). Acute respiratory effects due to beryllium exposure include rhinitis, pharyngitis, tracheobronchitis, and acute pneumonitis. Dermal exposure to soluble beryllium compounds can cause contact dermatitis, ulceration and granulomas (Hammond and Beliles 1980). Ocular effects include conjunctivitis and corneal ulceration from splash burns. The most common clinical symptoms caused by chronic beryllium exposure are granulomatous lung inflammation (IARC 1980, EPA 1986). Chronic skin lesions sometimes appear after a long latent period in conjunction with the pulmonary effects. Systemic effects from beryllium exposure may include right heart enlargement with accompanying cardiac failure, liver and spleen enlargement, cyanosis, digital clubbing, and kidney stone development (EPA 1986). Beryllium has been shown to be carcinogenic in experimental animals resulting primarily in lung and/or bone tumors when given by injection, intratracheal administration, or inhalation (EPA 1986). Several epidemiological studies have suggested that occupational exposure to beryllium may result in an increased lung cancer risk although the data are inconclusive (EPA 1986).

Beryllium has been classified by EPA in Group B2--Probable Human Carcinogen based on limited evidence of carcinogenicity from epidemiological studies (EPA 1986). The Carcinogen Assessment Group (CAG) calculated an inhalation cancer potency factor of 8.4 $(mg/kg/day)^{-1}$ based on an epidemiological study by Wagoner at al. (1980) and the industrial hygiene reviews by NIOSH (1972) and Eisenbud and Lisson (1983) (EPA 1986). EPA (1988) developed an oral reference dose (RfD) for beryllium of 0.005 mg/kg/day based on a study by Schroeder and Mitchner (1975) in which rats exposed to 5 ppm beryllium sulfate in drinking water for lifetime did not exhibit adverse effects; an uncertainty factor of 100 was used to develop the RfD.

EISENBUD, M., and LISSON, J. 1983. Epidemiological aspects of beryllium-induced nonmalignant lung disease: A 20-year update. JOM J. Occup. Med. 25:198

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1986. Health Assessment Document for Beryllium. Review Draft. Office of Health and Environmental Assessment, Washington, D.C. EPA 600/8-84-026B. April 1986

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INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC). 1980. Some Metals and Metallic Compounds. Vol. 23: IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. World Health Organization, Lyon, France. Pp. 143-204

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SCHROEDER, H.A., AND MITCHNER, M. 1975. Life-term studies in rats: Effects of aluminum, barium, beryllium, and tungsten. J. Nutr. 105:421-421

BIS(2-ETHYLHEXYL)PHTHALATE

Bis(2-ethylhexyl)phthalate also known as di-ethylhexyl phthalate (DEHP) is readily absorbed following oral or inhalation exposure (EPA 1980). DEHP is reported to be carcinogenic in rats and mice, causing increased incidences of hepatocellular carcinomas or neoplastic nodules following oral administration (NTP 1982). Chronic exposure to relatively high concentrations of DEHP in the diet can cause retardation of growth and increased liver and kidney weights in laboratory animals (NTP 1982, EPA 1980). Reduced fetal weight and increased number of resorptions have been observed in rats exposed orally to DEHP (EPA 1980).

DEHP has been classified in Group B2--Probable Human Carcinogen (EPA 1986). EPA (1988) calculated an oral cancer potency factor for DEHP of 1.4×10^{-2} $(mg/kg/day)^{-1}$ based on data from the NTP (1982) study. EPA has recommended an oral reference dose (RfD) for DEHP of 0.02 mg/kg/day based on a study by Carpenter et al. (1953) in which increased liver weight was observed in female guinea pigs exposed to 19 mg/kg bw/day in the diet for 1 year (EPA 1988); an uncertainty factor of 1,000 was used to develop the RfD.

CARPENTER, C.P., WEIL, C.S., and SMYTH, H.F. 1953. Chronic oral toxicity of di(2-ethylhexyl)phthalate for rats, guinea pigs, and dogs. Arch. Indust. Hyg. Occup. Med. 8:219-226

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1980. Ambient Water Quality Criteria for Phthalate Esters. Office of Water Regulations and Standards, Criteria and Standards Division, Washington, D.C. October 1980. EPA 40/5-80-067

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1986. Superfund Public Health Evaluation Manual. Office of Emergency and Remedial Response, Washington, D.C. EPA 540/1-86-060

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1988. Integrated Risk Information System (IRIS). Environmental Criteria and Assessment Office, Cincinnati, Ohio

NATIONAL TOXICOLOGY PROGRAM (NTP). 1982. Carcinogenesis Bioassay of Di(2-ethylhexyl)phthalate in F344 Rats and B6C3F_1 Mice. Feed Study. NTP Technical Report Series No. 217, U.S. Department of Health and Human Services. NIH Publication No. 82-1773. NTP-80-37

2-BUTANONE (METHYL ETHYL KETONE)

Absorption of methyl ethyl ketone from the gastrointestinal tract and from the lungs has been inferred from systemic toxic effects observed following acute oral exposure and acute and subchronic inhalation exposures (Lande et al. 1976). Schwetz et al. (1974) reported that rats exposed to inhaled methyl ethyl ketone at concentrations of 3,000 ppm displayed retarded fetal development and teratogenic effects (acaudia, imperforate anus, and brachygnathia). Inhaled methyl ethyl ketone also produces hepatotoxicity and neurological effects in rats (Cavender et al. 1983, Takeuchi et al. 1983).

EPA (1988a) determined an oral reference dose (RfD) of 5×10^{-2} mg/kg/day for methyl ethyl ketone based on a study by LaBelle and Brieger (1955) in which no effects were observed in 25 rats exposed to 235 ppm (693 mg/m^3 or 46 mg/kg/day) methyl ethyl ketone for 7 hours/day, 5 days/week for 12 weeks. Higher doses have resulted in fetotoxic effects in rats exposed to methyl ethyl ketone via inhalation (1958 mg/m^3 or 130 mg/kg/day) (Schwetz et al. 1974). EPA (1988b) also derived an inhalation RfD of 9×10^{-2} mg/kg/day based on the LaBelle and Brieger (1955) study. An uncertainty factor of 1,000 was used to calculate both oral and inhalation RfDs.

CAVENDER, F.L., CASEY, H.W., SALEM, H., SWENBERG, J.A., and GARALLA, E.J. 1983. A 90-day vapor inhalation toxicity study of methyl ethyl ketone. Fund. Appl. Toxicol. 3:264-270

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LABELLE, C.W., and BRIEGER, H. 1955. Vapor toxicity of a composite solvent and its principal components. Arch. Ind. Health 12:623-627

LANDE, S.S., DURKIN, P.R., CHRISTOPHER, D.H., HOWARD, P.H., and SAXENA, J. 1976. Investigation of Selected Potential Environmental Contaminants: Ketonic Solvents. U.S. Environmental Protection Agency, Washington, D.C. EPA 560/2-76-003

SCHWETZ, B.A., LEONG, B.K.J., and GEHRING, P.J. 1974. Embryo- and fetotoxicity of inhaled carbon tetrachloride, 1,1-dichloroethane and methyl ethyl ketone in rats. Toxicol. Appl. Pharmacol. 28:452-464

TAKEUCHI, Y., ONO, Y., HISANAGA, N., ET AL. 1983. An experimental study of the combined effects of n-hexane and methyl ethyl ketone. Br. J. Ind. Med. 40:199-203

CHLOROBENZENE

Evidence from toxicity studies suggests that chlorobenzene is absorbed after oral, inhalation, and dermal exposure (EPA 1985). Acute and chronic exposure to chlorobenzene has been associated in humans and experimental animals with central nervous system (CNS) effects, liver and kidney lesions, and respiratory distress. Results of reproductive studies with rats and dogs also indicate that chlorobenzene induces testicular lesions (EPA 1985).

EPA (1988) derived an oral RfD for chlorobenzene of $3x10^{-2}$ mg/kg/day based on a study by Monsanto (1967) in which dogs were administered chlorobenzene in capsules for 90 days; an uncertainty factor of 1,000 was used to develop the RfD. EPA (1988) also reported an inhalation RfD for chlorobenzene of $5x10^{-3}$ mg/kg/day based on a study by Dilley (1977) in which rats were exposed to chlorobenzene 7 hours/day, 5 days/week for 120 days; and uncertainty factor of 10,000 was used to develop the RfD.

DILLEY, J.V. 1977. Toxic Evaluation of Inhaled Chlorobenzene. NIOSH, DHEW, Cincinnati, OH. Contract 210-76-0126

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1985. Health Assessment Document for Chlorinated Benzenes. Final Report. Office of Health and Environmental Assessment, Washington, D.C. EPA/600/8-84/015F

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1988. Health Effects Assessment for Chlorobenzene. Office of Emergency and Remedial Response, Washington, D.C. EPA/540/1-86-040

MONSANTO COMPANY. 1967. 13-Week Oral Administration--Dogs, Monochlorobenzene. U.S. EPA, OPTS, Washington, D.C. TSCA Sec 8(d) submission 8DHQ-1078-0202(2)

CHLOROETHANE (ETHYL CHLORIDE)

Chloroethane is primarily absorbed through the lungs, although some dermal absorption may occur. Absorption and excretion of chloroethane occurs rapidly via the lungs; it is not metabolized to a significant degree (Clayton and Clayton 1981). Severe acute inhalation of chloroethane by humans produces minor neurological effects that are manifested as stupor and lack of coordination, and in some incidences as cardiac arrhythmia produced by the potentiation of adrenalin (Clayton and Clayton 1981). Acute inhalation of chloroethane by animals has produced histological or pathological changes in the liver, brain, and lungs (Troshina 1964). Chronic exposure of animals to chloroethane produced kidney damage and fatty changes in the liver, and at high levels has upset cardiac rhythm (EPA 1985). Studies assessing the mutagenicity and carcinogenicity of chloroethane are currently being conducted (EPA 1985).

CLAYTON, G. and CLAYTON, F., ed. 1981. Patty's Industrial Hygiene and Toxicology: Volume 2B-Toxicology. 3rd ed. John Wiley and Sons, New York, New York

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1985. Chemical, Physical, and Biological Properties of Compounds Present at Hazardous Waste Sites. Final Report: Methyl Chloride. Prepared for EPA by Clement Associates, Inc., Arlington , Va. September 27

TROSHINA, M. 1964. Toksikol. Novykk. Prom. Khim. Veshchestv. 6: 45 (through Chem. Abstr.) (As cited in Clayton and Clayton 1981)

CHLOROMETHANE (METHYL CHLORIDE)

Chloromethane is primarily absorbed by inhalation, although some is absorbed through the skin (NIOSH 1977). The compound is widely distributed in the body and rapidly metabolized and excreted within 24 hours of exposure. Acute exposure to humans produced primarily central nervous system (CNS) effects including headache, drowsiness, giddiness, ataxia, convulsions, hepatic and renal effects, depression of bone marrow activity, coma, and respiratory failure (ACGIH 1986). Symptoms may develop a few hours after exposure to chloromethane. Chronic effects of chloromethane exposure include blurred vision, dizziness, weakness, gastrointestinal disturbances with prolonged vomiting, sleep disturbances, muscular incoordination, and tachycardia (Hansen et al. 1953). Chronic exposure in animals was reported to produce neuromuscular, liver, kidney, and testicular damage and death (Evtushenko 1966, Mitchell et al. 1979, Smith and von Oettingen 1947). Chloromethane has produced teratogenic effects in the form of heart defects in the offspring of exposed mice (CIIT 1981a). Chloromethane was found to be carcinogenic in male mice exposed by inhalation for 24 months, producing tumors of the kidney and liver (CIIT 1981b).

EPA (1988) developed cancer potency factors for chloromethane from kidney tumor data in male mice obtained from the CIIT (1981b) study. An inhalation cancer potency factor of 6.3×10^{-3} $(mg/kg/day)^{-1}$ was calculated. EPA (1986) also calculated an oral cancer potency factor of 1.3×10^{-2} $(mg/kg/day)^{-1}$ based on an oral extrapolation from data obtained in the CIIT (1981b) study.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH). 1986. Documentation of the Threshold Limit Values and Biological Exposure Indices. 5th ed. ACGIH, Inc., Cincinnati, Ohio. p. 380

CHEMICAL INDUSTRY INSTITUTE OF TOXICOLOGY (CIIT). 1981a. Final Report on Structural Teratogenicity Evaluations of Methyl Chloride in Rats and Mice after Inhalation. Prepared by Battelle Columbus Laboratories. April 30. (As cited in EPA 1985)

CHEMICAL INDUSTRY INSTITUTE OF TOXICOLOGY (CIIT). 1981b. Final Report on 24 Month Inhalation Study on Methyl Chloride. Prepared by Battelle Columbus Laboratories. December 31. (As cited in EPA 1985)

CLAYTON, G. and CLAYTON, F., ed. 1981. Patty's Industrial Hygiene and Toxicology: Volume 2B-Toxicology. 3rd ed. John Wiley and Sons, New York, New York

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1985. Chemical, Physical, and Biological Properties of Compounds Present at Hazardous Waste Sites. Final Report: Methyl Chloride. Prepared for EPA by Clement Associates, Inc., Arlington , Va. September 27

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1986. Health and Environmental Effects Profile for Methyl Chloride. Office of Health and Environmental Assessment. Environmental Criteria and Assessment Office, Cincinnati, Ohio (As cited in EPA 1988)

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1988. Memorandum for Chris DeRosa, Environmental Criteria and Assessment Office, Cincinnati, OH, to Bruce Means. June Quarterly Update for HEA and HEED Chemicals. July 15

EVTUSHENKO, G. 1966. Gig. Tr. Prof. Zabol. 10:20 (As cited in Clayton and Clayton 1981)

HANSEN, H., WEAVER, K., and VENABLE, F. 1953. Arch. Ind. Hyg. Occup. Med. 8:328-334 (As cited in ACGIH 1986)

MITCHELL, R., PAVKOV, K., EVERETT, R., and HOLZWORTH, D. 1979. CIIT Docket No. 63059. Research Triangle Park, North Carolina (As cited in Clayton and Clayton 1981)

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH). 1977. Occupational Diseases, A Guide to their Recognition. p. 208 DHEW (NIOSH) Pub. No. 77-181 (June 1977). (As cited in ACGIH 1986)

SMITH, W. and VON OETTINGEN, W. 1947. J. Ind. Hyg. Toxicol. 29:47 (As cited in Clayton and Clayton 1981)

CHROMIUM

Chromium exists in two states, as chromium (III) and as chromium (VI). Following oral exposure, absorption of chromium (III) is low while absorption of chromium (VI) is high (EPA 1987). Chromium is an essential micronutrient and is not toxic in trace quantities (EPA 1980). High levels of soluble chromium (VI) and chromium (III) can produce kidney and liver damage following acute oral exposure; target organs affected by chronic oral exposure remain unidentified (EPA 1984). Chronic inhalation exposure may cause respiratory system damage (EPA 1984). Further, epidemiological studies of worker populations have clearly established that inhaled chromium (VI) is a human carcinogen; the respiratory passages and the lungs are the target organs (EPA 1984). Inhalation of chromium (III) or ingestion of chromium (VI) or (III) has not been associated with carcinogenicity in humans or experimental animals (EPA 1984). Certain chromium salts have been shown to be teratogenic and embryotoxic in mice and hamsters following intravenous or intraperitoneal injection (EPA 1984).

EPA has classified inhaled chromium (VI) in Group A--Probable Human Carcinogen (EPA 1988). Inhaled chromium (III) and ingested chromium (III) and (VI) have not been classified with respect to carcinogenicity. EPA (1988) developed an inhalation cancer potency factor of 41 $(mg/kg/day)^{-1}$ for chromium (VI) based on an increased incidence of lung cancer in workers exposed to chromium over a 6 year period, and followed for approximately 40 years (Mancuso 1975). EPA (1988) derived an oral reference dose of $5.0x10^{-3}$ mg/kg/day for chromium (VI) based on a study by MacKenzie et al. (1958) in which no observable adverse effects were observed in rats exposed to 2.4 mg chromium (VI)/kg/day in drinking water for 1 year. An uncertainty factor of 500 was used to derive the RfD. EPA (1988) developed an oral RfD of 1 mg/kg/day for chromium (III) based on a study in which rats were exposed to chromic oxide baked in bread; no effects due to chromic oxide treatment were observed at any dose level (Ivankovic and Preussman 1975). A safety factor of 1000 was used to calculate the oral RfD.

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1980. Ambient Water Quality Criteria for Chromium. Office of Water Regulations and Standards. Washington, D.C. EPA 440/5-80-035.

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1984. Health Assessment Document for Chromium. Environmental Criteria and Assessment Office, Research Triangle Park, N.C. EPA 600/8-83-014F

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1987. Draft Health Advisory for Chromium. Office of Drinking Water, Washington, D.C. March 31, 1987.

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1988. Integrated Risk Information System (IRIS). Environmental Criteria and Assessment Office, Cincinnati, Ohio

IVANKOVIC, S., and PREUSSMAN, R. 1975. Absence of toxic and carcinogenic effects after administration of high doses of chromic oxide pigment in subacute and long-term feeding experiments in rats. Fd. Cosmet. Toxicol. 13:347-351

MANCUSO, T.F. 1975. International Conference on Heavy Metals in the Environment. Toronto, Canada

MACKENZIE, R.D., BYERRUM, R.V., DECKER, C.F., HOPPERT, C.A., AND LONGHAM, F.L. 1958. Chronic toxicity studies II. Hexavalent and trivalent chromium administered in drinking water to rats. Arch. Ind. Health. 18:232-234

DDD, DDE, DDT

DDT and DDE are absorbed through the skin and gastrointestinal tract in humans (EPA 1984). In humans, DDT and its metabolites are stored primarily in adipose tissue; storage of DDT in human tissues can last up to 20 years and tissue storage of DDE can last for the lifetime of the individual (NIOSH 1978). Acute oral exposure to DDT in humans an animals causes dizziness, confusion, tremors, convulsions, and parathesia of the extremities. Allergic reactions in humans following dermal exposure to DDT have also been reported (EPA 1980). Long-term occupational exposure to DDT and DDE results in increased activity in hepatic microsomal enzymes, increased serum concentrations of LDH, SGOT, and cholesterol, decreased serum concentrations of creatinine phosphokinase, increased blood pressure, and increased frequency of miscarriages (NIOSH 1978). Liver effects, neurological effects, immunotoxicity, reduced fertility, embryotoxicity, and fetotoxicity have also been reported in animals exposed to DDT or DDE (NIOSH 1978, McLachlan and Dixon 1972, Schmidt 1973). DDT has been shown to be carcinogenic in mice and rats at several dose levels or dosage regimens. The principal site of action was the liver, but an increased incidence of tumors of the lung and lymphatic system were reported in several investigations (NIOSH 1978, Tomatis et al. 1974, NCI 1978). DDE also caused hepatocellular carcinomas in both sexes in B6C3F1 mice (NCI 1978).

DDD, DDE, and DDT are classified by EPA's Carcinogen Assessment Group in Group B2--Probable Human Carcinogen based on inadequate evidence of carcinogenicity from human studies and sufficient evidence of carcinogenicity from animal studies (EPA 1988). EPA (1988) developed an inhalation and oral cancer potency factor of 0.34 $(mg/kg/day)^{-1}$ based on the geometric mean of a number of carcinogenicity studies. EPA (1988) also developed an oral RfD for DDT of $5x10^{-4}$ mg/kg/day based on a study in which liver lesions were observed in rats fed 5 ppm but not in those fed 1 ppm (0.05 mg/kg/day) DDT (Laug et al. 1950); an uncertainty factor of 100 was used to derive the RfD.

EPA (1988) has reported an oral cancer potency factor of 0.24 $(mg/kg/day)^{-1}$ for DDD based on a study in which an increased incidence of lung tumors in males and lung and liver tumors in females was observed in mice fed 250 ppm (TWA) DDD

for 13 weeks (Tomatis et al. 1974). EPA (1988) also has reported an oral cancer potency factor of 0.34 $(mg/kg/day)^{-1}$ for DDE based on the geometric mean obtained from feeding studies in mice and hamsters.

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1980. Ambient Water Quality Criteria Document for DDT. Office of Water Regulations and Standards, Washington, DC EPA 440/5-80-038

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1984. Health Effects Assessment Document for DDT. Office of Emergency and Remedial Response, Washington, DC

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1988. Integrated Risk Information System (IRIS). Environmental Criteria and Assessment Office, Cincinnati, Ohio

LAUG, E.P., NELSON, A.A., FITZHUGH, O.G., and KUNZE, F.M. 1950. Liver cell alteration and DDT storage in the rat of the rat induced by dietary levels of 1-50 ppm DDT. J. Pharmacol. Exp. Ther. 98:268-273

MCLACHLAN, J.A., and DIXON, R.L. 1972. Gonadal function in mice exposed prenatally to p.p'-DDT. Toxicol. Appl. Pharmacol. 22:327

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NATIONAL CANCER INSTITUTE (NCI). Bioasssays of DDT, TDE, and p,p'-DDE for Possible Carcinogenicity. NCI-CG-TR-1321

SCHMIDT, R. 1973. Effects of 1,1,1-trichloro-2,2-bis(p-chlorophenol)-ethane (DDT) on the prenatal development of the mouse. Biol. Rundsch. 11:316-317 (Ger.)

TOMATIS, L., TURUSOV, V., CHARLES, R.T., BIOCCHI, M., and GATI, E. 1974. Liver tumors in CF-1 mice exposed for limited periods to technical DDT. Z. Krebsforsch. 82:25-35

1,2-DICHLOROBENZENE

1,2-Dichlorobenzene is readily absorbed through the lungs, skin, and gastrointestinal tract (EPA 1987). The principal toxic effects of this compound in humans and experimental animals from acute and longer-term exposure include central nervous system depression, blood dyscrasias, and lung, kidney, and liver damage (EPA 1985). Chromosome breaks also have been observed in exposed humans (EPA 1987).

EPA (1988) derived an RfD of $9x10^{-2}$ mg/kg/day for 1,2-dichlorobenzene based on a study in which kidney effects were observed in mice administered 1,2-dichlorobenzene 5 days/week for 103 weeks (Hollingsworth et al. 1958); an uncertainty factor of 100 was used to derive the RfD. EPA (1988) also reported an inhalation reference dose for 1,2-dichlorobenzene of $4x10^{-2}$ mg/kg/day based on an NTP (1985) study in which decreased body weight was observed in rats exposed to 1,2-dichlorobenzene for up to 7 months (EPA 1985); an uncertainty factor of 1,000 was used to develop the RfD.

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1985. Drinking Water Criteria Document for Ortho-Dichlorobenzene, Meta-Dichlorobenzene, and Para-Dichlorobenzene (Draft). Office of Drinking Water, Washington, D.C. June 1985. PB86-117918

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1987. Health Advisory for ortho-, meta-, and para-Dichlorobenzene. Office of Drinking Water, Washington, D.C. March 31, 1987

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1988. June Quarterly Update, Health Effects Assessments Summary Table. Environmental Criteria and Assessment Office, Cincinnati, Ohio. June, 1988

HOLLINGSWORTH, R.L., ROWE, V.K., OYEN, F., TORKELSON, and ADAMS, E.M. 1958. Toxicity of o-dichlorobenzene. Am. Med. Assoc. Arch. Ind. Health 17:180-187

NATIONAL TOXICOLOGY PROGRAM (NTP). Toxicology and Carcinogenesis Studies of 1,2-Dichlorobenzene in F344/N Rats and B6C3F1 Mice. NIH Tech. Rep. Ser. No. 255

1,3-DICHLOROBENZENE

1,3-Dichlorobenzene (1,3-DCB or meta-dichlorobenzene) is absorbed following oral and inhalation exposure (EPA 1985a). Results of pharmacokinetic studies suggest that dichlorobenzenes are readily distributed after absorption regardless of exposure route and that some tissues preferentially accumulate these compounds, particularly the kidney, liver, lung, and adipose tissue (EPA 1985b). 1,3-DCB is metabolized to arene oxide intermediates via action by epoxidase enzymes. Although no studies were available on the acute or chronic effects of 1,3-DCB exposure, these effects are expected to be similar to those associated with 1,2-DCB or 1,4-DCB. Acute exposure to high doses of 1,2-DCB or 1,4-DCB primarily affects the respiratory tract, central nervous system, and hematologic systems. Chronic exposure to 1,2-DCB or 1,4-DCB has been associated with damage to the reticuloendothelial and hematopoietic systems, as well as the central nervous system, liver, and kidneys (NJDWQI 1987). No data are available on either the carcinogenic or reproductive/teratogenic potential of 1,3-DCB.

With respect to carcinogenicity, EPA (1987) has classified 1,3-DCB in Group D--Not Classified. Since no adequate studies on the noncarcinogenic effects of 1,3-DCB were available, EPA (1987) calculated an oral RfD for 1,3-DCB based on subchronic data for 1,2-dichlorobenzene. In two separate unpublished studies (Battelle-Columbus 1978a,b), rats and mice were administered 1,2-dichlorobenzene in corn oil by gavage at doses of 30, 60, 125, 250, or 500 mg/kg/day 5 days/week for 13 weeks. A NOAEL of 125 mg/kg/day was identified from these studies; at higher doses (188 mg/kg/day, 5 days/week) kidney and liver weights increased in rats (Hollingsworth et al. 1958). Applying a safety factor of 1,000 to the NOAEL and adjusting for exposure for 5 days a week, EPA (1987) derived an oral RfD for 1,3-DCB of 8.9×10^{-2} mg/kg/day.

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ENVIRONMENTAL PROTECTION AGENCY (EPA). 1985b. Health Assessment Document for Chlorinated Benzenes. Final Report. Office of Health and Environmental Assessment. Washington, D.C. EPA/600/8-84/015F

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1987. Health Advisory for ortho-, meta-, and para-Dichlorobenzenes. Office of Drinking Water, Washington, D.C. March 31, 1987

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NEW JERSEY DRINKING WATER QUALITY INSTITUTE (NJDWQI). 1987. Maximum Contaminant Level Recommendations for Hazardous Contaminants in Drinking Water. Appendix B: Health-Based Maximum Contaminant Level Support Documents. Submitted to New Jersey Department of Environmental Protection, Trenton, New Jersey. March 26, 1987

1,4-DICHLOROBENZENE

1,4-dichlorobenzene is a solid used as an air deodorant and as an insecticide. It is readily absorbed through the lungs, skin, and gastrointestinal tract and is widely distributed to various tissues (EPA 1987). The principal toxic effects of this compound in humans and experimental animals from acute and longer-term exposure include central nervous system depression, blood dyscrasias, and lung, kidney, and liver damage (EPA 1985). Chromosome breaks also have been observed in exposed humans (EPA 1987). 1,4-Dichlorobenzene was found to cause liver tumors in mice in a 103-week gavage study (NTP 1986).

EPA classified 1,4-dichlorobenzene in Group B2--Probable Human Carcinogen based on adequate evidence of carcinogenicity in animals (EPA 1987). An oral cancer potency factor of 2.4×10^{-2} $(mg/kg/day)^{-1}$ has been reported by EPA (EPA 1988). EPA (1987) also derived an oral RfD for 1,4-dichlorobenzene of 0.1 mg/kg/day based on the NTP study in rats and using an uncertainty factor of 1,000. This RfD was used to develop a lifetime health advisory for 1,4-dichlorobenzene

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1985. Drinking Water Criteria Document for Ortho-Dichlorobenzene, Meta-Dichlorobenzene, and Para-Dichlorobenzene (Draft). Office of Drinking Water, Washington, D.C. June 1985. PB86-117918

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DI-n-BUTYL PHTHALATE

Di-n-butyl phthalate is readily absorbed following oral and inhalation exposure (EPA 1980). Reduced fetal weight, increased numbers of resorptions, and dose-related musculoskeletal abnormalities have been observed among fetuses from rats and mice exposed to very high doses of di-n-butyl phthalate during gestation (Shiota and Nishimura 1982).

EPA (1988) calculated an oral reference dose (RfD) for di-n-butyl phthalate based on a study by Smith (1953) in which male Sprague-Dawley rats were fed diets containing 0, 0.01%, 0.05%, 0.25%, or 1.25% dibutyl phthalate for a period of 1 year. One-half of all rats receiving the highest dibutyl phthalate concentration (1.25% of diet, or 600 mg/kg/day) died during the first week of exposure. The remaining animals survived the study with no apparent adverse effects. Using a NOAEL of 125 mg/kg/day (0.25% dibutyl phthalate in diet) and an uncertainty factor of 1,000, an oral reference dose (RfD) of 0.1 mg/kg/day was derived; a LOAEL of 600 mg/kg/day (1.25% dibutyl phthalate in diet) was observed in this study.

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SHIOTA, K., and NISHIMURA, H. 1982. Teratogenicity of di(2-ethylhexyl) phthalate (DEHP) and di-n-butyl phthalate (DBP) in mice. Environ. Health Perspect. 45:65-70

SMITH, C.C. 1953. Toxicity of butyl stearate, dibutyl sebacate, dibutyl phthalate, and methoxyethyl oleate. Arch. Ind. Hyg. 7:310 (As cited in EPA 1980, 1987)

DI-n-OCTYL PHTHALATE

Di-n-octyl phthalate is not especially toxic. It is a severe eye and a mild skin irritant in rabbits (NIOSH 1985, NTP/IRLG 1982, EPA 1980). Fetotoxicity and developmental abnormalities were observed in the offspring of rats administered 5 g/kg intraperitoneal injections on days 6 to 15 of gestation (NTP/IRLG 1982, EPA 1980).

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LEAD

Absorption of lead from the gastrointestinal tract of humans is estimated at 10%-15%. For adult humans, the deposition rate of particulate airborne lead is 30%-50%, and essentially all of the lead deposited is absorbed. Lead is stored in the body in bone, kidney, and liver (EPA 1984). The major adverse effects in humans caused by lead include alterations in the hematopoietic and nervous systems. The toxic effects are generally related to the concentration of this metal in blood. Blood concentration levels of over 80 ug/dl in children and over 100 ug/dl in sensitive adults can cause severe, irreversible brain damage, encephalopathy, and possible death. Lower blood concentrations of lead (30-40 ug/dl) have been associated in humans with altered nerve conduction, altered testicular function, renal dysfunction, and anemia. Lead exposure also has been associated in humans with spontaneous abortions, premature delivery, and early membrane rupture in humans; however, reliable exposure estimates are lacking in these cases. Decreased fertility, fetotoxic effects, and skeletal malformations have been observed in experimental animals exposed to lead (EPA 1984).

EPA classified certain lead salts in Group B2--Probable Human Carcinogen (EPA 1985), although no cancer potency factor has been established (EPA 1988). This category applies to those agents for which there is sufficient evidence of carcinogenicity in animals and inadequate evidence of carcinogenicity in humans. Oral ingestion of certain lead salts (lead acetate, lead phosphate, lead subacetate) has been associated in experimental animals with increased renal tumors, but no quantitative estimate of cancer potency has been developed for these various lead materials. Doses of lead that induced kidney tumors were high and were beyond the lethal dose in humans (EPA 1985). EPA (1985) has noted that the available data provide an insufficient basis on which to regulate lead acetate, phosphate and subacetate as human carcinogens. EPA (1988) has also considered it inappropriate to develop a reference dose (RfD) for inorganic lead and lead compounds, since many of he health effects associated with lead intake occur essentially without a threshold.

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1984. Health Effects Assessment for Lead. Environmental Criteria and Assessment Office, Cincinnati, Ohio. EPA/540/1-86-055

ENVIRONMENTAL PROTECTION AGENCY (EPA). 1985. National primary drinking water regulations; synthetic organic chemicals, inorganic chemicals and microorganisms. Fed. Reg. 50:46937-47025 (November 13, 1985)

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MERCURY

In humans, elemental and inorganic mercury are absorbed following inhalation exposure but are poorly absorbed following oral exposure (EPA 1984); absorption of orally administered inorganic mercury is estimated to be between 7 and 15% (Rahola et al. 1971, Task Group on Metal Accumulation 1973). No information was found on health effects following chronic exposure of humans to inorganic mercury. Occupational exposure of workers to elemental mercury vapors (0.1 to 0.2 mg/m^3) has been associated with mental disturbances, tremors, and gingivitis (EPA 1984). A primary target organ for inorganic compounds is the kidney. Human exposure to inorganic mercury compounds has been associated with anuria, polyuria, proteinuria, and renal lesions (Hammond and Beliles 1980). In rats administered mercury (as mercuric acetate) in the diet for up to 2 years, decreased body weight in males exposed to 160 ppm mercury and significantly increased kidney weight in the 40 and 160 ppm dose groups were observed (Fitzhugh et al. 1950). In hamsters administered mercuric acetate on day 8 of gestation, resorptions and embryo abnormalities were dose-related (Gale 1974).

EPA (1984) has categorized mercury as a Group D agent (Not Classified). This classification applies to those agents for which there is inadequate evidence of carcinogenicity in animals. EPA (1988) has reported an oral reference dose (RfD) for inorganic mercury of $2x10^{-3}$ mg/kg/day based on a chronic rat study in which kidney effects were observed (Fitzhugh et al. 1950). An uncertainty factor of 1,000 was used to derive the RfD.

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METHYLENE CHLORIDE

Methylene chloride is absorbed following oral and inhalation exposure. The amount of airborne methylene chloride absorbed following inhalation exposure increases in direct proportion to its concentration in inspired air, the duration of exposure, and physical activity. Dermal absorption has not been accurately measured (EPA 1985a). Because of methylene chloride's high solubility in water and lipids, it is probably distributed throughout all body fluids and tissues. Acute human exposure to methylene chloride may result in irritation of eyes, skin, and respiratory tract; central nervous system depression; elevated carboxyhemoglobin levels; and circulatory disorders that may be fatal. Chronic exposure of animals can produce renal and hepatic toxicity (EPA 1985a).

There have been several chronic studies in which methylene chloride was administered to experimental animals either orally or by inhalation. The inhalation studies provided clear evidence of carcinogenicity. There is only suggestive evidence of a treatment-related increase in combined hepatocellular carcinomas and neoplastic nodules provided in drinking water studies in experimental animals (EPA 1985a,b).

EPA (1988) classified methylene chloride in Group B2--Probable Human Carcinogen. It has been concluded by EPA (1985b) that the induction of distant site tumors from inhalation exposure and the borderline significance for induction of tumors in a drinking water study are an adequate basis for concluding that methylene chloride be considered a probable human carcinogen via ingestion as well as inhalation. EPA (1985b) derived an inhalation cancer potency factor of 1.4×10^{-2} $(mg/kg/day)^{-1}$ based on the results of a National Toxicology Program (NTP) inhalation bioassay (NTP 1986). In the NTP bioassay, groups of 50 male and 50 female F344/N rats and B3C6F1 mice were exposed by inhalation to methylene chloride concentrations ranging from 0 to 4,000 ppm for 6 hours a day, 5 days/week for 2 years. Significant dose related increases in the incidence of neoplastic lesions were reported for mammary tumors in male and female rats and for lung and liver tumors in male and female mice. EPA (1985b) determined an oral cancer potency factor of 7.5×10^{-3} $(mg/kg/day)^{-1}$

based on the results of the NTP (1986) inhalation bioassay and on an ingestion bioassay conducted by the National Coffee Association (NCA 1983). In the NCA study, groups of from 50 to 200 B6C3F1 mice received between 60 and 250 mg/kg/day of methylene chloride in their drinking water. Significant increases in the incidence of hepatocellular adenomas and/or carcinomas were reported for male mice in the 125 mg/kg/day and 185 mg/kg/day groups and a borderline significant increase in incidence of these neoplastic lesions was reported in the 250 mg/kg/day group.

An oral reference dose (RfD) of 0.06 mg/kg/day has been developed by EPA (1988) based on a 2-year rat drinking water bioassay (NCA 1982) that identified no-observed-effect levels (NOELs) of 5.85 and 6.47 mg/kg/day for male and female rats, respectively. Liver toxicity was observed at doses of 52.58 and 58.32 mg/kg/day for males and females, respectively. An uncertainty factor of 100 was used to derive the RfD.

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POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

PAHs occur in the environment as complex mixtures of many components with varying noncarcinogenic and carcinogenic potencies. Only a few components of these mixtures have been adequately characterized, and only limited information is available on the relative potencies of different compounds. The PAHs are often separated into two categories for the purposes of risk assessment: carcinogenic and noncarcinogenic PAHs.

PAH absorption following oral exposure is inferred from the demonstrated toxicity of PAHs following ingestion (EPA 1984a). PAH absorption following inhalation exposure is inferred from the demonstrated toxicity of PAHs following inhalation (EPA 1984a). It has been suggested that simultaneous exposure to carcinogenic PAHs such as benzo[a]pyrene and particulate matter can increase the effective dose of the compound (ATSDR 1987). PAHs are also absorbed following dermal exposure (Kao et al. 1985).

Acute effects from direct contact with PAHs and related materials are limited primarily to phototoxicity; the primary effects is dermatitis (NIOSH 1977). PAHs have also been shown to cause cytotoxicity in rapidly proliferating cells throughout the body; the hematopoietic system, lymphoid system, and testes are frequent targets (Santodonato et al. 1981). Some of the noncarcinogenic PAHs have been shown to cause systemic toxicity but these effects are generally seen only at rather high doses (Santodonato et al. 1981). Slight morphological changes in the livers and kidneys of rats have been reported following oral exposure to acenaphthene. Oral administration of naphthalene to rabbits and rats has resulted in cataract formation (EPA 1984b). Nonneoplastic lesions are seen in animals exposed to the more potent carcinogenic PAHs only after exposure to levels well above those required to elicit a carcinogenic response. Carcinogenic PAHs are believed to induce tumors both at the site of application and systemically. Neal and Rigdon (1967) reported that oral administration for approximately 110 days of up to 250 ppm benzo[a]pyrene led to forestomach tumors in mice. Thyssen et al. (1981) observed respiratory tract tumors in hamsters exposed to up to 9.5 mg/m^3 benzo[a]pyrene for up to 96 weeks.

Benzo[a]pyrene is representative of the carcinogenic PAHs and is classified by EPA as a Group B2--Probable Human Carcinogen based on sufficient evidence of carcinogenicity from animal studies and inadequate evidence from epidemiological studies (EPA 1984c). EPA (1984a) calculated a value of 11.5 $(mg/kg/day)^{-1}$ for the cancer potency factor for oral exposure to carcinogenic PAHs (specifically benzo[a]pyrene) based on the study by Neal and Rigdon (1967). EPA (1984a) calculated and inhalation cancer potency factor of 6.1 $(mg/kg/day)^{-1}$ for benzo(a)pyrene based on the study by Thyssen et al. (1981). These potency factors are currently undergoing a reevaluation based on recalculation of the data.

EPA's Environmental Criteria Assessment Office developed a reference dose for chronic exposure to naphthalene of 0.4 mg/kg/day based on the development of ocular lesions in rats (Schmal 1955, as cited in EPA 1986) and occupational data on coke oven workers. An uncertainty factor of 100 was applied to the animal data in the development of the reference dose.

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POLYCHLORINATED BIPHENYLS (PCBs)

PCBs are complex mixtures of chlorinated biphenyls. The commercial PCB mixtures that were manufactured in the United States were given the trade name of "Aroclor." Aroclors are distinguished by a four-digit number (for example, Aroclor 1260). The last two digits in the Aroclor 1200 series represent the average percentage by weight of chlorine in the product.

PCBs are readily absorbed through the gastrointestinal (G.I.) tract and somewhat less readily through the skin; PCBs are presumably readily absorbed from the lungs, but few data are available that experimentally define the extent of absorption after inhalation (EPA 1985). Dermatitis and chloracne (a disfiguring and long-term skin disease) have been the most prominent and consistent findings in studies of occupational exposure to PCBs. Several studies examining liver function in exposed humans have reported disturbances in blood levels of liver enzymes. Reduced birth weights, slow weight gain, reduced gestational ages, and behavioral deficits in infants were reported in a study of women who had consumed PCB-contaminated fish from Lake Michigan (EPA 1985). Based on the published literature, reproductive, hepatic, and immunotoxic effects appear to be the most sensitive end points of PCB toxicity in nonrodent species, and the liver appears to be the most sensitive target organ for toxicity in rodents (EPA 1985). Immunotoxic and immunosuppressive effects have been reported in most experiments in which these end points have been investigated, and are among the more sensitive indicators of PCB exposure (EPA 1985). A number of studies have suggested that PCB mixtures are capable of increasing the frequency of tumors including liver tumors in animals exposed to the mixtures for long periods (Kimbrough et al. 1975, NCI 1978, Schaeffer et al. 1984, Norback and Weltman 1985). Studies have suggested that PCB mixtures can act to promote or inhibit the action of other carcinogens in rats and mice (EPA 1985).

EPA (1984) classified PCB in Group B2 agent--Probable Human Carcinogen based on sufficient evidence in animal bioassays and inadequate evidence from studies in humans. The EPA Carcinogen Assessment Group (EPA 1988) calculated a low-level cancer potency factor of 7.7 $(mg/kg/day)^{-1}$ for PCBs based on the incidence of

hepatocellular carcinomas and adenocarcinomas in female Sprague-Dawley rats exposed to a diet containing Aroclor 1260 as reported in a study by Norback and Weltman (1985).

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TOLUENE

Toluene is absorbed in humans following both inhalation and dermal exposure (EPA 1985). In humans, the primary acute effects of toluene vapor are central nervous system (CNS) depression and narcosis. These effects occur at concentrations of ≥200 ppm (754 mg/m^3) (von Oettingen et al. 1942a,b). In experimental animals, acute oral and inhalation exposures to toluene can result in central nervous system depression and lesions of the lungs, liver, and kidneys (EPA 1987). The earliest observable sign of acute oral toxicity in animals is inhibition of the CNS, which becomes evident at approximately 2,000 mg/kg (Kimura et al. 1971). In humans, chronic exposure to toluene vapors at concentrations of approximately 200 and 800 ppm has been associated with CNS and peripheral nervous system effects, hepatomegaly, and hepatic and renal function changes (EPA 1987). Toxic effects following prolonged exposure of experimental animals to toluene are similar to those seen following acute exposure (Hanninen et al. 1976, von Oettingen et al. 1942a). There is some evidence in CD-1 mice that oral exposure to greater than 0.3 ml/kg toluene during gestation results embryotoxicity (Nawrot and Staples 1979). Inhalation exposure of up to 1,000 mg/m^3 by pregnant rats during gestation has been associated with significant increases in skeletal retardation (Hudak and Ungvary 1978).

EPA (1988a) has derived an oral risk reference dose for toluene based on a 24-month inhalation study in which rats were exposed to concentrations as high as 300 ppm (30 mg/kg/day) (CIIT 1980). No adverse effects were observed in any of the treated animals. Using a NOEL of 30 mg/kg/day and an uncertainty factor of 100, an oral RfD of 0.3 mg/kg/day was deruved. EPA (1988b) reported an inhalation RfD for toluene of 1 mg/kg/day also based on this CIIT study and using an uncertainty factor of 100.

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1,2,4-TRICHLOROBENZENE

Information inferred from data describing the toxicity or excretion of trichlorobenzenes suggests that they are absorbed following oral, dermal, and inhalation exposure (EPA 1985). Human exposure to 1,2,4-TCB in air can result in eye and respiratory irritation. The effects in laboratory animals of acute exposure to trichlorobenzenes include local irritations, convulsions, and death. Liver, kidneys, adrenals, mucous membranes, and brain ganglion cells appear to be target organs with effects including edema, necrosis, fatty infiltration of the liver, increased organ weights, porphyrin induction, and microsomal enzyme induction (EPA 1985). Studies on the toxic effects of trichlorobenzenes following subchronic exposure indicate that, in general, the liver and kidneys are target organs (Kociba et al. 1978, Coate et al. 1977, Watenabe et al. 1978). Subchronic oral studies have found that 1,2,4-TCB induces hepatic enzymes and liver porphyrins, increases liver weight, and causes fatty infiltration of the liver (Carlson and Tardiff 1976, Carlson 1977, Smith et al. 1978). Topical doses of 1,2,4-TCB have been reported to result in extensor convulsions, necrotic foci in the liver, and death in guinea pigs (Powers et al. 1975, Brown et al. 1969). Teratogenicity studies after administration by the oral route in rats showed mild osteogenic changes in pups and significantly retarded embryonic development as measured by growth parameters (Black et al. 1983, Kitchin and Ebron 1983). Maternal toxicity was observed at doses causing effects in the pups. Increased incidences of non-neoplastic lesions were seen in multiple organs in both male and female mice exposed to 1,2,4-TCB painted on the skin for 2 years (Yamamoto et al. 1957).

EPA (1988a) developed an oral RfD for 1,2,4-trichlorobenzene of 0.02 mg/kg/day based on a study by Carlson and Tardiff (1976) that identified increased liver-to-body weight rations in male rats exposed at 40 mg/kg/day but not at 20 mg/kg/day; an uncertainty factor of 1,000 was used to develop the RfD. EPA (1988b) developed an inhalation RfD of $3x10^{-3}$ mg/kg/day based on a study of Watanabe et al. (1978) in which rats were exposed to up to 2.5 mg/kg/day for 3 months; an uncertainty factor of 1,000 was used to develop the RfD.

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APPENDIX I

AIR MODELING SUMMARY

I.1 SOIL VOLATILIZATION EMISSIONS MODEL

Mathematical models have been developed to predict volatilization rates of organic chemicals from the soil when the chemical concentration in the soil is known. One such model proposed by Hwang (1986) was used to calculate the emissions of volatile organic compounds due to soil volatilization at the Pinettes site. The Hwang model used in this assessment calculates the flux as a function of time for chemicals incorporated throughout the soil column from the soil surface. A time dependent model was used because the organic chemicals in the soils at the Pinettes site represent a finite reservoir of contamination and as the organic chemicals volatilize from the site the concentration in the soil will decrease. The volatilization flux rate is proportional to the chemical concentration in the soil, therefore the reduction in soil concentration will result in a decreased volatilization flux rate. Additionally, it is possible that the initial mass of a particular chemical could be totally depleted from the source in less than a 70 year exposure period, so that calculating volatilization for a 70 year period without some depletion could result in unrealistically high risks.

First, it was necessary to assume an initial volume over which the contamination occurred in the soil. This was estimated to be an area of approximately 5,350 m^2 (57,600 ft^2) and the contaminants were estimated to extend to a depth of 1.8 m (6 ft). This was based on the presence of Aroclor 1260, the primary contaminant of concern at the site. The dimensions for the source volume represent the furthest extent at which Aroclor 1260 was detected in soil samples. However, Aroclor 1260 was not always detected in all soil samples from 0 to 6 feet within the specified area. Consequently, the contaminant source volume was conservatively considered to be an over-estimate of the emissions source. This results in a large flux of chemicals from the source area and predicted air concentrations will be conservative. Conversely, this large flux will cause the chemical to volatilize more quickly

which will deplete the source within a shorter amount of time and reduce the exposure period.

To account for the reduced volatilization flux rate due to source depletion, the Hwang model was run for one volatilization period (this period was assumed to equal 140 days because for the remaining days of the year the volatilization process would be decreased due to snow cover or frozen ground). The mass lost over the first period was subtracted from the mass of the chemical in the soil at the beginning of that period, and a new soil concentration was calculated. The new soil concentration was used in the Hwang model to calculate the volatilization flux for the next period. This process was continued until the volatilization flux was reduced by a factor of ten million (10^7) from the initial flux or until the reservoir was totally depleted for a given organic chemical. An average flux rate for the exposure period was calculated by summing the flux rates for each year and dividing by the number of years over which the 10^7 reduction in volatilization flux occurred.

Table I-1 lists the time period for volatilization and the average emission rates for the chemicals of concern at the Pinettes site. Note that the Hwang model does not explicitly take into account the effects of temperature, the presence of a stagnant boundary layer, and soil moisture on the rate of volatilization. Therefore, it overestimates volatilization of soluble, low molecular weight chemicals (such as chlorinated and non-chlorinated solvents) which are diffusion limited.

The time dependent volatilization model used in this exposure scenario assumes that the chemicals are incorporated uniformly throughout the soil column. In the soil matrix a chemical can exist in the following three phases: adsorbed to soil particles; as a liquid in the soil pore spaces; or as a vapor also in the soil pore spaces. In the Hwang model the flux rate of chemicals from the soil into the air is a result of Fickian diffusion of chemical vapors up through the soil matrix. Thus it was necessary to determine the concentration

of vapors in the soil pore spaces associated with the reported concentrations of chemicals adsorbed to soil particles at the Pinettes site. By assuming an equilibrium partitioning between the adsorbed, liquid and gas phases of a chemical in the soil matrix, it was possible to determine the chemical concentration in each phase.

The phase partitioning between the adsorbed and liquid phases is a function of the fraction of organic carbon (f_{oc}) in the soil and the tendency for the compound to be adsorbed by the organic matter. Based on site-specific data, the soils at the Pinettes site were described as sandy and silty with very little organic carbon content. Therefore, the value for f_{oc} was assumed to be 0.1%. The tendency for a chemical to be adsorbed to organic matter in the soil can be described by the organic carbon partition coefficient (K_{oc}). The equilibrium concentration of a chemical in solution was determined by:

$$C_l = \frac{C_s}{K_{oc} \; f_{oc}}$$

where

C_l = concentration of chemical in solution, [g/ml]

C_s = concentration of chemical adsorbed to soil, [g/g].

The concentration of a chemical in solution was used with the liquid-vapor partition coefficient to determine the equilibrium vapor-phase concentration. The liquid-vapor partition coefficient is generally represented by the chemical-specific Henry's Law Constant. Thus the vapor-phase concentration of a chemical in the soil pore spaces was determined by:

$$C_g = \frac{C_l \; H}{R \;\; T}$$

where

C_g = concentration of chemical in the vapor phase, [g/cm^3]

H = Henry's Law Constant, [atm-m^3/mol],

TABLE I-1

PERIODS FOR VOLATILIZATION OF CHEMICALS OF CONCERN
AND EMISSION RATES FROM SURFACE SOIL
PINETTES SITE

CHEMICAL	NUMBER OF YEARS FOR FLUX TO DECREASE BY 10^-7	CHEMICAL VOLATILIZED FIRST YEAR	AVERAGE EMISSION RATE FOR PERIOD (g/sec)
Acetone	1	YES	7.83E-05
PCBs(Aroclor-1260)	70	NO	2.38E-06
2-Butanone	1	YES	7.19E-06
Chlorobenzene	1	YES	5.50E-06
4,4'-DDD	70	NO	2.04E-08
4,4'-DDE	70	NO	3.18E-08
4,4'-DDT	70	NO	2.40E-07
1,2-Dichlorobenzene	34	NO	1.05E-05
1,3-Dichlorobenzene	23	NO	1.04E-05
1,4-Dichlorobenzene	26	NO	1.51E-05
Methylene Chloride	1	YES	7.68E-05
Carcinogenic PAH (Total)	70	NO	1.03E-07
NonCarcinogenic PAH (Total)	52	NO	1.66E-05
Toluene	1	YES	6.40E-06
1,2,4-Trichlorobenzene	70	NO	8.10E-06

R = universal gas constant, [8.19x10-5 $_{atm\text{-}m^3/mol\text{-}K}$]

T = soil temperature, [293 K].

The soil column was assumed to be isothermal with a constant temperature of 20°C. This assumption will yield an average estimate of the annual volatilization flux since periods of lower soil temperatures at the Pinettes area site could retard or even halt the volatilization process, while higher temperatures could accelerate the process.

Based on the assumption of equilibrium phase partitioning in the soil matrix, the vapor phase concentration of a chemical, C_g, in the Hwang time dependent flux rate equation is given by:

$$C_g = \frac{H}{R\ T} C_l = \frac{H}{R\ T} \frac{1}{K_d} C_s = \frac{H'}{K_d} C_{so} = \frac{H'}{K_{oc}\ f_{oc}} C_{so}$$

where C_{so} is the initial concentration of chemical adsorbed to the soil and all other varilables are as defined earlier.

The transport of chemical vapors in the soil is by diffusion through the soil pore spaces. The effect of soil geometry and moisture on the vapor-phase diffusion is accounted for by defining an effective diffusivity, D_s. The effective diffusivity is given by:

$$D_s = D_i * E^{1/3}$$

where

D_i = vapor-phase diffusion coefficient in air for i^{th} chemical, [cm^2/s]

E = soil porosity.

This definition for the effective diffusivity conservatively assumes that the soil is dry.

The flux rate of vapors from the soil surface into the overlying air is obtained by solving a mass balance equation for a vertical element of the soil. Solution of this equation requires the specification of initial and boundary conditions. In this case the assumed conditions are a time dependent emission from the soil surface, with chemicals incorporated throughout the soil column beginning at the soil surface. The initial condition is that the vapor-phase concentration throughout the soil pore spaces is given by the equilibrium partitioning described earlier. The boundary condition for the soil surface sets the vapor-phase concentration equal to zero. The lower boundary condition sets the vapor-phase concentration equal to the equilibrium concentration to an infinite depth. Using these initial and boundary conditions, the average flux rate for a given time period, t, is given by:

$$N_a = \frac{2\ E\ Ds}{\sqrt{\pi \alpha t}} \quad \frac{H'}{K_d}\ C_{so}$$

where

N_a = average flux rate over the period t, [g/m^2-s]

E = total porosity,

Ds = effective diffusivity, [cm^2/s]

H' = nondimesional Henry's Law constant

K_d = soil/liquid partition coefficient = Koc * foc, [cm^3/g]

C_{so} = initial chemical concnetration in the soil, [g/g]

t = flux rate period, s

α = $[D_s * E]/[E + P_s * (1 - E)(K_d/H')]$, [$cm^2/s$]

where P_s = true soil density = bulk soil density/(1-E), [g/cm^3].

The total porosity was set at 24%, based on site-specific data. The chemical-specific value for K_d was the product of the chemical-specific K_{oc} value and the soil f_{oc} value, assumed to be 0.1%. The soil was assumed to maintain a constant 20°C temperature. The flux rate period was 12,096,000 seconds (140 days) based on local climatological data for Caribou, Maine (NOAA, 1979). The

true soil density was computed as defined by Hwang (1986) as the ratio of the soil bulk density and the total soil porosity. The soil bulk density was assumed to be 1.54 g/cm^3 based on an average of the mean value for dry bulk density of medium sand and silt as stated in Morris and Johnson (1967).

The average emission rates determined using the Hwang model were incorporated into the Box model to determine air concentrations for current on-site workers and nearby residents at the Pinettes site.

I.2 WIND EROSION DUE TO VEHICLE EMISSIONS

Contaminants may be released from the unpaved road surface on the Pinettes site as a result of vehicular traffic. Entrainment of contaminated dust and dirt from the vehicles and the subsequent inhalation of particles is a possible exposure pathway for individuals at the garage and those at nearby residences. Emission rates are calculated using the methodology presented below.

The emission rate equation for vehicle traffic presented in EPA (1985) was used to determine the emission rate for this exposure scenario. The PM_{10} emission factor for an average case for vehicle traffic over the unpaved road at the Pinettes site was calculated by the following equation:

$$e_{10v} = k(1.7)\ \frac{s}{12}\ \frac{S}{24}\qquad \frac{W^{0.7}}{2.7}\ \frac{w^{0.5}}{4}\ \frac{365 - p}{365}$$

where

e_{10v} = PM_{10} emission factor per vehicle-kilometer of travel, VKT, (kg/VKT)

k = particle size multiplier (dimensionless),

s = silt content of soils (%),

S = mean vehicle speed (km/hour),

W = mean vehicle weight (Mg),

w = mean number of wheels, and

p = number of days with at least 0.254 mm of precipitation per year.

The particle size multiplier, k, was set at 0.36 which represents a particle size of 10 mm or less (PM_{10}). Site-specific data indicated a silt content of 26%. A mean vehicle speed of 4 km/hr was assumed for the vehicles which travel on the site road. Since a number of different types of vehicles use the road, a mean vehicle weight of 6.375 Mg and 12 wheels were used as average parameters for the vehicle emissions scenario. The number of days with at least 0.01 inches of precipitation was assumed to be 160. This was based on local climatological data for Caribou, Maine (NOAA, 1979). These assumptions are listed in Table I-2.

The PM_{10} emission rate due to vehicle traffic, E_{10v}, is estimated by multiplying the PM_{10} emission factor by the number of vehicle-kilometers travelled each day:

$$E_{10v} = e_{10v} * Av * CF$$

where

E_{10v} = PM_{10} emissions due to vehicle traffic (g/sec),

e_{10v} = PM_{10} emission factor due to vehicle traffic (kg/VKT),

Av = Average source extent (VKT/s), and

CF = Conversion factor (1000 g/kg).

The average source extent, Av, was calculated using the following equation:

Av = (# of round trips/day)x(# of vehicles/round trip)x(dist travelled/veh)

For the average case scenario, it was assumed that one vehicle made one round trip per day. Since the length of the road was estimated to be 150 m, the distance travelled per day was twice the length of the road (300 m).

TABLE I-2

PARAMETERS USED TO ESTIMATE DUST EMISSIONS
FROM VEHICLE TRAFFIC

Silt content (s)	26%
Mean vehicle speed (S) (km/hr)	4 km/hr
Mean vehicle weight (W) (Mg)	6.375 Mg
Mean number of wheels/vehicle (w)	12
Number of days with 0.01 inches of precipitation/year	160 days/year

These assumptions and the calculated PM_{10} emission factor are listed in Table I-3. Based on these assumptions, the emission rate was calculated to be 6.81×10^{-4} g/sec.

The particulate emission rates were then converted to chemical-specific emission rates using the equation:

$$R_{10v} = C_m * E_{10v}$$

where

R_{10v} = average emission rate of metals on particulates (g/sec),

C_m = contaminant concentration in the road surface (g/g), and

E_{10v} = PM_{10} due to vehicle traffic (g/sec).

Exposure point concentrations were then calculated using a dispersion model to be described in a later section of this appendix.

I.3 BOX MODEL

Both the on-site garage and the nearest residence (approximately 80 meters east of the center of the site) at the Pinettes site are located near the spill area. The Industrial Source Complex Long Term (ISCLT) model, which is the most recent EPA approved refined dispersion model, cannot be used to determine the ambient concentrations of an area source at or near the source of emission. The ISC User's Manual (EPA 1987) recommends subdividing the area source into smaller area sources in this case. However, the spill area of the Pinettes site is one emission source and it would be difficult to divide this source area into several separate emission sources. Therefore, a box model was used to determine the ambient air concentrations for on-site workers at the garage and the nearest resident.

The box model assumes steady and spatially uniform conditions of dispersion so that the emissions from an area source are uniformly distributed throughout a box defined by the area of the source and the mixing height. The model

TABLE I-3

ASSUMPTIONS USED TO DETERMINE SOURCE EXTENT
FOR AN AVERAGE CASE SCENARIO

# of Round trips/day	1
# of Vehicles/round trip	1
Distance travelled/vehicle	300 m

requires steady-state emission rates, a constant wind vector, and also that the crosswind distance of the area source is large in comparison to the downwind distance of the receptor. To meet these requirements, all emission rates were calculated for steady state, the wind speed was chosen to be the annual average wind speed recorded at a local airport, and the receptor location was the site of the area source. All of these assumptions are functions of the model. They are considered to be conservative and therefore appropriate for predicting annual average concentrations. The only condition left to determine was the height of the box. Box models used on an urban scale often use the height of the daytime mixing layer, approximately 500 m, as the height of the box. For that definition to be appropriate, a downstream fetch on the order of tens of kilometers is required. The mean vertical displacement of emissions as a function of stability and downwind distance should provide a reasonable analogy to the mixing height used in larger scale box models. The height of the box was determined using the following equation presented by Pasquill (1975):

$$X = 6.25\ Z_0\ [(H/Z0)\ \ln\ (H/Z_0) - 1.58(H/Z_0) + 1.58))]$$

This expression is for a D or neutral stability class. Although this stability does not result in the highest air concentrations (an F stability is most conservative) it should provide an average estimate of ambient concentrations because the effect of a change in atmospheric stability would be to raise or lower the box height relative to the neutral stability. Changes in the box height will affect the ambient concentrations in the box since the volume available for diluting the emissions is changed. The value for Z_0, the roughness height, was chosen to be 0.03 m which represents open flat terrain, grass and a few isolated obstacles (NOAA 1983). This description was considered to most closely resemble the area where volatilization would occur at the Pinettes site. The downwind distance, X, was chosen to be 91 m, which is the square root of the area of emissions at the Pinettes site. This value is an approximation of the length of one side of the site and assumes that the site is square. Because the actual site is

rectangular, ambient concentrations determined by the box model would be lowest when the wind is blowing parallel to the shortest side of the site, for the same conditions. Thus, treating the site as a square should provide an average case for the ambient concentrations.

Having specified X and Z_0, H was determined to be 4.3 m. This height represents the mean vertical height that a particle would attain after traveling across the entire length of the site. Because exposure to emissions could occur anywhere on the site and not just at the downwind edge, an average annual concentration was determined by using one-half the calculated value for the box height in the box model equation.

The concentration on-site can be determined using the equation:

$$C_i = \frac{Q_{vi}\, A}{(H/2)WU}$$

where

C_i = The concentration on-site for the i^{th} contaminant, [g/m^3]
Q_{vi} = The emission rate of the i^{th} contaminant, [g/m^2 - s]
U = Average wind speed in the box, [m/s]
H = Height of the box, [m]
W = Crosswind width of the area source, [m], and
A = Size of the area source, [m^2].

An average wind speed value of 5 m/s speed was based on local climatological data from Caribou, Maine (NOAA, 1979). This wind speed is measured at a typical anemometer height of 10 meters. Therefore, the wind speed used in the box model calculations is slightly larger than the actual ground level wind speed. However, the lower wind speed at the ground level would not differ significantly from the wind measured at 10 meters and therefore would have little effect on predicted concentrations. The dimensions A and W were determined using the square area source dimensions as described earlier. The input parameters used to determine the on-site concentrations were H/2 = 2.15 m; U = 5.0 m/s; and Z_0 = 0.03 m.

I.4 GAUSSIAN LINE SOURCE DISPERSION MODEL

A gaussian infinite line source dispersion model (Turner 1970) was used to estimate concentrations downwind of the unpaved road located on the Pinettes site. This model requires that the source be a straight line. Consequently, it was assumed that the road was a straight line with approximately a north-south orientation and that the modelled line source was located midway between the north-south sections of the actual road on-site.

This model was used as a conservative screening model based upon the air quality modeling parameters recommended in the Superfund Exposure Assessment Manual (ICF 1987). The major parameters suggested in this manual when estimating long-term atmospheric concentrations is a D stability classification and the assumption that the wind blows toward the exposure point 30 percent of the time. The model presented in Turner (1970) is used to estimate atmospheric dispersion when mean wind speed and direction can be determined. This model does not account for turbulence or the variation of wind speed with height. It is assumed that the stability classification is the same throughout the diffusing layer and that no turbulent transfer occurs through layers which have different stabilites.

The special case of defining a line as the emission source was used in calculating ambient air concentrations for the garage on-site and for off-site residents. The following equation was used to estimate concentrations:

$$\chi = \frac{2qF}{\sqrt{2\pi}\ \sigma_z U}$$

where

- q = Source strength per unit distance (g/sec-m),
- F = Percent of time during which wind blows toward receptor,
- σ_z = Standard deviation of plume concentration distribution in the vertical (m), and
- U = Mean wind speed (m/sec).

For the Pinettes site, it was assumed that a round trip by a vehicle on the unpaved road would constitute an erosion event. Therefore the source strength per unit distance, q, was calculated as the emission rate in g/sec divided by two times the length of the road (2 x 150 m or 300 m). As mentioned earlier, F was assumed to be 30 %. Once the downwind distance from the source to receptor is determined, σ_z, can be estimated using Figure 3-2 in Turner. For the Pinettes site the model was used to estimate concentrations at two receptors. Consequently, two different downwind distances and vertical dispersion coefficients were used. These values are listed in Table I-4. Based local climatological data for Caribou, Maine, the mean annual wind speed used was 5 m/sec.

TABLE I-4

DOWNWIND DISTANCES AND DISPERSION COEFFICIENTS FOR FUGITIVE DUST EMISSIONS

Receptor Location	Distance from Source	Dispersion Coefficient
Garage	52 m	335 m
Nearest Resident	88 m	430 m

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APPENDIX J

EXPOSURE AND RISK CHARACTERIZATION METHODOLOGY

J. EXPOSURE AND RISK CHARACTERIZATION METHODOLOGY

The purpose of this appendix is to present the methodology used to evaluate exposure and risk in the text of the Public Health Evaluation for the Pinettes Salvage Yard site.

J.1 DIRECT CONTACT WITH CONTAMINATED SOILS

Chronic daily intake (CDI) estimates for incidental soil ingestion are calculated as follows:

$$CDI = \frac{(Cs)(I)(AI)(E)(YR)(X)}{(BW)(DY)(YL)}$$

where

CDI = chronic daily intake (mg/kg/day);

Cs = chemical concentration in soil (mg/kg);

I = amount of soil ingested (mg/visit); = (mg/day);

AI = oral absorption factor;

E = frequency of exposure events (days/yr);

YR = years of exposure (years);

X = conversion factor ($kg/10^6$ mg);

BW = average body weight (kg);

DY = days in a year (365 days/year); and

YL = years in lifetime or in the period over which risk is being estimated (70 year lifetime for carcinogens, period of exposure for noncarcinogens).

CDIs for dermal absorption of chemicals of potential concern are calculated as follows:

$$CDI = \frac{(Cs)(CD)(E)(YR)(Z)(ABS)}{(BW)(DY)(YL)}$$

where

CDI = chronic daily intake (mg/kg/day);

Cs = chemical concentration in soil (mg/kg);

CD = contact rate for soil (mg/day);

E = frequency of exposure events (days/year)

YR = years of exposure;

Z = conversion factor (kg/10^6 mg);

ABS = dermal absorption factor;

BW = average body weight (kg);

DY = days in year (365 days/year); and

YL = years in lifetime or in the period over which risk is being estimated (70 year lifetime for carcinogens, period of exposure for noncarcinogens).

The total CDI associated with direct contact with soils is the sum of the CDIs from incidental ingestion and dermal absorption.

J.2 EXPOSURE TO CONTAMINANTS RELEASED FROM SOILS VIA INHALATION

The equation used to estimate the CDI through inhalation is:

$$CDI = \frac{(C_a)(V))(E)(YR)}{(BW)(DY)(LT)}$$

where

CDI = chronic daily intake (mg/kg/day);

C_a = ambient air concentration (mg/m^3);

V = ventilation rate (m3/day);

E = number of exposure events (days/yr);

YR = years of exposure (yr);

BW = body weight (kg);

DY = days in a year (365 days/yr); and

YL = years in lifetime or in the period over which risk is being assessed (70 year lifetime for carcinogens, less than lifetime for noncarcinogens).

J.3 INGESTION OF GROUNDWATER

The CDI estimates for ingestion of groundwater were calculated as follows:

$$CDI = \frac{(C_w)(I)(YR)}{(BW)(YL)}$$

where

CDI = chronic daily intake (mg/kg/day);

C_w = chemical concentration in groundwater (mg/liter);

I = amount of water ingested (liter/day);

YR = years of exposure (year);

BW = average body weight (kg); and

YL = years in a lifetime (70 years).

J.4 EXAMPLE CALCULATIONS

(see attached pages)

ICF INCORPORATED

Calculations Pinette's Salvage

SUBJECT: Sample Calculation for CDI for Incidental Soil Ingestion (for PCBs)

Job Number _____
File Number _____
Sheet 1 Of 5
By _____ Date _____
App _____ Date _____

For soil ingestion:

$$CDI = \frac{(C_s)(I)(AI)(E)(yR)(X)}{(BW)(DY)(YL)}$$

Average Case

where CDI = chronic daily intake (mg/kg/day)

(PCBs) → C_s = $2100 \frac{kg}{Kg} \cdot \frac{mg}{10^3 kg} = 2.1 \frac{mg}{Kg}$

I = 50 mg/event (= 50 mg/day)

AI = 0.15

E = 28 days/yR

yR = 10 yR

X = Kg/10^6 mg

BW = 47 kg (for children)

DY = 365 days/yR

YL = 70 years (for carcinogens)

$$\therefore \quad CDI = \frac{(2.1 \frac{mg}{Kg})(50 \frac{mg}{day})(0.15)(28 \frac{days}{yR})(10 yR)(\frac{Kg}{10^6 mg})}{(47 Kg)(365 \frac{days}{yR})(70 yR)}$$

$$\boxed{CDI = 3.67 \times 10^{-9} \frac{mg}{Kg/day}}$$

ICF INCORPORATED

Calculations Pinette's Salvage

SUBJECT: Sample Calculation for CDI for Incidental Soil Ingestion (cont.)

Job Number _____
File Number _____
Sheet 2 Of 5
By _____ Date _____
App _____ Date _____

Maximum Case

$(PCBs) \Rightarrow C_S = 92{,}000 \frac{\mu g}{Kg} \times \frac{mg}{10^3 \mu g} = 92 \frac{mg}{Kg}$

$I = 160\ mg/day \div (160\ mg/event)$

$AI = 0.50$

$E = 52\ days/yR$

$yR = 10\ yEARS$

$X = \frac{Kg}{10^6 mg}$

$BW = 47\ Kg$ (for children)

$Dy = 365\ days/yR$

$YL = 70\ yEARS$ (for carcinogens)

$$\therefore CDI = \frac{(92 \frac{mg}{Kg})(160 \frac{mg}{day})(0.50)(52 \frac{days}{yR})(10\ yR)(\frac{Kg}{10^6 mg})}{(47\ Kg)(365 \frac{days}{yR})(70\ yR)}$$

$$\boxed{CDI = 3.19 \times 10^{-6}\ mg/Kg/day}$$

ICF INCORPORATED

Calculations Pinettes Salvage

SUBJECT: Sample Calculation for CDI for Dermal Absorption (for PCBs)

Job Number _____
File Number _____
Sheet 3 Of 5
By _____ Date _____
App _____ Date _____

for dermal absorption:

$$CDI = \frac{(CS)(CD)(E)(YR)(\pm)(ABS)}{(BW)(DY)(YL)}$$

Average Case

where: CDI = chronic daily intake ($mg/kg/day$)

(PCBs) → C_S = 2.1 mg/kg

CD = 390 $mg/event$ (= 390 mg/day)

E = 28 $days/yr$

YR = 10 years

$\pm$ = $\frac{kg}{10^6 mg}$

ABS = 0.07

BW = 47 kg (for children)

DY = 365 $days/yr$

YL = 70 years (for carcinogens)

$$\therefore CDI = \frac{(2.1\ \frac{mg}{kg})(390\ \frac{mg}{day})(28\ \frac{days}{yr})(10\ yr)(\frac{kg}{10^6 mg})(0.07)}{(47\ kg)(365\ \frac{days}{yr})(70\ yr)}$$

$$\boxed{CDI = 1.34 \times 10^{-8}\ mg/kg/day}$$

ICF INCORPORATED

Calculations Pivette's Salvage

SUBJECT: Sample Calculation for CDI for Dermal Absorption (for PCBs) (cont.)

Job Number _____
File Number _____
Sheet 4 Of 5
By _____ Date _____
App _____ Date _____

Maximum Case

(PCBs) → C_S = 92 mg/kg

CD = 1,600 $mg/event$ (= 1,600 mg/day)

E = 52 days/yr

YR = 10 years

Z = $\frac{1\,kg}{10^6\,mg}$

ABS = 0.07

BW = 47 kg (for children)

DY = 365 days/yr

YL = 70 years (for carcinogens)

$$\therefore \quad CDI = \frac{(92\ mg/kg)(1600\ mg/day)(52\ days/yr)(10\ yr)\left(\frac{1\,kg}{10^6\,mg}\right)(0.07)}{(47\ kg)(365\ days/yr)(70\ yr)}$$

$$\boxed{CDI = 4.46 \times 10^{-6}\ mg/kg/day}$$

ICF INCORPORATED

Calculations Pinettes Salvage

SUBJECT: Sample Calculation for Estimated Exposures and Risks for Children through direct contact and incidental ingestion of Surface Soil (for PCBs)

Job Number _____
File Number _____
Sheet 5 Of 5
By _____ Date _____
App _____ Date _____

	Avg	Max
CDI via Dermal Absorption (mg/kg/day)	1.34×10^{-8}	4.46×10^{-6}
CDI via Incidental Ingestion (mg/kg/day)	3.67×10^{-9}	3.19×10^{-6}
Combined CDI (mg/kg/day)	1.71×10^{-8}	7.65×10^{-6}

Cancer Potency Factor (CPF) for PCBs = 7.7 $(mg/kg/day)^{-1}$

CANCER RISK = CDI * CPF

Avg. Case

Cancer Risk = 1.71×10^{-8} (mg/kg/day) * (7.7 $(mg/kg/day)^{-1}$)

Cancer Risk = 1.3×10^{-7}

Max Case

Cancer Risk = 7.65×10^{-6} (mg/kg/day) * (7.7 $(mg/kg/day)^{-1}$)

Cancer Risk = 5.9×10^{-5}

APPENDIX K

COMMON AND SCIENTIFIC NAMES USED IN THE WETLANDS INVESTIGATION AND PUBLIC HEALTH EVALUATION

APPENDIX K
COMMON AND SCIENTIFIC NAMES USED IN THE TEXT

Common name	Scientific Name
Mammals	
meadow voles	Microtus pennsylvanicus
mink	Mustela vison
beaver	Castor canadensis
red fox	Vulpes fulva
white-tailed deer	Odocoileus virginianus
moose	Alces alces
shrews	Sorex sp.
field mice	Peromyscus sp.
eastern chipmunk	Tamias striatus
short-tailed weasel	Mustela erminea
muskrat	Ondatra zibethicus
opossum	Didelphis marsupialis
cottontail rabbit	Sylvilagus floridanus
racoon	Procyon lotor
woodchuck	Marmota monax
Birds	
Eastern kingbird	Tyrannus tyrannus
American goldfinch	Spinus tristus
barn swallow	Hirundo rustica
mourning dove	Zenaidura macroura
red-winged blackbird	Agelaius phoeniceus
common yellowthroat	Geothlypis tichus
swamp sparrow	Melospiza georgiana
belted kingfisher	Megaceryle alcyon
screech owl	Otus asio
Bald eagle	Haliaeetus leucocephalus
American Peregrine Falcon	Falco peregrinus anatum
Amphibians & Reptiles	
Eastern newt	Notophthalmus viridescens
Northern leopard frog	Rana pipiens
green frog	Rana clamitans
Painted turtle	Chrysemys picta
Fish	
yellow perch	Perca flavescens
pumpkinseed	Lepomis gibbosus
common shiner	Notropis cornutus
white sucker	Catostomus commersoni
brook stickleback	Culaea inconstans
Invertebrates	
scud	Gammarus pseudolimnaeus
midge	Tanytarsus dissimilis

APPENDIX K
COMMON AND SCIENTIFIC NAMES USED IN THE TEXT (continued)

Common name	Scientific Name
Plants	
Ostrich ferns	*Matteuccia struthiopteris*
Arrow-leaved tearthumb	*Polygonum sagittatum*
Bedstraw	*Galium palustre*
Black willow	*Salix nigra*
Cattail	*Typha latifolia*
Cottonwood	*Populus deltoides*
Foul-meadow grass	*Poa palustris*
Foxtail	*Alopecurus*
Joe-Pye-weed	*Eupatorium maculatum*
Mint	*Mentha arvensis*
Sensitive fern	*Onoclea sensibilis*
Soft-stem bulrush	*Scirpus validus*
Speckled alder	*Alnus rugosa*
Tamarack	*Larix laricina*
Tussock sedge	*Carex stricta*