APPENDIX C
LABORATORY TEST RESULTS

TABLE C-1

SUMMARY OF LABORATORY TEST RESULTS - DRILL HOLE

Drill Hole No. @ Depth, Ft.	Water Content, %	Dry Unit Weight, pcf	Liquid Limit	Plastic Index	Gravel, %	Sand, %	Fines, %	Specific Gravity	U Co Str
WC-1 @ 0.0-1.0	2.7		41	23	0	7	93		
WC-1 @ 10.0-10.6			39	16	0	1	99		
WC-1 @ 21.5	4.6			NP	0	13	87	2.63	
WC-1 @ 32.0	6.1				0	67	33	2.61	
WC-1 @ 33.0-34.0	7.4 *	123.7							920
WC-1 @ 42.0-43.0	4.8 *	128.2							2135
WC-1 @ 55.0-56.0	5.2 *	137.4							2275
WC-1 @ 62.0	10.1		39	17	0	3	97	2.67	
WC-2 @ 5.1-6.1	15.4 *	111.9							
WC-2 @ 15.2-16.1	13.3			NP	0	76	24		
WC-2 @ 20.0-21.0	16.6 *	109.9	30	14	0	42	58		
WC-2 @ 40.2-41.2			34	14	0	5	95		
WC-2 @ 45.2-46.2	18.0 *	105.4							
WC-2 @ 56.0-57.0	17.9 *	109.0			0	18	82		
WC-2 @ 60.4-61.4			24	9	0	7	93		
WC-2 @ 70.2-70.9	15.6 *	114.9	41	17	0	2	98		
WC-3 @ 15.0-16.0			23	4	0	59	41		
WC-3 @ 20.8-21.8	21.1 *	101.6							
WC-3 @ 35.6-36.6	14.7 *	114.4	27	11	0	54	46		
WC-3 @ 55.6-56.6			36	17	0	29	71		
WC-3 @ 69.9-70.9			31	15	0	60	40		
WC-3 @ 85.6-86.6			30	14	0	24	76		
WC-3 @ 88.3-88.5	7.2				0	82	18	2.60	

23272/R2T.C-1 10-26-93(10:38am)/RPT

* Field water content determination

TABLE C-1
(Continued)

Drill Hole No. @ Depth, Ft.	Water Content, %	Dry Unit Weight, pcf	Liquid Limit	Plastic Index	Gravel, %	Sand, %	Fines, %	Specific Gravity	U Con Stre
WC-4 @ 0.0-1.0	0.9		20	5	0	52	48		
WC-4 @ 5.0-6.0			23	3	0	74	26		
WC-5 @ 0.2-1.0	13.0 *	101.8							
WC-5 @ 5.0-6.0			35	13	0	33	67		
WC-5 @ 10.1-11.9	32.6 *	88.6							
WC-5 @ 30.0	11.1		47	24	0	1	99	2.68	
WC-6 @ 0.0-1.0			41	19	0	18	82		
WC-6 @ 5.0	31.7	90.7							
WC-6 @ 5.0-6.0	25.6		39	24	0	10	90		
WC-6 @ 10.3-11.1			28	6	0	22	78		
WC-6 @ 20.0-21.0	8.6	116.3							905
WC-6 @ 22.0	8.7				0	78	22	2.63	
WC-6 @ 27.0-28.0	6.7	118.4							915
WC-6 @ 30.0	6.3				0	85	15	2.67	
WC-7 @ 5.2-6.2	6.6		36	20	0	2	98		
WC-7 @ 10.0-10.6			39	17	0	31	69		
WC-7 @ 15.0	12.4	120.3							
WC-8 @ 0.0-1.0	2.5		27	12	12	32	56		
WC-8 @ 1.0	9.3								
WC-8 @ 15.0-16.0	7.7	118.2							1085

23272/R2T.C-1 10-26-93(10:38am)/RPT

* Field water content determination

TABLE C-1
(Concluded)

Drill Hole No. @ Depth, Ft.	Water Content, %	Dry Unit Weight, pcf	Liquid Limit	Plastic Index	Gravel, %	Sand, %	Fines, %	Specific Gravity	U Cor Str
WC-8 @ 26.0-27.0	9.1	120.8							675
WC-9 @ 0.0-1.1	3.0		30	18	0	50	50		
WC-9 @ 4.9-5.9	2.6				0	59	41		
WC-9 @ 5.0	15.6	113.3							
WC-9 @ 10.0-10.8	16.6 *	112.6							
WC-9A @ 11.0-11.4	7.7			NP	0	35	65	2.50	
WC-9A @ 20.6-21.0	1.0							2.53	
WC-10 @ 0.0-1.1	3.3		33	13	0	56	44		
WC-10 @ 1.0	9.6	95.4							
WC-11 @ 0.0-1.2	3.3		32	16	2	40	58		
WC-11 @ 5.1-6.1	23.0 *	102.9	41	23	0	20	80		
WC-11 @ 15.4-16.1	17.8 *	112.2							

[1] Description of samples without gradation testing are based on drill log information.

23272/R2T.C-1 10-26-93(10:38am)/RPT

* Field water content determination

3

TABLE C-2

SUMMARY OF LABORATORY WATER SOLUBLE SULFATE TEST RESULTS

Drill Hole No.	Depth, ft.	Water Soluble Sulfate, %
WC-6	5.0	0.005
WC-7	15.0	<0.010
WC-8	1.0	<0.001
WC-9	5.0	<0.010
WC-10	9.6	<0.010

Note: The degree of attack is based on the following range as presented by the U.S. Bureau of Reclamation.

Degree	Percent Sulfate
Negligible	0.0 - 0.1
Positive	0.1 - 0.2
Severe	0.2 - 2.0
Very severe	> 2.0

TABLE C-3

SUMMARY OF LABORATORY CONSOLIDATED-UNDRAINED TRIAXI COMPRESSION TEST RESULTS

Sample No. @ Depth	Description	Effective Stress Parameters c' (psf)	Effective Stress Parameters φ' (degrees)	Total Stress Parameters c (psf)	Total Stress Parameters φ (degrees)	Condition	Specimen No.	Initial Water Content, %	Initi Dr Un Wt.,
WC-2 @ 30.0'-32.0'	WC-2 Sandy Clay	0	35	0	24	Undisturbed	1	20.9	104
							2	21.9	105
							3	20.0	106.
TP-34 @ 5.0'-10.0'	TP-34 Sandy Clay	0	26	706	14	Remolded	1	18.0	102
							2	18.1	102
							3	18.2	100
TP-42 @ 5.0'-10.0'	TP-42 Sandy Clay	1022	24	1-51	15	Remolded	1	22.3	99.
							2	22.5	98.
							3	23.4	98.

C1

TABLE C-4

SUMMARY OF LABORATORY TEST RESULTS - TEST PITS

Test Pit No./ Sample No.	Depth, ft.	USCS Classification	Liquid Limit	Plastic Index	Gravel, %	Sand, %	Fines, %	Specific Gravity -4	Specific Gravity Apparent	Specific Gravity Bulk	Specific Gravity Abs., %	Max. D: Unit Wt.,
TP-27/1	1.0-3.0	SP-SM		NP	0	95	5	2.58				
TP-27/2	3.0-7.0	SC	39	17	0	77	23	2.50				104.4
TP-28/1	0.0-3.0	CL	42	20	0	46	54	2.52				99.4
TP-29/1	1.0-2.0	CL	30	13	0	43	57	2.59				107.4
TP-29/2	2.0-5.8	SP-SM		NP	0	90	10	2.60				
TP-30/1	1.0-1.5	SM		NP	0	70	30	2.57	2.79	2.66	1.8	
TP-30/2	1.5-2.0	SM		NP	0	80	20	2.55				
TP-30/3	2.0-3.6	SM		NP	12	66	22	2.53				
TP-30/4	3.6-7.0	SM		NP	0	74	26	2.58				
TP-31/1	0.0-2.0	CL	30	13	0	50	50	2.54				105.2
TP-31/2	2.0-5.5	ML		NP	0	49	51	2.60				
TP-32/1	1.0-4.0	CL	23	8	0	34	66	2.58				112.4
TP-32/2	4.0-10.7	CL	28	12	0	45	55	2.60				111.8
TP-33/1	1.0-2.8	CL	33	18	0	37	63	2.59				108.9

TABLE C-4
(Continued)

Test Pit No./ Sample No.	Depth, ft.	USCS Classification	Liquid Limit	Plastic Index	Gravel, %	Sand, %	Fines, %	Specific Gravity -4	Specific Gravity Apparent	Specific Gravity Bulk	Specific Gravity Abs., %	Max. Dry Unit Wt., pc
TP-33/2	2.8-4.2	SC	26	9	0	53	47	2.60				113.9
TP-33/3	4.2-5.2	GP		NP	58	38	4	2.70	2.68	2.57	1.7	
TP-33/4	5.2-7.3	SM		NP	0	86	14	2.72				
TP-33/5	7.3-9.4	GW-GM		NP	64	30	6	2.72	2.81	2.69	1.6	
TP-34/1	1.0-2.0	CL	37	21	0	32	68	2.55				105.8
TP-34/2	2.0-9.5	CL-ML										103.4
TP-34/3	9.5-12.5	CL	37	21	0	20	80	2.59				103.7
TP-35/1	1.0-4.2	CL	36	18	0	20	80	2.54				101.1
TP-35/2	4.2-7.5	CL	34	15	0	11	89	2.47				105.7
TP-35/3	7.5-10.0	SM		NP	0	76	24	2.70				
TP-36/1	1.5-3.0	CL	30	12	0	20	80	2.61				108.1
TP-36/2	3.0-10.3	CL	32	13	0	12	88	2.60				106.4
TP-37/1	1.5-5.5	SM		NP	0	67	33	2.63				
TP-37/2	5.5-9.2	GW-GM		NP	64	30	6	2.77	2.75			
TP-38/1	1.0-2.5	CL	35	16	0	9	91	2.59				102.0

TABLE C-4
(Concluded)

Test Pit No./ Sample No.	Depth, ft.	USCS Classification	Liquid Limit	Plastic Index	Gravel, %	Sand, %	Fines, %	Specific Gravity -4	Specific Gravity Apparent	Specific Gravity Bulk	Specific Gravity Abs., %	Max. D Unit Wt.,
TP-38/2	2.5-10.4	CL	33	14	0	8	92	2.59				104.0
TP-39/1	1.0-2.0	GC	32	10	50	19	31	2.61	2.62			
TP-39/2	2.0-3.5	ML		NP	0	39	61	2.64				
TP-39/3	3.5-6.5	ML		NP	0	39	61	2.63				
TP-40/1	1.0-5.0	CL	33	14	0	21	79	2.61				102.5
TP-40/2	5.0-10.0	CL	27	12	0	31	69	2.59				108.3
TP-41/1	0.0-7.8	CL	33	14	0	6	94	2.62				103.3
TP-41/2	7.8-10.0	CL	33	14	0	12	88	2.62				107.1
TP-42/1	1.0-5.0	CL	29	17	0	34	66	2.59				106.1
TP-42/2	5.0-10.0	CL										101.0

TABLE C-5

SUMMARY OF LABORATORY PINHOLE DISPERSION TEST RESULTS

Sample No.	Depth, ft.	Remolded Water Content, %	Approximate Compaction, %	Dispersive Rating *
TP-33	1.0-3.0	19.5	98	ND (Nondispersive)
TP-34	2.0-9.0	18.6	98	ND (Nondispersive)
TP-37	1.5-5.5	19.5	98	ND (Nondispersive)
TP-41	0.0-7.0	19.5	98	ND (Nondispersive)
TP-42	5.0-10.0	20.2	98	ND (Nondispersive)

* Per ASTM D 4647-87, Method B.

SAMPLE NO. #WC-1		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 0 to 1.01 FEET	
TEST BY	BH & BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-1	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%							
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	23.3	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	92.30	%MOIST-4	2.70%	DRY SAMP	89.87
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	GRAMS
DRY MASS PASSING		89.87	89.87	89.87	89.87	89.87	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	89.87

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.2	FACTOR = %TOT PASS NO#4 / TOTAL WT =	1.992
DISH NO. DISH #T312		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	4.1
SIEVING TIME	10 MIN	DATE	7-28-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.09	50.12	= % OF	99.8%	2.36 MM		
16	0.13	50.08	TOTAL	99.7%	1.18 MM	GRAVEL	0.0%
30	0.21	50.00	PASSING	99.6%	.600 MM	SAND	6.6%
50	0.63	49.58		98.7%	.300 MM	-200	93.4%
100	1.41	48.80		97.2%	.150 MM	.075 TO	
200	3.33	46.88		93.4%	.075 MM	.005 =	43.8%
PAN	4.09	TESTED BY	JD	DATE	8-20-93	CU =	0.00
TOTAL	4.09					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	#25644			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21.5	44.0	5.13	38.87	77.41%	.037 MM	
4 MIN	21.5	39.0	5.13	33.87	67.46%	.019 MM	
19 MIN	21.5	34.0	5.13	28.87	57.50%	.009 MM	
60 MIN	21.5	30.0	5.13	24.87	49.53%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS		DEPTH	
WC-1				10.0 TO 10.61	
TEST BY	BH			CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR	FEATURE	EXC. NO. WC-1	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	367.90	%MOIST-4	11.85%	DRY SAMP	328.92
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		328.92	328.92	328.92	328.92	328.92	WT.IN PAN 328.92
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	0.8
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.00	50.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.30	49.70		99.4%	.600 MM	SAND	1.4%
50	0.00	50.00		100.0%	.300 MM	-200	98.6%
100	0.10	49.90		99.8%	.150 MM	.075 TO	
200	0.70	49.30		98.6%	.075 MM	.005 =	33.1%
PAN	0.80	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	50.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25680			DISPERSING AGENT	SODIUM HEX		
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	51.0	6.24	44.76	89.52%	.037 MM	
4 MIN	22	46.0	6.24	39.76	79.52%	.019 MM	
19 MIN	22	42.0	6.24	35.76	71.52%	.009 MM	
60 MIN	22	39.0	6.24	32.76	65.52%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO. WC # 1		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 21.5 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE DRILL HOLE		EXC. N0. WC # 1	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	50.00	MOIST-4	0.00%	DRY SAMP	50.00
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS WT.IN PAN
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		50.00	50.00	50.00	50.00	50.00	
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	50.00

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. Pan# G		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	10.0
SIEVING TIME	10 MIN	DATE	7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.20	49.80		99.6%	2.36 MM		
16	0.40	49.60		99.2%	1.18 MM	GRAVEL	0.0%
30	0.50	49.50		99.0%	.600 MM	SAND	12.6%
50	0.60	49.40		98.8%	.300 MM	-200	87.4%
100	1.80	48.20		96.4%	.150 MM	.075 TO	
200	6.30	43.70		87.4%	.075 MM	.005 =	67.4%
PAN	10.00	TESTED BY BT & JD		DATE 7-9-93		CU =	0.00
TOTAL	10.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO N0	25644			DISPERSING AGENT		SODIUM HEX	
START		DATE	7-14-93			AMOUNT M125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	34.0	5.00	29.00	58.00%	.037 MM	
4 MIN	22	22.0	5.00	17.00	34.00%	.019 MM	
19 MIN	22	17.5	5.00	12.50	25.00%	.009 MM	
60 MIN	22	15.0	5.00	10.00	20.00%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

ML SILT

SAMPLE NO. WC # 1		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 32 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE DRILL HOLE		EXC. N0. WC # 1	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		[redacted]	+ OR − A LINE		−

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	50.00	MOIST−4	0.00%	DRY SAMP	50.00
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		50.00	50.00	50.00	50.00	50.00	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	50.00

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. Pan# G		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	36.8
SIEVING TIME	10 MIN	DATE	7−9−93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.00	50.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.00	50.00		100.0%	.600 MM	SAND	67.4%
50	7.40	42.60		85.2%	.300 MM	−200	32.6%
100	20.30	29.70		59.4%	.150 MM	.075 TO	
200	33.70	16.30		32.6%	.075 MM	.005 =	21.2%
PAN	36.80	TESTED BY BT & JD		DATE	7−9−93	CU =	0.00
TOTAL	36.80					CC =	0.00

HYDROMETER ANALYSIS

HYDRO N0	25625			DISPERSING AGENT		SODIUM HEX	
START		DATE	7−14−93			AMOUNT M125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	15.0	5.78	9.22	18.44%	.037 MM	
4 MIN	22	13.5	5.78	7.72	15.44%	.019 MM	
19 MIN	22	12.5	5.78	6.72	13.44%	.009 MM	
60 MIN	22	11.5	5.78	5.72	11.44%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

[redacted]

SAMPLE NO. WC # 1		GRADATION AND SOILS CLASSIFICATION ANALYSIS			DEPTH 62 FEET	
TEST BY	BT				CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE DRILL HOLE	EXC. N0. WC # 1	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	16.7	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	50.00	MOIST-4	0.00%	DRY SAMP	50.00
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS WT.IN PAN 50.00
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		50.00	50.00	50.00	50.00	50.00	
% 0F TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. Pan#G		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	1.4
SIEVING TIME	10 MIN	DATE	7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.30	49.70		99.4%	1.18 MM	GRAVEL	0.0%
30	0.80	49.20		98.4%	.600 MM	SAND	2.8%
50	1.10	48.90		97.8%	.300 MM	-200	97.2%
100	1.40	48.60		97.2%	.150 MM	.075 TO	
200	1.40	48.60		97.2%	.075 MM	.005 =	45.7%
PAN	1.40	TESTED BY BT & JD		DATE 7-9-93		CU =	0.00
TOTAL	1.40					CC =	0.00

HYDROMETER ANALYSIS

HYDRO N0	25680			DISPERSING AGENT	SODIUM HEX		
START		DATE	7-14-93			AMOUNT M125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	49.0	6.24	42.76	85.52%	.037 MM	
4 MIN	22	45.0	6.24	38.76	77.52%	.019 MM	
19 MIN	22	38.0	6.24	31.76	63.52%	.009 MM	
60 MIN	22	32.0	6.24	25.76	51.52%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO. #WC-2		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 15.2 to 16/09	
TEST BY	BH & BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-2	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR − A LINE		−

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	231.10	%MOIST−4	13.30%	DRY SAMP	203.97
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	GRAMS
DRY MASS PASSING		203.97	203.97	203.97	203.97	203.97	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	203.97

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.4	FACTOR = %TOT PASS NO#4 / TOTAL WT =	1.984
DISH NO. DISH #T306		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	38.9
SIEVING TIME	10 MIN	DATE	7-28-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.09	50.32		99.8%	2.36 MM		
16	0.12	50.29		99.8%	1.18 MM	GRAVEL	0.0%
30	1.63	48.78		96.8%	.600 MM	SAND	76.3%
50	24.14	26.27		52.1%	.300 MM	−200	23.7%
100	35.62	14.79		29.3%	.150 MM	.075 TO	
200	38.47	11.94		23.7%	.075 MM	.005 =	14.5%
PAN	38.88	TESTED BY	JD	DATE	8-20-93	CU =	0.00
TOTAL	38.88					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	#25680			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21.5	15.0	6.36	8.64	17.14%	.037 MM	
4 MIN	21.5	14.0	6.36	7.64	15.16%	.019 MM	
19 MIN	21.5	12.0	6.36	5.64	11.19%	.009 MM	
60 MIN	21.5	11.0	6.36	4.64	9.20%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SM SILTY SAND

SAMPLE NO. WC-2		GRADATION AND SOILS CLASSIFICATION ANALYSIS			DEPTH 20.0 TO 21.02	
TEST BY	BH				CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE	EXC. NO. WC-2	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%						
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12" 0.0%	3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		CL	+ OR - A LINE	+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	513.20	%MOIST-4	16.63%	DRY SAMP	440.02
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		440.02	440.02	440.02	440.02	440.02	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	440.02

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	21.6
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.40	49.60		99.2%	2.36 MM		
16	0.80	49.20		98.4%	1.18 MM	GRAVEL	0.0%
30	2.80	47.20		94.4%	.600 MM	SAND	42.0%
50	14.10	35.90		71.8%	.300 MM	-200	58.0%
100	19.10	30.90		61.8%	.150 MM	.075 TO	
200	21.00	29.00		58.0%	.075 MM	.005 =	33.4%
PAN	21.60	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	50.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25680			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21	31.0	6.19	24.81	49.62%	.037 MM	
4 MIN	21	26.0	6.19	19.81	39.62%	.019 MM	
19 MIN	21	21.5	6.19	15.31	30.62%	.009 MM	
60 MIN	21	18.5	6.19	12.31	24.62%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(CL) SANDY LEAN CLAY

SAMPLE NO. WC-2		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 40.15 TO 41.17	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-2	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	537.00	%MOIST-4	18.03%	DRY SAMP	454.97
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		454.97	454.97	454.97	454.97	454.97	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	454.97

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	3.5
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.50	49.50		99.0%	1.18 MM	GRAVEL	0.0%
30	0.80	49.20		98.4%	.600 MM	SAND	5.0%
50	1.10	48.90		97.8%	.300 MM	-200	95.0%
100	1.70	48.30		96.6%	.150 MM	.075 TO	
200	2.50	47.50		95.0%	.075 MM	.005 =	45.7%
PAN	3.50	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	50.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25811			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20.5	46.0	6.33	39.67	79.34%	.037 MM	
4 MIN	20.5	39.0	6.33	32.67	65.34%	.019 MM	
19 MIN	20.5	35.5	6.33	29.17	58.34%	.009 MM	
60 MIN	20.5	31.0	6.33	24.67	49.34%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO. WC-2		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 56.0 TO 57.0	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-2	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		[redacted]	+ OR - A LINE		[redacted]

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	516.60	%MOIST-4	18.04%	DRY SAMP	437.65
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		437.65	437.65	437.65	437.65	437.65	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	437.65

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	10.5
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.00	50.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.10	49.90		99.8%	.600 MM	SAND	17.6%
50	0.30	49.70		99.4%	.300 MM	-200	82.4%
100	3.60	46.40		92.8%	.150 MM	.075 TO	
200	8.80	41.20		82.4%	.075 MM	.005 =	43.5%
PAN	10.50	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	10.50					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21	37.0	6.04	30.96	61.92%	.037 MM	
4 MIN	21	32.0	6.04	25.96	51.92%	.019 MM	
19 MIN	21	28.0	6.04	21.96	43.92%	.009 MM	
60 MIN	21	25.5	6.04	19.46	38.92%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

[redacted]

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH	
WC-2						60.4 TO 61.4	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT		FEATURE		EXC. NO.	
		ELKHEAD RESERVIOR				WC-2	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	530.10	%MOIST-4	15.84%	DRY SAMP	457.61
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		457.61	457.61	457.61	457.61	457.61	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	457.61

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	3.5
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.90	49.10		98.2%	2.36 MM		
16	2.20	47.80		95.6%	1.18 MM	GRAVEL	0.0%
30	2.70	47.30		94.6%	.600 MM	SAND	6.8%
50	2.90	47.10		94.2%	.300 MM	-200	93.2%
100	3.20	46.80		93.6%	.150 MM	.075 TO	
200	3.40	46.60		93.2%	.075 MM	.005 =	38.2%
PAN	3.50	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	50.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25680			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21	49.0	6.48	42.52	85.04%	.037 MM	
4 MIN	21	46.0	6.48	39.52	79.04%	.019 MM	
19 MIN	21	39.0	6.48	32.52	65.04%	.009 MM	
60 MIN	21	34.0	6.48	27.52	55.04%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO. WC-2		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 70.2 TO 70.9	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-2	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	17.4	CLASS OF FINES =		CL	+ OR − A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	548.30	%MOIST−4	15.64%	DRY SAMP	474.14
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		474.14	474.14	474.14	474.14	474.14	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	474.14

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	1.0
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.00	50.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.20	49.80		99.6%	.600 MM	SAND	1.8%
50	0.50	49.50		99.0%	.300 MM	−200	98.2%
100	0.70	49.30		98.6%	.150 MM	.075 TO	
200	0.90	49.10		98.2%	.075 MM	.005 =	47.4%
PAN	1.00	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	1.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25811			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	23.00	47.0	5.60	41.40	82.80%	.037 MM	
4 MIN	23.00	42.5	5.60	36.90	73.80%	.019 MM	
19 MIN	23.00	36.5	5.60	30.90	61.80%	.009 MM	
60 MIN	23.00	31.0	5.60	25.40	50.80%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO. WC-3		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 14.95 TO 15.96	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-3	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		CL-ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	517.70	%MOIST-4	15.72%	DRY SAMP	447.37
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		447.37	447.37	447.37	447.37	447.37	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	447.37

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	30.2
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00	= % OF	100.0%	2.36 MM		
16	0.00	50.00	TOTAL	100.0%	1.18 MM	GRAVEL	0.0%
30	0.80	49.20	PASSING	98.4%	.600 MM	SAND	59.2%
50	11.70	38.30		76.6%	.300 MM	-200	40.8%
100	25.60	24.40		48.8%	.150 MM	.075 TO	
200	29.60	20.40		40.8%	.075 MM	.005 =	19.9%
PAN	30.20	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	50.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21	21.0	6.04	14.96	29.92%	.037 MM	
4 MIN	21	19.5	6.04	13.46	26.92%	.019 MM	
19 MIN	21	18.0	6.04	11.96	23.92%	.009 MM	
60 MIN	21	16.5	6.04	10.46	20.92%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SM SILTY SAND

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH	
WC-3						35.6 TO 36.61	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-3	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	521.80	%MOIST-4	14.72%	DRY SAMP	454.85
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		454.85	454.85	454.85	454.85	454.85	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	454.85

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR=%TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	28.5
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00	= % OF	100.0%	2.36 MM		
16	0.00	50.00	TOTAL	100.0%	1.18 MM	GRAVEL	0.0%
30	0.40	49.60	PASSING	99.2%	.600 MM	SAND	54.4%
50	5.90	44.10		88.2%	.300 MM	-200	45.6%
100	19.50	30.50		61.0%	.150 MM	.075 TO	
200	27.20	22.80		45.6%	.075 MM	.005 =	24.8%
PAN	28.50	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	50.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25811			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	24.0	6.48	17.52	35.04%	.037 MM	
4 MIN	20	20.5	6.48	14.02	28.04%	.019 MM	
19 MIN	20	18.0	6.48	11.52	23.04%	.009 MM	
60 MIN	20	17.0	6.62	10.38	20.76%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SC / CL LEAN CLAYEY SAND

SAMPLE NO. WC-3		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 55.6 TO 56.6	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT BLKHEAD RESERVIOR		FEATURE		EXC. N0. WC-3	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%							
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	523.70	%MOIST-4	19.40%	DRY SAMP	438.61
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		438.61	438.61	438.61	438.61	438.61	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	438.61

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	16.3
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.20	49.80		99.6%	1.18 MM	GRAVEL	0.0%
30	0.60	49.40		98.8%	.600 MM	SAND	28.6%
50	3.30	46.70		93.4%	.300 MM	-200	71.4%
100	9.60	40.40		80.8%	.150 MM	.075 TO	
200	14.30	35.70		71.4%	.075 MM	.005 =	28.6%
PAN	16.30	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	50.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25680			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20.5	38.0	6.60	31.40	62.80%	.037 MM	
4 MIN	20.5	34.0	6.60	27.40	54.80%	.019 MM	
19 MIN	20.5	32.0	6.60	25.40	50.80%	.009 MM	
60 MIN	20.5	28.0	6.60	21.40	42.80%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(CL)s LEAN CLAY WITH SAND

SAMPLE NO. WC-3		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 69.9 TO 70.9	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-3	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%							
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	14.9	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	516.60	%MOIST-4	18.04%	DRY SAMP	437.65
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		437.65	437.65	437.65	437.65	437.65	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	437.65

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR=%TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	30.4
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00	= % OF	100.0%	2.36 MM		
16	0.30	49.70	TOTAL	99.4%	1.18 MM	GRAVEL	0.0%
30	1.30	48.70	PASSING	97.4%	.600 MM	SAND	59.6%
50	15.10	34.90		69.8%	.300 MM	-200	40.4%
100	25.80	24.20		48.4%	.150 MM	.075 TO	
200	29.80	20.20		40.4%	.075 MM	.005 =	19.4%
PAN	30.40	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	30.40					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25644			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	22.0	5.00	17.00	34.00%	.037 MM	
4 MIN	22	19.0	5.00	14.00	28.00%	.019 MM	
19 MIN	22	16.5	5.00	11.50	23.00%	.009 MM	
60 MIN	22	15.5	5.00	10.50	21.00%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SC CLAYEY SAND

SAMPLE NO. WC-3		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 85.6 TO 86.6	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-3	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	542.90	%MOIST-4	18.77%	DRY SAMP	457.10
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		457.10	457.10	457.10	457.10	457.10	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	457.10

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	14.6
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.10	49.90		99.8%	2.36 MM		
16	0.30	49.70		99.4%	1.18 MM	GRAVEL	0.0%
30	0.70	49.30		98.6%	.600 MM	SAND	23.8%
50	2.10	47.90		95.8%	.300 MM	-200	76.2%
100	6.80	43.20		86.4%	.150 MM	.075 TO	
200	11.90	38.10		76.2%	.075 MM	.005 =	47.1%
PAN	14.60	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	50.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	32.0	6.30	25.70	51.40%	.037 MM	
4 MIN	20	27.0	6.30	20.70	41.40%	.019 MM	
19 MIN	20	23.0	6.30	16.70	33.40%	.009 MM	
60 MIN	19.5	21.0	6.43	14.57	29.14%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(CL)s LEAN CLAY WITH SAND

SAMPLE NO. WC # 3		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 88.3 TO 88.5	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE DRILL HOLE		EXC. NO. WC # 3	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		[redacted]	+ OR − A LINE		[redacted]

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	50.00	MOIST−4	0.00%	DRY SAMP	50.00
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		50.00	50.00	50.00	50.00	50.00	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	50.00

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	100.1	FACTOR = %TOT PASS NO#4 / TOTAL WT =	0.999
DISH NO. Pan#G		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	83.8
SIEVING TIME	10 MIN	DATE	7−9−93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	100.08		100.0%	2.36 MM		
16	0.00	100.08		100.0%	1.18 MM	GRAVEL	0.0%
30	0.30	99.78		99.7%	.600 MM	SAND	82.5%
50	42.10	57.98		57.9%	.300 MM	−200	17.5%
100	75.80	24.28		24.3%	.150 MM	.075 TO	
200	82.60	17.48		17.5%	.075 MM	.005 =	9.2%
PAN	83.80	TESTED BY BT & JD		DATE 7−9−93		CU =	0.00
TOTAL	83.80					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO 25644				DISPERSING AGENT		SODIUM HEX	
START		DATE	7−14−93			AMOUNT M25 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	23.00	20.0	6.24	13.76	13.75%	.037 MM	
4 MIN	23.00	17.0	6.24	10.76	10.75%	.019 MM	
19 MIN	23.00	16.0	6.24	9.76	9.75%	.009 MM	
60 MIN	23.00	14.5	6.24	8.26	8.25%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

[redacted]

SAMPLE NO. #WC-4	GRADATION AND SOILS CLASSIFICATION ANALYSIS			DEPTH 0 to 1.02 FEET	
TEST BY	BH & BT			CHECK BY	COMP
AREA	PROJECT ELKHEAD RESERVIOR		FEATURE	EXC. NO. WC-4	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%

MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	4.4	CLASS OF FINES =		CL-ML	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	103.00	%MOIST-4	0.90%	DRY SAMP	102.08
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		102.08	102.08	102.08	102.08	102.08	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	102.08

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.5	FACTOR = %TOT PASS NO#4 / TOTAL WT =	1.982
DISH NO. DISH #93		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	28.2
SIEVING TIME	10 MIN	DATE	7-28-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	5.41	45.04	= % OF	89.3%	2.36 MM		
16	8.71	41.74	TOTAL	82.7%	1.18 MM	GRAVEL	0.0%
30	10.18	40.27	PASSING	79.8%	.600 MM	SAND	52.0%
50	12.00	38.45		76.2%	.300 MM	-200	48.0%
100	17.50	32.95		65.3%	.150 MM	.075 TO	
200	26.24	24.21		48.0%	.075 MM	.005 =	33.9%
PAN	28.23	TESTED BY	JD	DATE	8-20-93	CU =	0.00
TOTAL	28.23					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	#25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21.5	20.0	5.91	14.09	27.93%	.037 MM	
4 MIN	21.5	18.0	5.91	12.09	23.96%	.019 MM	
19 MIN	21.5	14.5	5.91	8.59	17.03%	.009 MM	
60 MIN	21.5	13.0	5.91	7.09	14.05%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SC-SM SILTY, CLAYEY SAND

SAMPLE NO. WC-4		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 5.01 TO 6.01	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-4	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	429.60	%MOIST-4	7.27%	DRY SAMP	400.52
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.29	0.37	0.46	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.29	0.37	0.46	
DRY MASS RET		0.00	0.00	0.29	0.37	0.46	
DRY MASS PASSING		400.52	400.52	400.23	400.15	400.06	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	99.93%	99.91%	99.89%	400.06

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	1.998
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	37.8
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	6.60	43.40	= % OF	86.7%	2.36 MM		
16	11.50	38.50	TOTAL	76.9%	1.18 MM	GRAVEL	0.1%
30	18.70	31.30	PASSING	62.5%	.600 MM	SAND	74.3%
50	27.60	22.40		44.7%	.300 MM	-200	25.6%
100	33.10	16.90		33.8%	.150 MM	.075 TO	
200	37.20	12.80		25.6%	.075 MM	.005 =	16.4%
PAN	37.80	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	50.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25680			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	19.5	16.0	6.30	9.70	19.38%	.037 MM	
4 MIN	19.5	14.0	6.30	7.70	15.38%	.019 MM	
19 MIN	19.5	12.0	6.30	5.70	11.39%	.009 MM	
60 MIN	19.5	11.0	6.43	4.57	9.13%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SM SILTY SAND

SAMPLE NO. WC-5		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 5.0 TO 6.01	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-5	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	534.90	%MOIST-4	31.03%	DRY SAMP	408.23
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		408.23	408.23	408.23	408.23	408.23	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	408.23

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	20.3
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.20	49.80		99.6%	1.18 MM	GRAVEL	0.0%
30	0.30	49.70		99.4%	.600 MM	SAND	33.4%
50	0.80	49.20		98.4%	.300 MM	-200	66.6%
100	8.50	41.50		83.0%	.150 MM	.075 TO	
200	16.70	33.30		66.6%	.075 MM	.005 =	37.1%
PAN	20.30	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	50.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25680			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	31.0	6.24	24.76	49.52%	.037 MM	
4 MIN	22	27.0	6.24	20.76	41.52%	.019 MM	
19 MIN	22	22.0	6.24	15.76	31.52%	.009 MM	
60 MIN	22	21.0	6.24	14.76	29.52%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(CL) SANDY LEAN CLAY

SAMPLE NO. WC # 5		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 30 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE DRILL HOLE		EXC. NO. WC # 5	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	23.9	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	50.00	MOIST-4	0.00%	DRY SAMP	50.00
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		50.00	50.00	50.00	50.00	50.00	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	50.00

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. Pan#G		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	0.5
SIEVING TIME	10 MIN	DATE	7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.00	50.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.20	49.80		99.6%	.600 MM	SAND	1.0%
50	0.20	49.80		99.6%	.300 MM	-200	99.0%
100	0.30	49.70		99.4%	.150 MM	.075 TO	
200	0.50	49.50		99.0%	.075 MM	.005 =	39.0%
PAN	0.50	TESTED BY BT & JD		DATE 7-9-93		CU =	0.00
TOTAL	0.50					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO	25644			DISPERSING AGENT		SODIUM HEX	
START		DATE	7-14-93			AMOUNT M125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22.00	52.0	5.00	47.00	94.00%	.037 MM	
4 MIN	22.00	48.0	5.00	43.00	86.00%	.019 MM	
19 MIN	22.00	43.0	5.00	38.00	76.00%	.009 MM	
60 MIN	22.00	35.0	5.00	30.00	60.00%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH	
WC-6						0.0 TO 1.01	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT		FEATURE		EXC. NO.	
		ELKHEAD RESERVIOR				WC-6	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	494.10	%MOIST-4	21.11%	DRY SAMP	407.98
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		407.98	407.98	407.98	407.98	407.98	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	407.98

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	10.5
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.00	50.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.10	49.90		99.8%	.600 MM	SAND	17.6%
50	0.30	49.70		99.4%	.300 MM	-200	82.4%
100	3.60	46.40		92.8%	.150 MM	.075 TO	
200	8.80	41.20		82.4%	.075 MM	.005 =	43.5%
PAN	10.50	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	50.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21	37.0	6.04	30.96	61.92%	.037 MM	
4 MIN	21	32.0	6.04	25.96	51.92%	.019 MM	
19 MIN	21	28.0	6.04	21.96	43.92%	.009 MM	
60 MIN	21	25.5	6.04	19.46	38.92%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(CL)s LEAN CLAY WITH SAND

SAMPLE NO. #WC-6	GRADATION AND SOILS CLASSIFICATION ANALYSIS	DEPTH 5.0 to 6.1 FEET
TEST BY BH & BT		CHECK BY COMP
AREA	PROJECT ELKHEAD RESERVIOR / FEATURE	EXC. N0. WC-6

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%

MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	23.2	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	117.40	%MOIST-4	25.60%	DRY SAMP	93.47
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		93.47	93.47	93.47	93.47	93.47	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	93.47

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING = 50.2	FACTOR = %TOT PASS NO#4 / TOTAL WT = 1.994
DISH NO. DISH #15	DRY MASS OF SAMPLE (SIEVED) AFTER WASHING = 5.7
SIEVING TIME 10 MIN	DATE 7-28-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.15		100.0%	2.36 MM		
16	0.00	50.15		100.0%	1.18 MM	GRAVEL	0.0%
30	0.03	50.12		99.9%	.600 MM	SAND	10.3%
50	0.36	49.79		99.3%	.300 MM	-200	89.7%
100	2.41	47.74		95.2%	.150 MM	.075 TO	
200	5.19	44.96		89.7%	.075 MM	.005 =	41.6%
PAN	5.68	TESTED BY	JD	DATE 8-20-93		CU =	0.00
TOTAL	5.68					CC =	0.00

HYDROMETER ANALYSIS

HYDRO #25644				DISPERSING AGENT	SODIUM HEX	
START		DATE			AMOUNT 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22.5	47.5	5.91	41.59	82.93%	.037 MM	
4 MIN	22.5	39.5	5.91	33.59	66.98%	.019 MM	
19 MIN	22.5	34.0	5.91	28.09	56.01%	.009 MM	
60 MIN	22.5	30.0	5.91	24.09	48.04%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO. WC-6		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 10.3 TO 11.08	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-6	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	[redacted]	CLASS OF FINES =		CL-ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	538.80	%MOIST-4	12.46%	DRY SAMP	479.10
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		479.10	479.10	479.10	479.10	479.10	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	479.10

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	23.8
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.50	49.50		99.0%	2.36 MM		
16	0.90	49.10		98.2%	1.18 MM	GRAVEL	0.0%
30	1.00	49.00		98.0%	.600 MM	SAND	21.8%
50	1.40	48.60		97.2%	.300 MM	--200	78.2%
100	2.20	47.80		95.6%	.150 MM	.075 TO	
200	10.90	39.10		78.2%	.075 MM	.005 =	58.6%
PAN	23.80	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	50.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21	27.0	6.19	20.81	41.62%	.037 MM	
4 MIN	21	21.0	6.19	14.81	29.62%	.019 MM	
19 MIN	21	17.5	6.19	11.31	22.62%	.009 MM	
60 MIN	21	16.0	6.19	9.81	19.62%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(CL-ML)s SILTY CLAY WITH SAND

SAMPLE NO. WC # 6		GRADATION AND SOILS CLASSIFICATION ANALYSIS			DEPTH 22 FEET	
TEST BY	BT				CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE DRILL HOLE	EXC. N0. WC # 6	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME						
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"	3" TO 5"	0.0%
P. INDEX		CLASS OF FINES =		[redacted]	+ OR − A LINE	[redacted]

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	50.00	MOIST−4	0.00%	DRY SAMP	50.00
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		50.00	50.00	50.00	50.00	50.00	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	50.00

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	100.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	1.000
DISH NO. Pan#G		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	80.5
SIEVING TIME	10 MIN	DATE	7−9−93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	100.00		100.0%	2.36 MM		
16	0.00	100.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.00	100.00		100.0%	.600 MM	SAND	78.2%
50	1.40	98.60		98.6%	.300 MM	−200	21.8%
100	61.70	38.30		38.3%	.150 MM	.075 TO	
200	78.20	21.80		21.8%	.075 MM	.005 =	12.3%
PAN	80.50	TESTED BY BT & JD		DATE 7−9−93		CU =	0.00
TOTAL	80.50					CC =	0.00

HYDROMETER ANALYSIS

HYDRO N0	25625			DISPERSING AGENT	SODIUM HEX	
START		DATE	7−14−93		AMOUNT M125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	23.00	21.0	5.52	15.48	15.48%	.037 MM	
4 MIN	23.00	18.5	5.52	12.98	12.98%	.019 MM	
19 MIN	23.00	17.0	5.52	11.48	11.48%	.009 MM	
60 MIN	23.00	15.0	5.52	9.48	9.48%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SAMPLE NO. WC # 6		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 30 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE DRILL HOLE		EXC. NO. WC # 6	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX		CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	50.00	MOIST-4	0.00%	DRY SAMP	50.00
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		50.00	50.00	50.00	50.00	50.00	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	50.00

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	100.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	1.000
DISH NO. Pan#G		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	86.2
SIEVING TIME	10 MIN	DATE	7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	1.50	98.50	= % OF	98.5%	2.36 MM		
16	2.00	98.00	TOTAL	98.0%	1.18 MM	GRAVEL	0.0%
30	2.20	97.80	PASSING	97.8%	.600 MM	SAND	84.9%
50	25.90	74.10		74.1%	.300 MM	-200	15.1%
100	77.00	23.00		23.0%	.150 MM	.075 TO	
200	84.90	15.10		15.1%	.075 MM	.005 =	7.3%
PAN	86.20	TESTED BY BT & JD		DATE 7-9-93		CU =	0.00
TOTAL	86.20					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO	25680			DISPERSING AGENT		SODIUM HEX	
START		DATE	7-14-93			AMOUNT M25 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22.00	18.5	6.24	12.26	12.26%	.037 MM	
4 MIN	22.00	16.0	6.24	9.76	9.76%	.019 MM	
19 MIN	22.00	15.0	6.24	8.76	8.76%	.009 MM	
60 MIN	22.00	14.0	6.24	7.76	7.76%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO. #WC-7		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 5.2 to 6.21 FEET	
TEST BY	BH & BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-7	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	20.0	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	380.00	%MOIST-4	2.50%	DRY SAMP	370.73
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		370.73	370.73	370.73	370.73	370.73	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	370.73

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.3	FACTOR = %TOT PASS NO#4 / TOTAL WT =	1.987
DISH NO. DISH #10		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	1.2
SIEVING TIME	10 MIN	DATE	7-28-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.04	50.28	= % OF	99.9%	2.36 MM		
16	0.13	50.19	TOTAL	99.7%	1.18 MM	GRAVEL	0.0%
30	0.21	50.11	PASSING	99.6%	.600 MM	SAND	2.2%
50	0.34	49.98		99.3%	.300 MM	-200	97.8%
100	0.70	49.62		98.6%	.150 MM	.075 TO	
200	1.10	49.22		97.8%	.075 MM	.005 =	20.1%
PAN	1.15	TESTED BY	JD	DATE	8-20-93	CU =	0.00
TOTAL	1.15					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	#25680			DISPERSING AGENT	SODIUM HEX		
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22.5	56.5	5.91	50.59	100.54%	.037 MM	
4 MIN	22.5	54.0	5.91	48.09	95.57%	.019 MM	
19 MIN	22.5	50.5	5.91	44.59	88.61%	.009 MM	
60 MIN	22.5	45.0	5.91	39.09	77.68%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO. WC-7		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 10.0 TO 10.57	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. WC-7	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	16.7	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	344.50	%MOIST-4	14.83%	DRY SAMP	300.01
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		300.01	300.01	300.01	300.01	300.01	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	300.01

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =					2.000
DISH NO. PAN #C				DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =		17.2	
SIEVING TIME		10 MIN		DATE	7-13-92		
SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.00	50.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.10	49.90		99.8%	.600 MM	SAND	30.8%
50	1.40	48.60		97.2%	.300 MM	-200	69.2%
100	8.30	41.70		83.4%	.150 MM	.075 TO	
200	15.40	34.60		69.2%	.075 MM	.005 =	36.5%
PAN	17.20	TESTED BY	JB	DATE	7-13-92	CU =	0.00
TOTAL	17.20					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20.5	33.0	6.17	26.83	53.66%	.037 MM	
4 MIN	20.5	29.0	6.17	22.83	45.66%	.019 MM	
19 MIN	20.5	24.5	6.17	18.33	36.66%	.009 MM	
60 MIN	20.5	22.5	6.17	16.33	32.66%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(CL) SANDY LEAN CLAY

SAMPLE NO. #WC-8	GRADATION AND SOILS CLASSIFICATION ANALYSIS			DEPTH 0 to 0.97 FEET	
TEST BY	BH & BT			CHECK BY	COMP
AREA	PROJECT ELKHEAD RESERVIOR		FEATURE	EXC. NO. WC-8	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	3/4"	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	11.8	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT	380.00	% MOIST-4	2.50%	DRY SAMP	371.82
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN
WET MATL & PAN ACC		0.00	0.00	34.70	39.00	44.80	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	34.70	39.00	44.80	
DRY MASS RET		0.00	0.00	34.70	39.00	44.80	GRAMS
DRY MASS PASSING		371.82	371.82	337.12	332.82	327.02	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	90.67%	89.51%	87.95%	327.02

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.8	FACTOR = %TOT PASS NO#4 / TOTAL WT	=	1.733
DISH NO.	DISH #60	DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	19.1	
SIEVING TIME	10 MIN	DATE	7-28-92	

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.99	49.77		86.2%	2.36 MM		
16	1.98	48.78		84.5%	1.18 MM	GRAVEL	12.0%
30	3.13	47.63		82.5%	.600 MM	SAND	31.5%
50	5.04	45.72		79.2%	.300 MM	-200	56.5%
100	11.15	39.61		68.6%	.150 MM	.075 TO	
200	18.16	32.60		56.5%	.075 MM	.005 =	30.6%
PAN	19.08	TESTED BY	JD	DATE	8-20-93	CU =	0.00
TOTAL	19.08					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	#25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21	33.0	6.04	26.96	46.71%	.037 MM	
4 MIN	21	26.0	6.04	19.96	34.58%	.019 MM	
19 MIN	21	23.5	6.04	17.46	30.25%	.009 MM	
60 MIN	21	21.0	6.04	14.96	25.92%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(CL) SANDY LEAN CLAY

GRADATION AND SOILS CLASSIFICATION ANALYSIS

#WC-9		DEPTH 0 to 1.07 FEET	
TEST BY	BH & BT	CHECK BY	COMP
AREA	PROJECT ELKHEAD RESERVIOR	FEATURE	EXC. NO. WC-9

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%

MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	18.4	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

% MOIST + 4	0.00%	SAMP WT.	78.70	% MOIST - 4	3.00%	DRY SAMP	76.41

SIEVE SIZE	(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC	0.00	0.00	0.00	0.00	0.00	
MASS OF PAN	0.00	0.00	0.00	0.00	0.00	
WET MASS RET	0.00	0.00	0.00	0.00	0.00	
DRY MASS RET	0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING	76.41	76.41	76.41	76.41	76.41	WT.IN PAN
% OF TOTAL PASSING	100.00%	100.00%	100.00%	100.00%	100.00%	76.41

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING = 50.7

FACTOR = %TOT PASS NO#4 / TOTAL WT = 1.973

DISH NO. DISH #2

DRY MASS OF SAMPLE (SIEVED) AFTER WASHING = 25.8

SIEVING TIME 10 MIN

DATE 7-28-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS
8	0.12	50.57		99.8%	2.36 MM	
16	0.14	50.55		99.7%	1.18 MM	GRAVEL 0.0%
30	0.56	50.13		98.9%	.600 MM	SAND 49.8%
50	8.93	41.76		82.4%	.300 MM	-200 50.2%
100	21.19	29.50		58.2%	.150 MM	.075 TO
200	25.25	25.44		50.2%	.075 MM	.005 = 11.7%
PAN	25.82	TESTED BY	JD	DATE	8-20-93	CU = 0.00
TOTAL	25.82					CC = 0.00

HYDROMETER ANALYSIS

HYDRO #25644 DISPERSING AGENT SODIUM HEX

START DATE AMOUNT 125 ML

TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	31.0	5.00	26.00	51.29%	.037 MM	
4 MIN	22	28.0	5.00	23.00	45.37%	.019 MM	
19 MIN	22	25.5	5.00	20.50	40.44%	.009 MM	
60 MIN	22	24.5	5.00	19.50	38.47%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SC / CL SANDY LEAN CLAY

GRADATION AND SOILS CLASSIFICATION ANALYSIS

#WC-9		DEPTH 4.9 to 5.93 FEET	
TEST BY	BH & BT	CHECK BY	COMP
AREA	PROJECT ELKHEAD RESERVIOR	FEATURE	EXC. NO. WC-9

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%

MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
F. INDEX		CLASS OF FINES =			+ OR - A LINE		

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	35.70	% MOIST-4	2.60%	DRY SAMP	34.80
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		34.80	34.80	34.80	34.80	34.80	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	34.80

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING = 34.8

FACTOR = %TOT PASS NO#4 / TOTAL WT = 2.871

DISH NO. DISH #A-14

DRY MASS OF SAMPLE (SIEVED) AFTER WASHING = 21.0

SIEVING TIME 10 MIN

DATE 7-28-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	34.83		100.0%	2.36 MM		
16	0.00	34.83		100.0%	1.18 MM	GRAVEL	0.0%
30	0.36	34.47		99.0%	.600 MM	SAND	58.6%
50	8.17	26.66		76.5%	.300 MM	-200	41.4%
100	16.89	17.94		51.5%	.150 MM	.075 TO	
200	20.42	14.41		41.4%	.075 MM	.005 =	6.9%
PAN	20.97	TESTED BY	JD	DATE	8-20-93	CU =	0.00
TOTAL	20.97					CC =	0.00

HYDROMETER ANALYSIS

HYDRO #25680 DISPERSING AGENT SODIUM HEX

START DATE AMOUNT 125 ML

TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	21.0	5.00	16.00	45.94%	.037 MM	
4 MIN	22	19.0	5.00	14.00	40.20%	.019 MM	
19 MIN	22	18.0	5.00	13.00	37.32%	.009 MM	
60 MIN	22	17.0	5.00	12.00	34.45%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SAMPLE NO. WC # 9A		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 11.0 TO 11.4	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE DRILL HOLE		EXC. NO. WC # 9A	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX		CLASS OF FINES =		ML	+ OR − A LINE		−

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	50.00	MOIST−4	0.00%	DRY SAMP	50.00
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		50.00	50.00	50.00	50.00	50.00	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	50.00

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. Pan#G		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	19.6
SIEVING TIME	10 MIN	DATE	7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.20	49.80		99.6%	2.36 MM		
16	1.20	48.80		97.6%	1.18 MM	GRAVEL	0.0%
30	2.50	47.50		95.0%	.600 MM	SAND	34.6%
50	3.90	46.10		92.2%	.300 MM	−200	65.4%
100	9.70	40.30		80.6%	.150 MM	.075 TO	
200	17.30	32.70		65.4%	.075 MM	.005 =	39.9%
PAN	19.60	TESTED BY BT & JD		DATE 7-9-93		CU =	0.00
TOTAL	19.60					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO	25625			DISPERSING AGENT		SODIUM HEX	
START		DATE	7-14-93			AMOUNT M25 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22.00	31.0	6.24	24.76	49.52%	.037 MM	
4 MIN	22.00	25.0	6.24	18.76	37.52%	.019 MM	
19 MIN	22.00	21.5	6.24	15.26	30.52%	.009 MM	
60 MIN	22.00	19.0	6.24	12.76	25.52%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

ML SANDY SILT

SAMPLE NO. #WC-10	GRADATION AND SOILS CLASSIFICATION ANALYSIS			DEPTH 0 to 1.1 FEET	
TEST BY	BH & BT			CHECK BY	COMP
AREA	PROJECT ELKHEAD RESERVIOR		FEATURE	EXC. NO. WC-10	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	13.2	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	210.20	%MOIST-4	3.30%	DRY SAMP	203.48
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		203.48	203.48	203.48	203.48	203.48	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	203.48

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.3	FACTOR = %TOT PASS NO#4 / TOTAL WT =	1.988
DISH NO. DISH #57		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	28.9
SIEVING TIME	10 MIN	DATE	7-28-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.31		100.0%	2.36 MM		
16	0.01	50.30		100.0%	1.18 MM	GRAVEL	0.0%
30	0.42	49.89		99.2%	.600 MM	SAND	55.7%
50	9.12	41.19		81.9%	.300 MM	-200	44.3%
100	22.66	27.65		55.0%	.150 MM	.075 TO	
200	28.00	22.31		44.3%	.075 MM	.005 =	14.6%
PAN	28.86	TESTED BY	JD	DATE	8-20-93	CU =	0.00
TOTAL	28.86					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	#25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	33.0	6.04	26.96	53.59%	.037 MM	
4 MIN	22	26.0	6.04	19.96	39.67%	.019 MM	
19 MIN	22	23.5	6.04	17.46	34.70%	.009 MM	
60 MIN	22	21.0	6.04	14.96	29.74%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CLAYEY SAND
(SC)

SAMPLE NO. #WC-11	GRADATION AND SOILS CLASSIFICATION ANALYSIS			DEPTH 0 to 1.15 FEET	
TEST BY	BH & BT			CHECK BY	COMP
AREA	PROJECT ELKHEAD RESERVIOR		FEATURE	EXC. NO. WC-11	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	#4	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	15.8	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	118.60	% MOIST-4	3.30%	DRY SAMP	114.88
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	2.10	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	2.10	
DRY MASS RET		0.00	0.00	0.00	0.00	2.10	GRAMS
DRY MASS PASSING		114.88	114.88	114.88	114.88	112.78	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	98.17%	112.78

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.1	FACTOR = % TOT PASS NO#4 / TOTAL WT	=	1.960
DISH NO.	DISH #108	DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	21.3	
SIEVING TIME	10 MIN	DATE	7-28-92	

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS
8	0.00	50.10		98.2%	2.36 MM	
16	0.16	49.94		97.9%	1.18 MM	GRAVEL 1.8%
30	1.05	49.05		96.1%	.600 MM	SAND 40.2%
50	8.61	41.49		81.3%	.300 MM	-200 57.9%
100	16.42	33.68		66.0%	.150 MM	.075 TO
200	20.54	29.56		57.9%	.075 MM	.005 = 22.7%
PAN	21.29	TESTED BY	JD	DATE	8-20-93	CU = 0.00
TOTAL	21.29					CC = 0.00

HYDROMETER ANALYSIS

HYDRO	#25644			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21.5	30.0	6.04	23.96	46.95%	.037 MM	
4 MIN	21.5	28.0	6.04	21.96	43.03%	.019 MM	
19 MIN	21.5	25.5	6.04	19.46	38.13%	.009 MM	
60 MIN	21.5	24.0	6.04	17.96	35.19%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(CL) SANDY LEAN CLAY

SAMPLE NO. #WC-11	GRADATION AND SOILS CLASSIFICATION ANALYSIS		DEPTH 5.1 to 6.11 FEET
TEST BY BH & BT			CHECK BY COMP
AREA	PROJECT ELKHEAD RESERVIOR	FEATURE	EXC. NO. WC-11

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	23.2	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	108.80	% MOIST-4	9.50%	DRY SAMP	99.36
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	GRAMS
DRY MASS PASSING		99.36	99.36	99.36	99.36	99.36	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	99.36

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.2	FACTOR = %TOT PASS NO#4 / TOTAL WT =	1.990
DISH NO. DISH #T304		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	10.5
SIEVING TIME	10 MIN	DATE	7-28-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS
8	0.17	50.07		99.7%	2.36 MM	
16	0.44	49.80		99.1%	1.18 MM	GRAVEL 0.0%
30	0.97	49.27		98.1%	.600 MM	SAND 19.8%
50	3.80	46.44		92.4%	.300 MM	-200 80.2%
100	7.41	42.83		85.3%	.150 MM	.075 TO
200	9.97	40.27		80.2%	.075 MM	.005 = 29.4%
PAN	10.47	TESTED BY	JD	DATE	8-20-93	CU = 0.00
TOTAL	10.47					CC = 0.00

HYDROMETER ANALYSIS

HYDRO	#25680			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21.5	40.5	6.36	34.14	67.95%	.037 MM	
4 MIN	21.5	37.0	6.36	30.64	60.99%	.019 MM	
19 MIN	21	34.5	6.48	28.02	55.77%	.009 MM	
60 MIN	21	32.0	6.48	25.52	50.80%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(CL): LEAN CLAY WITH SAND

SAMPLE NO. TP-27/#1		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 1.0 to 3.0 Feet	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE TEST PIT		EXC. NO. TP-27	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	58.81	MOIST-4	0.00%	DRY SAMP	58.81
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		58.81	58.81	58.81	58.81	58.81	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	58.81

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING = 628.9	FACTOR = %TOT PASS NO#4 / TOTAL WT = 0.159
DISH NO. Pan#16	DRY MASS OF SAMPLE (SIEVED) AFTER WASHING = 596.8
SIEVING TIME 10 MIN	DATE 7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.30	628.60		100.0%	2.36 MM		
16	0.80	628.10		99.9%	1.18 MM	GRAVEL	0.0%
30	3.10	625.80		99.5%	.600 MM	SAND	94.8%
50	143.90	485.00		77.1%	.300 MM	-200	5.2%
100	548.80	80.10		12.7%	.150 MM	.075 TO	
200	595.90	33.00		5.2%	.075 MM	.005 =	3.7%
PAN	596.80	TESTED BY BT & JD		DATE 7-9-93		CU =	0.00
TOTAL	596.80					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO #25625				DISPERSING AGENT		SODIUM HEX	
START		DATE 7-12-93				AMOUNT M 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	23.0	6.30	16.70	2.66%	.037 MM	50 GRAMS
4 MIN	20	20.0	6.30	13.70	2.18%	.019 MM	
19 MIN	20	18.0	6.30	11.70	1.86%	.009 MM	
60 MIN	20	16.0	6.30	9.70	1.54%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SP-SM POORLY GRADED SAND WITH SILT

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS		DEPTH	
TP-27/#2				3.0 to 7.0 Feet	
TEST BY	BT			CHECK BY	COMP
AREA		PROJECT	FEATURE	EXC. NO.	
		ELKHEAD RESERVIOR	TEST PIT	TP-27	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME

MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	17.4	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	64.80	MOIST-4	0.00%	DRY SAMP	64.80
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		64.80	64.80	64.80	64.80	64.80	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	64.80

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	628.9	FACTOR = %TOT PASS NO#4 / TOTAL WT =	0.159

DISH NO. Pan#C				DRY MASS OF SAMPLE (SIEVED) AFTER WASHING = 488.8			
SIEVING TIME	10 MIN			DATE 7-9-93			
SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	215.10	413.80		65.8%	2.36 MM		
16	329.90	299.00		47.5%	1.18 MM	GRAVEL	0.0%
30	396.40	232.50		37.0%	.600 MM	SAND	77.3%
50	432.10	196.80		31.3%	.300 MM	-200	22.7%
100	461.70	167.20		26.6%	.150 MM	.075 TO	
200	486.30	142.60		22.7%	.075 MM	.005 =	18.5%
PAN	488.80	TESTED BY BT & JD		DATE 7-9-93		CU =	0.00
TOTAL	488.80					CC =	0.00

HYDROMETER ANALYSIS

HYDRO N0 #25811				DISPERSING AGENT SODIUM HEX			
START		DATE 7-12-93				AMOUNT N 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	52.0	6.48	45.52	7.24%	.037 MM	100 GRAMS
4 MIN	20	47.0	6.48	40.52	6.44%	.019 MM	
19 MIN	20	40.0	6.48	33.52	5.33%	.009 MM	
60 MIN	20	33.0	6.48	26.52	4.22%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SC CLAYEY SAND

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH	
TP-28/#1						0 to 3.0 Feet	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT		FEATURE		EXC. NO.	
		ELKHEAD RESERVIOR		TEST PIT		TP-28	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME

MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	19.8	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	78.27	MOIST-4	0.00%	DRY SAMP	78.27
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		78.27	78.27	78.27	78.27	78.27	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	78.27

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	305.7	FACTOR = %TOT PASS NO#4 / TOTAL WT =	0.327
DISH NO. Pan#16		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	146.8
SIEVING TIME	10 MIN	DATE	7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	9.40	296.30		96.9%	2.36 MM		
16	18.70	287.00		93.9%	1.18 MM	GRAVEL	0.0%
30	32.70	273.00		89.3%	.600 MM	SAND	46.1%
50	61.90	243.80		79.8%	.300 MM	-200	53.9%
100	101.30	204.40		66.9%	.150 MM	.075 TO	
200	141.00	164.70		53.9%	.075 MM	.005 =	43.7%
PAN	146.80	TESTED BY BT & JD		DATE	7-9-93	CU =	0.00
TOTAL	146.80					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO	#25625			DISPERSING AGENT		SODIUM HEX	
START		DATE	7-12-93			AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	21	52.0	6.04	45.96	15.03%	.037 MM	100 GRAMS
4 MIN	21	46.0	6.04	39.96	13.07%	.019 MM	
19 MIN	21	41.0	6.04	34.96	11.44%	.009 MM	
60 MIN	21	37.0	6.04	30.96	10.13%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SC/CL SANDY LEAN CLAY

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH	
TP-29/#1						1.0 to 2.0 Feet	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT		FEATURE		EXC. NO.	
		ELKHEAD RESERVIOR		TEST PIT		TP-29	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	13.1	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	66.88	MOIST-4	10.60%	DRY SAMP	60.47
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		60.47	60.47	60.47	60.47	60.47	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	60.47

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	492.7	FACTOR = %TOT PASS NO#4 / TOTAL WT	=	0.203
DISH NO.	Pan#11	DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	213.4	
SIEVING TIME	10 MIN	DATE	7-9-93	

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	4.30	488.40		99.1%	2.36 MM		
16	5.80	486.90		98.8%	1.18 MM	GRAVEL	0.0%
30	7.60	485.10		98.5%	.600 MM	SAND	42.6%
50	30.40	462.30		93.8%	.300 MM	-200	57.4%
100	121.30	371.40		75.4%	.150 MM	.075 TO	
200	210.10	282.60		57.4%	.075 MM	.005 =	49.1%
PAN	213.40	TESTED BY	BT	DATE	7-9-93	CU =	0.00
TOTAL	213.40					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO	#25680			DISPERSING AGENT		SODIUM HEX	
START		DATE	7-12-93			AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	61.0	6.24	54.76	11.11%	.037 MM	100 GRAMS
4 MIN	22	54.0	6.24	47.76	9.69%	.019 MM	
19 MIN	22	50.0	6.24	43.76	8.88%	.009 MM	
60 MIN	22	47.0	6.24	40.76	8.27%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(CL) SANDY LEAN CLAY

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS			DEPTH	
TP-29/#2					2.0 to 5.8 Feet	
TEST BY	BT				CHECK BY	COMP
AREA		PROJECT		FEATURE	EXC. NO.	
		ELKHEAD RESERVIOR		TEST PIT	TP-29	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	55.68	MOIST-4	10.30%	DRY SAMP	50.48
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		50.48	50.48	50.48	50.48	50.48	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	50.48

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	660.3	FACTOR = %TOT PASS NO#4 / TOTAL WT =	0.151
DISH NO. Pan#6		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	595.6
SIEVING TIME	10 MIN	DATE	7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	2.20	658.10		99.7%	2.36 MM		
16	4.90	655.40		99.3%	1.18 MM	GRAVEL	0.0%
30	26.00	634.30		96.1%	.600 MM	SAND	89.5%
50	130.00	530.30		80.3%	.300 MM	-200	10.5%
100	505.30	155.00		23.5%	.150 MM	.075 TO	
200	590.70	69.60		10.5%	.075 MM	.005 =	8.9%
PAN	595.60	TESTED BY	BT	DATE	7-9-93	CU =	0.00
TOTAL	595.60					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO	#25625			DISPERSING AGENT	SODIUM HEX	
START		DATE	7-12-93		AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	21.0	5.78	15.22	2.31%	.037 MM	50 GRAMS
4 MIN	22	19.0	5.78	13.22	2.00%	.019 MM	
19 MIN	22	17.0	5.78	11.22	1.70%	.009 MM	
60 MIN	22	16.5	5.78	10.72	1.62%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SP-SM POORLY GRADED SAND WITH SILT

SAMPLE NO. TP-30/#1		GRADATION & SOILS CLASSIFICATION ANALYSIS				DEPTH 1.0 to 1.5 Feet	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT BLKHEAD RESERVIOR		FEATURE TEST PIT		EXC. NO. TP-30	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	75.14	MOIST-4	13.60%	DRY SAMP	66.14
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS WT.IN PAN
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		66.14	66.14	66.14	66.14	66.14	
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	66.14

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	595.2	FACTOR = %TOT PASS NO#4 / TOTAL WT =	0.168
DISH NO. Pan#A		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	419.8
SIEVING TIME	10 MIN	DATE	7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS
8	0.10	595.10		100.0%	2.36 MM	
16	0.20	595.00		100.0%	1.18 MM	GRAVEL 0.0%
30	3.80	591.40		99.4%	.600 MM	SAND 69.9%
50	87.40	507.80		85.3%	.300 MM	-200 30.1%
100	310.20	285.00		47.9%	.150 MM	.075 TO
200	415.90	179.30		30.1%	.075 MM	.005 = 27.6%
PAN	419.80	TESTED BY BT & JD		DATE	7-9-93	CU = 0.00
TOTAL	419.80					CC = 0.00

HYDROMETER ANALYSIS

HYDRO NO #25644				DISPERSING AGENT		SODIUM HEX	
START		DATE	7-12-93			AMOUNT M125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	25.0	5.00	20.00	3.36%	.037 MM	
4 MIN	22	22.0	5.00	17.00	2.86%	.019 MM	
19 MIN	22	21.0	5.00	16.00	2.69%	.009 MM	
60 MIN	22	20.0	5.00	15.00	2.52%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SM SILTY SAND

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH	
TP-30/#2						1.5 to 2.0 Feet	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT		FEATURE		EXC. NO.	
		ELKHEAD RESERVIOR		TEST PIT		TP-30	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME

MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	38.25	MOIST-4	11.10%	DRY SAMP	34.43
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		34.43	34.43	34.43	34.43	34.43	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	34.43

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	614.9	FACTOR = %TOT PASS NO#4 / TOTAL WT =	0.163
DISH NO.	Pan#L	DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	497.6
SIEVING TIME	10 MIN	DATE	7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	2.70	612.20		99.6%	2.36 MM		
16	3.60	611.30		99.4%	1.18 MM	GRAVEL	0.0%
30	16.50	598.40		97.3%	.600 MM	SAND	80.5%
50	199.60	415.30		67.5%	.300 MM	-200	19.5%
100	430.50	184.40		30.0%	.150 MM	.075 TO	
200	494.90	120.00		19.5%	.075 MM	.005 =	17.8%
PAN	497.60	TESTED BY BT & BH		DATE 7-9-93		CU =	0.00
TOTAL	497.60					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO #25680				DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT M125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	23.0	6.24	16.76	2.73%	.037 MM	
4 MIN	22	20.0	6.24	13.76	2.24%	.019 MM	
19 MIN	22	19.0	6.24	12.76	2.08%	.009 MM	
60 MIN	22	17.0	6.24	10.76	1.75%	.005 MM	
71HR 15MIN				0.00	0.00%	.002 MM	
251H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SM SILTY SAND

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH	
TP-30/#3						2.0 to 3.6 Feet	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT		FEATURE		EXC. NO.	
		ELKHEAD RESERVIOR		TEST PIT		TP-30	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME

MAX SIZE	1.5"	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	83.18	MOIST-4	14.90%	DRY SAMP	73.59
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	4.32	7.30	8.78	9.21	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	4.32	7.30	8.78	9.21	
DRY MASS RET		0.00	4.32	7.30	8.78	9.21	
DRY MASS PASSING		73.59	69.27	66.29	64.81	64.38	WT.IN PAN
% OF TOTAL PASSING		100.00%	94.13%	90.08%	88.07%	87.48%	9.28

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	468.1	FACTOR = %TOT PASS NO#4 / TOTAL WT =	0.187
DISH NO.	Pan#1	DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	357.9
SIEVING TIME	10 MIN	DATE	7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	2.10	466.00		87.1%	2.36 MM		
16	3.30	464.80		86.9%	1.18 MM	GRAVEL	12.5%
30	12.20	455.90		85.2%	.600 MM	SAND	65.8%
50	109.70	358.40		67.0%	.300 MM	-200	21.7%
100	279.80	188.30		35.2%	.150 MM	.075 TO	
200	352.20	115.90		21.7%	.075 MM	.005 =	19.3%
PAN	357.90	TESTED BY BT & BH		DATE	7-9-93	CU =	0.00
TOTAL	357.90					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO #25625				DISPERSING AGENT		SODIUM HEX	
START		DATE	7-14-93			AMOUNT M125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	24.0	5.78	18.22	3.41%	.037 MM	
4 MIN	22	21.0	5.78	15.22	2.84%	.019 MM	
19 MIN	22	19.5	5.78	13.72	2.56%	.009 MM	
60 MIN	22	18.5	5.78	12.72	2.38%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SM SILTY SAND

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH	
TP-30/#4						3.6 To 7.0 Feet	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT		FEATURE		EXC. NO.	
		ELKHEAD RESERVIOR		TEST PIT		TP-30	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	80.85	MOIST-4	12.90%	DRY SAMP	71.61
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		71.61	71.61	71.61	71.61	71.61	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	71.61

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	451.3	FACTOR = %TOT PASS NO#4 / TOTAL WT =	0.222
DISH NO. Pan# N-10		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	334.8
SIEVING TIME	10 MIN	DATE	7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	74.90	376.40		83.4%	2.36 MM		
16	115.60	335.70		74.4%	1.18 MM	GRAVEL	0.0%
30	146.00	305.30		67.6%	.600 MM	SAND	73.5%
50	174.10	277.20		61.4%	.300 MM	-200	26.5%
100	256.70	194.60		43.1%	.150 MM	.075 TO	
200	331.60	119.70		26.5%	.075 MM	.005 =	21.1%
PAN	334.80	TESTED BY	BT &BH	DATE	7-9-93	CU =	0.00
TOTAL	334.80					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO #25644				DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT M125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	35.0	0.00	35.00	7.76%	.037 MM	
4 MIN	22	30.0	0.00	30.00	6.65%	.019 MM	
19 MIN	22	27.0	0.00	27.00	5.98%	.009 MM	
60 MIN	22	24.5	0.00	24.50	5.43%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SM SILTY SAND

SAMPLE NO. TP-31-#1		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 0 to 2.0 Feet	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE TEST PIT		EXC. NO. TP-31	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	12.8	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	82.58	MOIST-4	16.30%	DRY SAMP	71.01
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		71.01	71.01	71.01	71.01	71.01	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	71.01

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	445.1	FACTOR = %TOT PASS NO#4 / TOTAL WT =	0.225
DISH NO. Pan#11		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	226.7
SIEVING TIME	10 MIN	DATE 7-9-93	

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	3.90	441.20		99.1%	2.36 MM		
16	9.60	435.50		97.8%	1.18 MM	GRAVEL	0.0%
30	29.90	415.20		93.3%	.600 MM	SAND	50.0%
50	82.50	362.60		81.5%	.300 MM	-200	50.0%
100	162.70	282.40		63.4%	.150 MM	.075 TO	
200	222.60	222.50		50.0%	.075 MM	.005 =	44.0%
PAN	226.70	TESTED BY BT & JD		DATE 7-9-93		CU =	0.00
TOTAL	226.70					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO 25680				DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT M25 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	43.0	6.24	36.76	8.26%	.037 MM	
4 MIN	22	39.0	6.24	32.76	7.36%	.019 MM	
19 MIN	22	36.0	6.24	29.76	6.69%	.009 MM	
60 MIN	22	33.0	6.24	26.76	6.01%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SC/CL LEAN CLAYEY SAND

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS			DEPTH	
TP-31-#2					2.0 TO 5.5 FEET	
TEST BY	BT				CHECK BY	COMP
AREA		PROJECT		FEATURE	EXC. NO.	
		ELKHEAD RESERVIOR		TEST PIT	TP-31	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	65.87	MOIST-4	0.00%	DRY SAMP	65.87
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) N0.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		65.87	65.87	65.87	65.87	65.87	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	65.87

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	549.8	FACTOR = %TOT PASS NO#4 / TOTAL WT =	0.182
DISH NO. Pan#G		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	282.3
SIEVING TIME	10 MIN	DATE	7-9-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	30.10	519.70		94.5%	2.36 MM		
16	50.50	499.30		90.8%	1.18 MM	GRAVEL	0.0%
30	75.40	474.40		86.3%	.600 MM	SAND	49.4%
50	116.90	432.90		78.7%	.300 MM	-200	50.6%
100	174.40	375.40		68.3%	.150 MM	.075 TO	
200	271.50	278.30		50.6%	.075 MM	.005 =	47.3%
PAN	282.30	TESTED BY BT & JD		DATE	7-9-93	CU =	0.00
TOTAL	282.30					CC =	0.00

HYDROMETER ANALYSIS

HYDRO N0	25625			DISPERSING AGENT		SODIUM HEX	
START		DATE	7-14-93			AMOUNT M125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22.00	38.0	5.78	32.22	5.86%	.037 MM	
4 MIN	22.00	31.5	5.78	25.72	4.68%	.019 MM	
19 MIN	22.00	26.5	5.78	20.72	3.77%	.009 MM	
60 MIN	22.00	24.0	5.78	18.22	3.31%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SM-ML SANDY SILT

TP-32/#1		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 1.0 TO 4.0 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE TEST PIT		EXC. NO. TP-32	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	8.2	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	79.36	%MOIST-4	8.30%	DRY SAMP	73.28
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		73.28	73.28	73.28	73.28	73.28	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	73.28

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT	= 2.000
DISH NO. PAN #10		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	17.9
SIEVING TIME	10 MIN	DATE	7-21-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.00	50.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.20	49.80		99.6%	.600 MM	SAND	34.0%
50	2.60	47.40		94.8%	.300 MM	-200	66.0%
100	10.00	40.00		80.0%	.150 MM	.075 TO	
200	17.00	33.00		66.0%	.075 MM	.005 =	41.4%
PAN	17.90	TESTED BY	BH	DATE	7-21-93	CU =	0.00
TOTAL	17.90					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO 25680				DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	33.0	6.72	26.28	52.56%	.037 MM	
4 MIN	20	25.0	6.72	18.28	36.56%	.019 MM	
19 MIN	20	21.0	6.72	14.28	28.56%	.009 MM	
60 MIN	20	19.0	6.72	12.28	24.56%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(CL) SANDY LEAN CLAY

TP-32/#2		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 4 TO 10.7 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE TEST PIT		EXC. NO. TP-32	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	12.3	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	81.79	%MOIST-4	9.60%	DRY SAMP	74.63
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		74.63	74.63	74.63	74.63	74.63	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	74.63

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #11		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	22.9
SIEVING TIME	10 MIN	DATE	7-21-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.00	50.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.10	49.90		99.8%	.600 MM	SAND	45.4%
50	3.50	46.50		93.0%	.300 MM	-200	54.6%
100	13.20	36.80		73.6%	.150 MM	.075 TO	
200	22.70	27.30		54.6%	.075 MM	.005 =	28.6%
PAN	22.90	TESTED BY	BH	DATE	7-21-93	CU =	0.00
TOTAL	22.90					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO 25644				DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT M 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	29.0	5.50	23.50	47.00%	.037 MM	
4 MIN	20	24.0	5.50	18.50	37.00%	.019 MM	
19 MIN	20	21.5	5.50	16.00	32.00%	.009 MM	
60 MIN	20	18.5	5.50	13.00	26.00%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SC/CL SANDY LEAN CLAY

TP-33/#1		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 1.0 TO 2.8 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE TEST PIT		EXC. NO. TP-33	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	17.6	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	72.79	%MOIST-4	11.30%	DRY SAMP	65.40
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		65.40	65.40	65.40	65.40	65.40	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	65.40

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #13		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	19.2
SIEVING TIME	10 MIN	DATE	7-21-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.30	49.70	= % OF	99.4%	2.36 MM		
16	0.50	49.50	TOTAL	99.0%	1.18 MM	GRAVEL	0.0%
30	0.70	49.30	PASSING	98.6%	.600 MM	SAND	37.4%
50	4.00	46.00		92.0%	.300 MM	-200	62.6%
100	12.30	37.70		75.4%	.150 MM	.075 TO	
200	18.70	31.30		62.6%	.075 MM	.005 =	32.2%
PAN	19.20	TESTED BY	BH	DATE	7-21-93	CU =	0.00
TOTAL	19.20					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO 25625				DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT W 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	31.0	6.30	24.70	49.40%	.037 MM	
4 MIN	20	25.0	6.30	18.70	37.40%	.019 MM	
19 MIN	20	23.0	6.30	16.70	33.40%	.009 MM	
60 MIN	20	21.5	6.30	15.20	30.40%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(CL) SANDY LEAN CLAY

TP-33/#2	GRADATION AND SOILS CLASSIFICATION ANALYSIS	DEPTH 2.8 TO 4.2 FEET
TEST BY BT		CHECK BY COMP

AREA	PROJECT	FEATURE	EXC. NO.
	ELKHEAD RESERVIOR	TEST PIT	TP-33

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%

MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	10.1	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	66.24	%MOIST-4	13.10%	DRY SAMP	58.57
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		58.57	58.57	58.57	58.57	58.57	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	58.57

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000

DISH NO. PAN #3	DRY MASS OF SAMPLE (SIEVED) AFTER WASHING = 26.9
SIEVING TIME 10 MIN	DATE 7-21-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.20	49.80		99.6%	2.36 MM		
16	0.40	49.60		99.2%	1.18 MM	GRAVEL	0.0%
30	0.90	49.10		98.2%	.600 MM	SAND	52.6%
50	6.30	43.70		87.4%	.300 MM	-200	47.4%
100	18.60	31.40		62.8%	.150 MM	.075 TO	
200	26.30	23.70		47.4%	.075 MM	.005 =	32.4%
PAN	26.90	TESTED BY	BH	DATE 7-21-93		CU =	0.00
TOTAL	26.90					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO 25644	DISPERSING AGENT SODIUM HEX
START DATE	AMOUNT 125 ML

TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	26.0	5.50	20.50	41.00%	.037 MM	
4 MIN	20	22.0	5.50	16.50	33.00%	.019 MM	
19 MIN	20	19.0	5.50	13.50	27.00%	.009 MM	
60 MIN	20	13.0	5.50	7.50	15.00%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SC/CL LEAN CLAYEY SAND

TP-33/#3		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 4.2 TO 5.2 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE TEST PIT		EXC. NO. TP-33	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	1 1/2"	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	56.27	%MOIST-4	2.60%	DRY SAMP	55.66
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	
WET MATL & PAN ACC		0.00	7.17	19.22	28.28	32.19	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	7.17	19.22	28.28	32.19	
DRY MASS RET		0.00	7.17	19.22	28.28	32.19	
DRY MASS PASSING		55.66	48.49	36.44	27.38	23.47	WT.IN PAN
% OF TOTAL PASSING		100.00%	87.12%	65.47%	49.19%	42.17%	23.47

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	100.0	FACTOR = %TOT PASS NO#4 / TOTAL WT	=	0.422
DISH NO. DISH #T308		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	89.3	
SIEVING TIME	10 MIN	DATE	7-21-93	

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	12.40	87.60		36.9%	2.36 MM		
16	22.40	77.60		32.7%	1.18 MM	GRAVEL	57.8%
30	38.10	61.90		26.1%	.600 MM	SAND	37.5%
50	66.70	33.30		14.0%	.300 MM	-200	4.6%
100	83.60	16.40		6.9%	.150 MM	.075 TO	
200	89.00	11.00		4.6%	.075 MM	.005 =	2.9%
PAN	89.30	TESTED BY	BH	DATE	7-21-93	CU =	73.55
TOTAL	89.30					CC =	0.26

HYDROMETER ANALYSIS

HYDRO NO 25625				DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT ≈ 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	16.0	6.30	9.70	4.09%	.037 MM	
4 MIN	20	13.5	6.30	7.20	3.04%	.019 MM	
19 MIN	20	11.5	6.30	5.20	2.19%	.009 MM	
60 MIN	20	10.5	6.30	4.20	1.77%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(GP)s POORLY GRADED GRAVEL WITH SAND

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS			DEPTH	
TP-33/#4					5.2 to 7.3 Feet	
TEST BY	BT				CHECK BY	COMP
AREA		PROJECT		FEATURE	EXC. NO.	
		ELKHEAD RESERVIOR		TEST PIT	TP-33	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

MOIST+4	0.00%	SAMP WT.	47.18	MOIST-4	0.00%	DRY SAMP	47.18
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		47.18	47.18	47.18	47.18	47.18	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	47.18

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	100.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	1.000
DISH NO. T 308		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	86.0
SIEVING TIME	10 MIN	DATE	7-23-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	1.70	98.30		98.3%	2.36 MM		
16	7.20	92.80		92.8%	1.18 MM	GRAVEL	0.0%
30	23.00	77.00		77.0%	.600 MM	SAND	85.8%
50	51.30	48.70		48.7%	.300 MM	-200	14.2%
100	77.80	22.20		22.2%	.150 MM	.075 TO	
200	85.80	14.20		14.2%	.075 MM	.005 =	6.9%
PAN	86.00	TESTED BY JB		DATE	7-23-93	CU =	0.00
TOTAL	86.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO	#25625			DISPERSING AGENT	SODIUM HEX	
START		DATE	7-23-93		AMOUNT M 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	20.0	6.72	13.28	13.28%	.037 MM	100 GRAMS
4 MIN	20	17.5	6.72	10.78	10.78%	.019 MM	
19 MIN	20	15.5	6.72	8.78	8.78%	.009 MM	
60 MIN	20	14.0	6.72	7.28	7.28%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SM SILTY SAND

GRADATION AND SOILS CLASSIFICATION ANALYSIS

TP-33/#5				DEPTH 7.3 TO 9.4 FEET	
TEST BY	BT			CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR	FEATURE TEST PIT	EXC. NO. TP-33	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%

MAX SIZE	1 1/2"	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	81.28	%MOIST-4	4.00%	DRY SAMP	80.13
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	
WET MATL & PAN ACC		0.00	19.66	34.13	45.16	51.32	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	19.66	34.13	45.16	51.32	
DRY MASS RET		0.00	19.66	34.13	45.16	51.32	
DRY MASS PASSING		80.13	60.47	46.00	34.97	28.81	WT.IN PAN
% OF TOTAL PASSING		100.00%	75.46%	57.41%	43.64%	35.95%	28.81

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	100.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	0.360
DISH NO. DISH #10		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	83.8
SIEVING TIME	10 MIN	DATE	7-21-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	27.70	72.30		26.0%	2.36 MM		
16	37.50	62.50		22.5%	1.18 MM	GRAVEL	64.0%
30	44.60	55.40		19.9%	.600 MM	SAND	30.0%
50	59.70	40.30		14.5%	.300 MM	-200	6.0%
100	76.50	23.50		8.4%	.150 MM	.075 TO	
200	83.40	16.60		6.0%	.075 MM	.005 =	3.4%
PAN	83.80	TESTED BY	BH	DATE	7-21-93	CU =	114.88
TOTAL	83.80					CC =	2.70

HYDROMETER ANALYSIS

HYDRO NO	25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT N 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	18.5	20.0	7.08	12.92	4.65%	.037 MM	
4 MIN	18.5	17.0	7.08	9.92	3.57%	.019 MM	
19 MIN	19.0	15.0	6.96	8.04	2.89%	.009 MM	
60 MIN	19.5	14.0	6.84	7.16	2.57%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(GW-GM)s WELL-GRADED GRAVEL WITH SILT & SAND

TP-34/#1		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 1.0 TO 2.0 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE TEST PIT		EXC. NO. TP-34	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%							
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	21.3	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	68.74	%MOIST-4	11.70%	DRY SAMP	61.54
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		61.54	61.54	61.54	61.54	61.54	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	61.54

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. DISH #9		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	18.1
SIEVING TIME	10 MIN	DATE	7-21-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.70	49.30		98.6%	2.36 MM		
16	0.80	49.20		98.4%	1.18 MM	GRAVEL	0.0%
30	0.90	49.10		98.2%	.600 MM	SAND	32.4%
50	3.60	46.40		92.8%	.300 MM	-200	67.6%
100	9.70	40.30		80.6%	.150 MM	.075 TO	
200	16.20	33.80		67.6%	.075 MM	.005 =	28.9%
PAN	18.10	TESTED BY	BH	DATE	7-21-93	CU =	0.00
TOTAL	18.10					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO 25644				DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	18.5	35.0	5.88	29.12	58.24%	.037 MM	
4 MIN	18.5	28.5	5.88	22.62	45.24%	.019 MM	
19 MIN	19.5	26.0	5.63	20.37	40.74%	.009 MM	
60 MIN	19.5	25.0	5.63	19.37	38.74%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(CL) SANDY LEAN CLAY

TP-34/#3		GRADATION AND SOILS CLASSIFICATION ANALYSIS		DEPTH 9.5 TO 12.5 FEET	
TEST BY	BT			CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR	FEATURE TEST PIT	EXC. NO. TP-34	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	55.9	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	68.85	%MOIST-4	17.50%	DRY SAMP	58.60
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		58.60	58.60	58.60	58.60	58.60	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	58.60

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.1	FACTOR = %TOT PASS NO#4 / TOTAL WT =	1.998
DISH NO. DISH #99		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	10.2
SIEVING TIME	10 MIN	DATE	7-21-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.05		100.0%	2.36 MM		
16	0.10	49.95		99.8%	1.18 MM	GRAVEL	0.0%
30	0.10	49.95		99.8%	.600 MM	SAND	20.0%
50	1.50	48.55		97.0%	.300 MM	-200	80.0%
100	4.90	45.15		90.2%	.150 MM	.075 TO	
200	10.00	40.05		80.0%	.075 MM	.005 =	43.3%
PAN	10.20	TESTED BY	BH	DATE	7-21-93	CU =	0.00
TOTAL	10.20					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO 25811				DISPERSING AGENT	SODIUM HEX	
START		DATE			AMOUNT 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	19.5	39.0	6.62	32.38	64.70%	.037 MM	
4 MIN	19.5	32.0	6.62	25.38	50.71%	.019 MM	
19 MIN	19.5	28.0	6.62	21.38	42.72%	.009 MM	
60 MIN	19.5	25.0	6.62	18.38	36.72%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(CL)s LEAN CLAY WITH SAND

GRADATION AND SOILS CLASSIFICATION ANALYSIS

TP-35/#1		DEPTH 1.0 TO 4.2 FEET	
TEST BY	BT	CHECK BY	COMP
AREA	PROJECT ELKHEAD RESERVIOR	FEATURE TEST PIT	EXC. NO. TP-35

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%

MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	17.6	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	58.32	%MOIST-4	12.70%	DRY SAMP	51.75
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		51.75	51.75	51.75	51.75	51.75	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	51.75

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO.	DISH #T312	DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	11.7
SIEVING TIME	10 MIN	DATE	7-21-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.00	50.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.00	50.00		100.0%	.600 MM	SAND	20.0%
50	0.50	49.50		99.0%	.300 MM	-200	80.0%
100	4.60	45.40		90.8%	.150 MM	.075 TO	
200	10.00	40.00		80.0%	.075 MM	.005 =	42.2%
PAN	11.70	TESTED BY	BH	DATE	7-21-93	CU =	0.00
TOTAL	11.70					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO 25811		DISPERSING AGENT	SODIUM HEX
START	DATE		AMOUNT 125 ML

TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	19.5	39.0	6.62	32.38	64.76%	.037 MM	
4 MIN	19.5	30.0	6.62	23.38	46.76%	.019 MM	
19 MIN	19.5	27.5	6.62	20.88	41.76%	.009 MM	
60 MIN	19.5	25.5	6.62	18.88	37.76%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(CL)s LEAN CLAY WITH SAND

TP-35/#2		GRADATION AND SOILS CLASSIFICATION ANALYSIS		DEPTH 4.2 TO 7.5 FEET	
TEST BY	BT			CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR	FEATURE TEST PIT	EXC. NO. TP-35	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%

MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"		3" TO 5"	0.0%
P. INDEX	15.0	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	60.56	%MOIST-4	19.30%	DRY SAMP	50.76
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		50.76	50.76	50.76	50.76	50.76	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	50.76

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO.	DISH #7A	DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	10.0
SIEVING TIME	10 MIN	DATE	7-21-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.00	50.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.00	50.00		100.0%	.600 MM	SAND	11.4%
50	0.60	49.40		98.8%	.300 MM	-200	88.6%
100	1.90	48.10		96.2%	.150 MM	.075 TO	
200	5.70	44.30		88.6%	.075 MM	.005 =	57.5%
PAN	10.00	TESTED BY	BH	DATE	7-21-93	CU =	0.00
TOTAL	10.00					CC =	0.00

HYDROMETER ANALYSIS

HYDRO NO 25625				DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	19.5	37.0	6.43	30.57	61.14%	.037 MM	
4 MIN	19.5	29.5	6.43	23.07	46.14%	.019 MM	
19 MIN	19.5	24.0	6.43	17.57	35.14%	.009 MM	
60 MIN	19.5	22.0	6.43	15.57	31.14%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH	
TP-35/#3						7.5 TO 10 FEET	
TEST BY	BH					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. TP-35	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%

MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		~

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	70.46	%MOIST-4	16.70%	DRY SAMP	60.38
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		60.38	60.38	60.38	60.38	60.38	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	60.38

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	100.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	1.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	78.5
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	100.00		100.0%	2.36 MM		
16	0.00	100.00		100.0%	1.18 MM	GRAVEL	0.0%
30	0.30	99.70		99.7%	.600 MM	SAND	76.5%
50	24.10	75.90		75.9%	.300 MM	-200	23.5%
100	64.30	35.70		35.7%	.150 MM	.075 TO	
200	76.50	23.50		23.5%	.075 MM	.005 =	9.3%
PAN	78.50	TESTED BY	BT	DATE	7-13-92	CU =	0.00
TOTAL	78.50					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25680			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	19.5	26.0	6.84	19.16	19.16%	.037 MM	
4 MIN	19.5	24.0	6.84	17.16	17.16%	.019 MM	
19 MIN	19.5	22.0	6.84	15.16	15.16%	.009 MM	
60 MIN	19.5	21.0	6.84	14.16	14.16%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SM SILTY SAND

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS		DEPTH	
TP-36/#1				1.5 TO 3.0 FEET	
TEST BY	BH			CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR	FEATURE	EXC. NO. TP-36	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME 0%

MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	12.1	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	70.06	%MOIST-4	9.70%	DRY SAMP	63.87
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		63.87	63.87	63.87	63.87	63.87	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	63.87

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	12.1
SIEVING TIME	10 MIN	DATE	7-13-92

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.20	49.80		99.6%	2.36 MM		
16	0.20	49.80		99.6%	1.18 MM	GRAVEL	0.0%
30	0.20	49.80		99.6%	.600 MM	SAND	20.0%
50	0.40	49.60		99.2%	.300 MM	-200	80.0%
100	3.90	46.10		92.2%	.150 MM	.075 TO	
200	10.00	40.00		80.0%	.075 MM	.005 =	56.2%
PAN	12.10	TESTED BY	BT	DATE	7-13-92	CU =	0.00
TOTAL	12.10					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25811			DISPERSING AGENT	SODIUM HEX		
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	29.5	6.62	22.88	45.76%	.037 MM	
4 MIN	22	25.0	6.62	18.38	36.76%	.019 MM	
19 MIN	22	20.5	6.62	13.88	27.76%	.009 MM	
60 MIN	22	18.5	6.62	11.88	23.76%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(CL)s LEAN CLAY WITH SAND

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS		DEPTH	
TP-36/#2				3.0 TO 10.3 FEET	
TEST BY	BH			CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR	FEATURE	EXC. NO. TP-36	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	13.2	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

%MOIST+4	0.00%	SAMP WT.	66.78	%MOIST-4	16.30%	DRY SAMP	57.42
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		57.42	57.42	57.42	57.42	57.42	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	57.42

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. DISH #89		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	10.9
SIEVING TIME	10 MIN	DATE	7-16-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.10	49.90		99.8%	2.36 MM		
16	0.20	49.80		99.6%	1.18 MM	GRAVEL	0.0%
30	0.40	49.60		99.2%	.600 MM	SAND	12.2%
50	0.70	49.30		98.6%	.300 MM	-200	87.8%
100	2.20	47.80		95.6%	.150 MM	.075 TO	
200	6.10	43.90		87.8%	.075 MM	.005 =	62.0%
PAN	10.90	TESTED BY	BT	DATE	7-13-92	CU =	0.00
TOTAL	10.90					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	33.0	6.62	26.38	52.76%	.037 MM	
4 MIN	22	26.0	6.62	19.38	38.76%	.019 MM	
19 MIN	22	22.0	6.62	15.38	30.76%	.009 MM	
60 MIN	22	19.5	6.62	12.88	25.76%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO. TP37/#1		GRADATION AND SOILS CLASSIFICATION ANALYSIS		DEPTH 1.5 to 5.5 FEET	
TEST BY	BT			CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR	FEATURE	EXC. NO. TP-37	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.0%	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	64.16	% MOIST-4	7.60%	DRY SAMP	59.63
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS WT.IN PAN
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		59.63	59.63	59.63	59.63	59.63	
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	59.63

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	34.5
SIEVING TIME	10 MIN	DATE	7-28-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS
8	0.30	49.70		99.4%	2.36 MM	
16	0.40	49.60		99.2%	1.18 MM	GRAVEL 0.0%
30	0.80	49.20		98.4%	.600 MM	SAND 67.0%
50	10.00	40.00		80.0%	.300 MM	-200 33.0%
100	26.30	23.70		47.4%	.150 MM	.075 TO
200	33.50	16.50		33.0%	.075 MM	.005 = 15.0%
PAN	34.50	TESTED BY	BH	DATE	7-28-93	CU = 0.00
TOTAL	34.50					CC = 0.00

HYDROMETER ANALYSIS

HYDRO	#25644			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	20.0	5.00	15.00	30.00%	.037 MM	
4 MIN	22	16.5	5.00	11.50	23.00%	.019 MM	
19 MIN	22	15.0	5.00	10.00	20.00%	.009 MM	
60 MIN	22	14.0	5.00	9.00	18.00%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

SM SILTY SAND

SAMPLE NO. TP37/#2		GRADATION AND SOILS CLASSIFICATION ANALYSIS		DEPTH 5.5 to 9.2 FEET	
TEST BY	BT			CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR	FEATURE	EXC. NO. TP-37	

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	3"	PLUS 12"	0.0%	5" TO 12"	0.0%	0" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE		-

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	67.42	% MOIST-4	4.40%	DRY SAMP	66.37
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS
WET MATL & PAN ACC		1.14	15.91	29.70	37.89	42.49	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		1.14	15.91	29.70	37.89	42.49	
DRY MASS RET		1.14	15.91	29.70	37.89	42.49	
DRY MASS PASSING		65.23	50.46	36.67	28.48	23.88	WT.IN PAN
% OF TOTAL PASSING		98.28%	76.03%	55.25%	42.91%	35.98%	23.88

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	100.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	0.360
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	84.2
SIEVING TIME	10 MIN	DATE	7-28-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	20.30	79.70		28.7%	2.36 MM		
16	28.80	71.20		25.6%	1.18 MM	GRAVEL	64.0%
30	40.60	59.40		21.4%	.600 MM	SAND	29.8%
50	55.40	44.60		16.0%	.300 MM	-200	6.2%
100	74.20	25.80		9.3%	.150 MM	.075 TO	
200	82.90	17.10		6.2%	.075 MM	.005 =	3.9%
PAN	84.20	TESTED BY	BH	DATE	7-28-93	CU =	140.01
TOTAL	84.20					CC =	2.02

HYDROMETER ANALYSIS

HYDRO	#25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	16.0	5.78	10.22	3.68%	.037 MM	
4 MIN	22	14.0	5.78	8.22	2.96%	.019 MM	
19 MIN	22	13.0	5.78	7.22	2.60%	.009 MM	
60 MIN	22	12.0	5.78	6.22	2.24%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(GW-GM)s WELL-GRADED GRAVEL WITH SILT & SAND

SAMPLE NO. TP-38/#1		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 1.0 to 2.5 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT BLKHEAD RESERVIOR		FEATURE		EXC. NO. TP-38	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	15.8	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	65.06	% MOIST-4	8.80%	DRY SAMP	59.80
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS XILOGRAM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		59.80	59.80	59.80	59.80	59.80	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	59.80

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	9.4
SIEVING TIME	10 MIN	DATE	7-28-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS
8	0.00	50.00		100.0%	2.36 MM	
16	0.00	50.00		100.0%	1.18 MM	GRAVEL 0.0%
30	0.10	49.90		99.8%	.600 MM	SAND 9.2%
50	0.20	49.80		99.6%	.300 MM	-200 90.8%
100	1.10	48.90		97.8%	.150 MM	.075 TO
200	4.60	45.40		90.8%	.075 MM	.005 = 57.3%
PAN	9.40	TESTED BY	BH	DATE	7-28-93	CU = 0.00
TOTAL	9.40					CC = 0.00

HYDROMETER ANALYSIS

HYDRO	#25680			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	39.0	6.24	32.76	65.52%	.037 MM	
4 MIN	22	30.0	6.24	23.76	47.52%	.019 MM	
19 MIN	22	24.5	6.24	18.26	36.52%	.009 MM	
60 MIN	22	23.0	6.24	16.76	33.52%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO. TP-38/#2		GRADATION AND SOILS CLASSIFICATION ANALYSIS			DEPTH 2.5 to 10.4 FEET	
TEST BY	BT				CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE	EXC. NO. TP-38	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME						0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12" 0.0%	3" TO 5"	0.0%
P. INDEX	14.1	CLASS OF FINES =		CL	+ OR - A LINE	+

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	66.39	% MOIST-4	14.80%	DRY SAMP	57.83
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		57.83	57.83	57.83	57.83	57.83	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	57.83

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = % TOT PASS NO#4 / TOTAL WT	=	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	9.7	
SIEVING TIME	10 MIN	DATE	7-28-93	

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS
8	0.00	50.00		100.0%	2.36 MM	GRAVEL 0.0%
16	0.00	50.00		100.0%	1.18 MM	SAND 8.0%
30	0.30	49.70		99.4%	.600 MM	-200 92.0%
50	0.40	49.60		99.2%	.300 MM	.075 TO
100	1.10	48.90		97.8%	.150 MM	.005 = 58.0%
200	4.00	46.00		92.0%	.075 MM	
PAN	9.70	TESTED BY	BH	DATE	7-28-93	CU = 0.00
TOTAL	9.70					CC = 0.00

HYDROMETER ANALYSIS

HYDRO	#25680			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	24	40.5	4.50	36.00	72.00%	.037 MM	
4 MIN	24	30.0	4.50	25.50	51.00%	.019 MM	
19 MIN	24	24.0	4.50	19.50	39.00%	.009 MM	
60 MIN	24	21.5	4.50	17.00	34.00%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO. TP-39/#1		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 1.0 to 2.0 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. TP-39	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	3"	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	10.4	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	93.80	% MOIST-4	9.70%	DRY SAMP	89.46
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS WT.IN PAN
WET MATL & PAN ACC		3.22	20.98	33.36	40.65	44.76	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		3.22	20.98	33.36	40.65	44.76	
DRY MASS RET		3.22	20.98	33.36	40.65	44.76	
DRY MASS PASSING		86.24	68.48	56.10	48.81	44.70	
% OF TOTAL PASSING		96.40%	76.55%	62.71%	54.56%	49.97%	44.70

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = % TOT PASS NO#4 / TOTAL WT =	0.999
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	20.3
SIEVING TIME	10 MIN	DATE	7-28-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	2.30	47.70		47.7%	2.36 MM		
16	3.20	46.80		46.8%	1.18 MM	GRAVEL	50.0%
30	4.30	45.70		45.7%	.600 MM	SAND	18.7%
50	7.50	42.50		42.5%	.300 MM	-200	31.3%
100	13.80	36.20		36.2%	.150 MM	.075 TO	
200	18.70	31.30		31.3%	.075 MM	.005 =	14.6%
PAN	20.30	TESTED BY	BH	DATE	7-28-93	CU =	0.00
TOTAL	20.30					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	#25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	24	31.0	5.26	25.74	25.72%	.037 MM	
4 MIN	24	27.5	5.26	22.24	22.23%	.019 MM	
19 MIN	24	24.5	5.26	19.24	19.23%	.009 MM	
60 MIN	24	22.0	5.26	16.74	16.73%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(GC): CLAYEY GRAVEL WITH SAND

SAMPLE NO. TP-39/#2	GRADATION AND SOILS CLASSIFICATION ANALYSIS	DEPTH 2.0 to 3.5 FEET
TEST BY BT		CHECK BY COMP
AREA	PROJECT ELKHEAD RESERVIOR / FEATURE	EXC. NO. TP-39

PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME						0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5" 0.0%
P. INDEX	NP	CLASS OF FINES =		ML	+ OR - A LINE	-

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	6.38	% MOIST-4	10.60%	DRY SAMP	5.77
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		5.77	5.77	5.77	5.77	5.77	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	5.77

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	24.6
SIEVING TIME	10 MIN	DATE	7-28-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS
8	0.30	49.70		99.4%	2.36 MM	
16	0.40	49.60		99.2%	1.18 MM	GRAVEL 0.0%
30	0.50	49.50		99.0%	.600 MM	SAND 39.0%
50	0.70	49.30		98.6%	.300 MM	-200 61.0%
100	5.30	44.70		89.4%	.150 MM	.075 TO
200	19.50	30.50		61.0%	.075 MM	.005 = 48.5%
PAN	24.60	TESTED BY	BH	DATE	7-28-93	CU = 0.00
TOTAL	24.60					CC = 0.00

HYDROMETER ANALYSIS

HYDRO #25680				DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT 125 ML	
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	24	21.0	5.77	15.23	30.46%	.037 MM	
4 MIN	24	17.0	5.77	11.23	22.46%	.019 MM	
19 MIN	24	15.0	5.77	9.23	18.46%	.009 MM	
60 MIN	24	12.0	5.77	6.23	12.46%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(ML) SANDY SILT

SAMPLE NO. TP-39/#3		GRADATION AND SOILS CLASSIFICATION ANALYSIS		DEPTH 3.5 to 6.5 FEET	
TEST BY	BT			CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR	FEATURE	EXC. NO. TP-39	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME					0%
MAX SIZE	0.00	PLUS 12" 0.0%	5" TO 12" 0.0%	3" TO 5"	0.0%
P. INDEX	NP	CLASS OF FINES =	ML	+ OR - A LINE	-

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	44.36	% MOIST-4	10.90%	DRY SAMP	40.00
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		40.00	40.00	40.00	40.00	40.00	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	40.00

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT	=	2.000
DISH NO.	PAN #C	DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	24.2	
SIEVING TIME	10 MIN	DATE	7-28-93	

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.40	49.60		99.2%	2.36 MM		
16	0.60	49.40		98.8%	1.18 MM	GRAVEL	0.0%
30	0.80	49.20		98.4%	.600 MM	SAND	38.8%
50	1.20	48.80		97.6%	.300 MM	-200	61.2%
100	7.00	43.00		86.0%	.150 MM	.075 TO	
200	19.40	30.60		61.2%	.075 MM	.005 =	42.7%
PAN	24.20	TESTED BY	BH	DATE	7-28-93	CU =	0.00
TOTAL	24.20					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	#25644			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	23.0	5.77	17.23	34.46%	.037 MM	
4 MIN	22	18.5	5.77	12.73	25.46%	.019 MM	
19 MIN	22	16.0	5.77	10.23	20.46%	.009 MM	
60 MIN	22	15.0	5.77	9.23	18.46%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(ML) SANDY SILT

SAMPLE NO. TP-40/#1		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 1.0 to 5.0 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. TP-40	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	14.2	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	64.59	% MOIST-4	10.90%	DRY SAMP	58.24
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		58.24	58.24	58.24	58.24	58.24	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	58.24

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = % TOT PASS NO#4 / TOTAL WT	=	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	12.2	
SIEVING TIME	10 MIN	DATE	7-28-93	

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.10	49.90		99.8%	1.18 MM	GRAVEL	0.0%
30	0.30	49.70		99.4%	.600 MM	SAND	21.4%
50	1.10	48.90		97.8%	.300 MM	-200	78.6%
100	5.40	44.60		89.2%	.150 MM	.075 TO	
200	10.70	39.30		78.6%	.075 MM	.005 =	37.1%
PAN	12.20	TESTED BY	BH	DATE	7-28-93	CU =	0.00
TOTAL	12.20					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	#25680			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	37.5	5.77	31.73	63.46%	.037 MM	
4 MIN	22	34.0	5.77	28.23	56.46%	.019 MM	
19 MIN	22	29.5	5.77	23.73	47.46%	.009 MM	
60 MIN	22	26.5	5.77	20.73	41.46%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

(CL): LEAN CLAY WITH SAND

SAMPLE NO. TP-40/#2		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 5.0 to 10.0 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. TP-40	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	12.2	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	73.73	% MOIST-4	9.40%	DRY SAMP	67.39
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		67.39	67.39	67.39	67.39	67.39	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	67.39

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT	=	2.000
DISH NO. PAN #C		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	18.2	
SIEVING TIME	10 MIN	DATE	7-28-93	

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.60	49.40		98.8%	2.36 MM		
16	0.90	49.10		98.2%	1.18 MM	GRAVEL	0.0%
30	1.30	48.70		97.4%	.600 MM	SAND	31.2%
50	2.60	47.40		94.8%	.300 MM	-200	68.8%
100	8.50	41.50		83.0%	.150 MM	.075 TO	
200	15.60	34.40		68.8%	.075 MM	.005 =	35.3%
PAN	18.20	TESTED BY	BH	DATE	7-28-93	CU =	0.00
TOTAL	18.20					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	#25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	22	34.0	5.77	28.23	56.46%	.037 MM	
4 MIN	22	30.0	5.77	24.23	48.46%	.019 MM	
19 MIN	22	25.5	5.77	19.73	39.46%	.009 MM	
60 MIN	22	22.5	5.77	16.73	33.46%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(CL) SANDY LEAN CLAY

SAMPLE NO. TP-41/#1		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH 0 to 7.8 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. TP-41	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	13.8	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	60.55	% MOIST-4	13.30%	DRY SAMP	53.44
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		53.44	53.44	53.44	53.44	53.44	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	53.44

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT	=	2.000
DISH NO. DISH #15		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	4.7	
SIEVING TIME	10 MIN	DATE	7-28-93	

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS
8	0.00	50.00		100.0%	2.36 MM	
16	0.00	50.00		100.0%	1.18 MM	GRAVEL 0.0%
30	0.00	50.00		100.0%	.600 MM	SAND 5.8%
50	0.00	50.00		100.0%	.300 MM	-200 94.2%
100	0.60	49.40		98.8%	.150 MM	.075 TO
200	2.90	47.10		94.2%	.075 MM	.005 = 61.2%
PAN	4.70	TESTED BY	BH	DATE	7-28-93	CU = 0.00
TOTAL	4.70					CC = 0.00

HYDROMETER ANALYSIS

HYDRO	#25644			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	40.0	5.50	34.50	69.00%	.037 MM	
4 MIN	20	30.0	5.50	24.50	49.00%	.019 MM	
19 MIN	20	25.0	5.50	19.50	39.00%	.009 MM	
60 MIN	20	22.0	5.50	16.50	33.00%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO. TP-41/#2		GRADATION AND SOILS CLASSIFICATION ANALYSIS			DEPTH 7.5 to 10.0 FEET	
TEST BY	BT				CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE	EXC. NO. TP-41	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME						0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12" 0.0%	3" TO 5"	0.0%
P. INDEX	13.8	CLASS OF FINES =		CL	+ OR - A LINE	+

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	74.09	% MOIST-4	10.30%	DRY SAMP	67.17
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		67.17	67.17	67.17	67.17	67.17	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	67.17

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. DISH #32		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	7.6
SIEVING TIME	10 MIN	DATE	7-28-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.20	49.80		99.6%	2.36 MM		
16	0.30	49.70		99.4%	1.18 MM	GRAVEL	0.0%
30	0.40	49.60		99.2%	.600 MM	SAND	11.8%
50	0.60	49.40		98.8%	.300 MM	-200	88.2%
100	1.70	48.30		96.6%	.150 MM	.075 TO	
200	5.90	44.10		88.2%	.075 MM	.005 =	53.2%
PAN	7.60	TESTED BY	BH	DATE	7-28-93	CU =	0.00
TOTAL	7.60					CC =	0.00

HYDROMETER ANALYSIS

HYDRO	#25680			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	37.5	5.50	32.00	64.00%	.037 MM	
4 MIN	20	31.0	5.50	25.50	51.00%	.019 MM	
19 MIN	20	26.0	5.50	20.50	41.00%	.009 MM	
60 MIN	20	23.0	5.50	17.50	35.00%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

CL LEAN CLAY

SAMPLE NO.		GRADATION AND SOILS CLASSIFICATION ANALYSIS				DEPTH	
TP-42/#1						1.0 to 5.0 FEET	
TEST BY	BT					CHECK BY	COMP
AREA		PROJECT ELKHEAD RESERVIOR		FEATURE		EXC. NO. TP-42	
PERCENT OF TEST PIT OR AUGER HOLE OVERSIZE BY VOLUME							0%
MAX SIZE	0.00	PLUS 12"	0.0%	5" TO 12"	0.0%	3" TO 5"	0.0%
P. INDEX	13.8	CLASS OF FINES =		CL	+ OR - A LINE		+

GRADATION OF GRAVEL SIZE

% MOIST+4	0.00%	SAMP WT.	60.29	% MOIST-4	15.70%	DRY SAMP	52.11
SIEVE SIZE		(75 MM) 3"	(37.5 MM) 1 1/2"	(19.0 MM) 3/4"	(9.5 MM) 3/8"	(4.75 MM) NO.4	SAMPLE WEIGHED IN POUNDS KILOGRAM GRAMS
WET MATL & PAN ACC		0.00	0.00	0.00	0.00	0.00	
MASS OF PAN		0.00	0.00	0.00	0.00	0.00	
WET MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS RET		0.00	0.00	0.00	0.00	0.00	
DRY MASS PASSING		52.11	52.11	52.11	52.11	52.11	WT.IN PAN
% OF TOTAL PASSING		100.00%	100.00%	100.00%	100.00%	100.00%	52.11

GRADATION OF SAND SIZE

DRY WT MATL GRAMS BEFORE WASHING =	50.0	FACTOR = %TOT PASS NO#4 / TOTAL WT =	2.000
DISH NO. DISH #T312		DRY MASS OF SAMPLE (SIEVED) AFTER WASHING =	18.4
SIEVING TIME	10 MIN	DATE	7-28-93

SIEVE NO.	MASS RET (GR)	MASS PASS (GR)	FACTOR X MASS PASS = % OF TOTAL PASSING	% TOTAL PASSING	PARTICAL DIAMETER	REMARKS	
8	0.00	50.00		100.0%	2.36 MM		
16	0.10	49.90		99.8%	1.18 MM	GRAVEL	0.0%
30	0.30	49.70		99.4%	.600 MM	SAND	33.8%
50	2.70	47.30		94.6%	.300 MM	-200	66.2%
100	10.70	39.30		78.6%	.150 MM	.075 TO	
200	16.90	33.10		66.2%	.075 MM	.005 =	32.8%
PAN	18.40	TESTED BY	BH	DATE	7-28-93	CU =	0.00
TOTAL	18.40					CC =	0.00

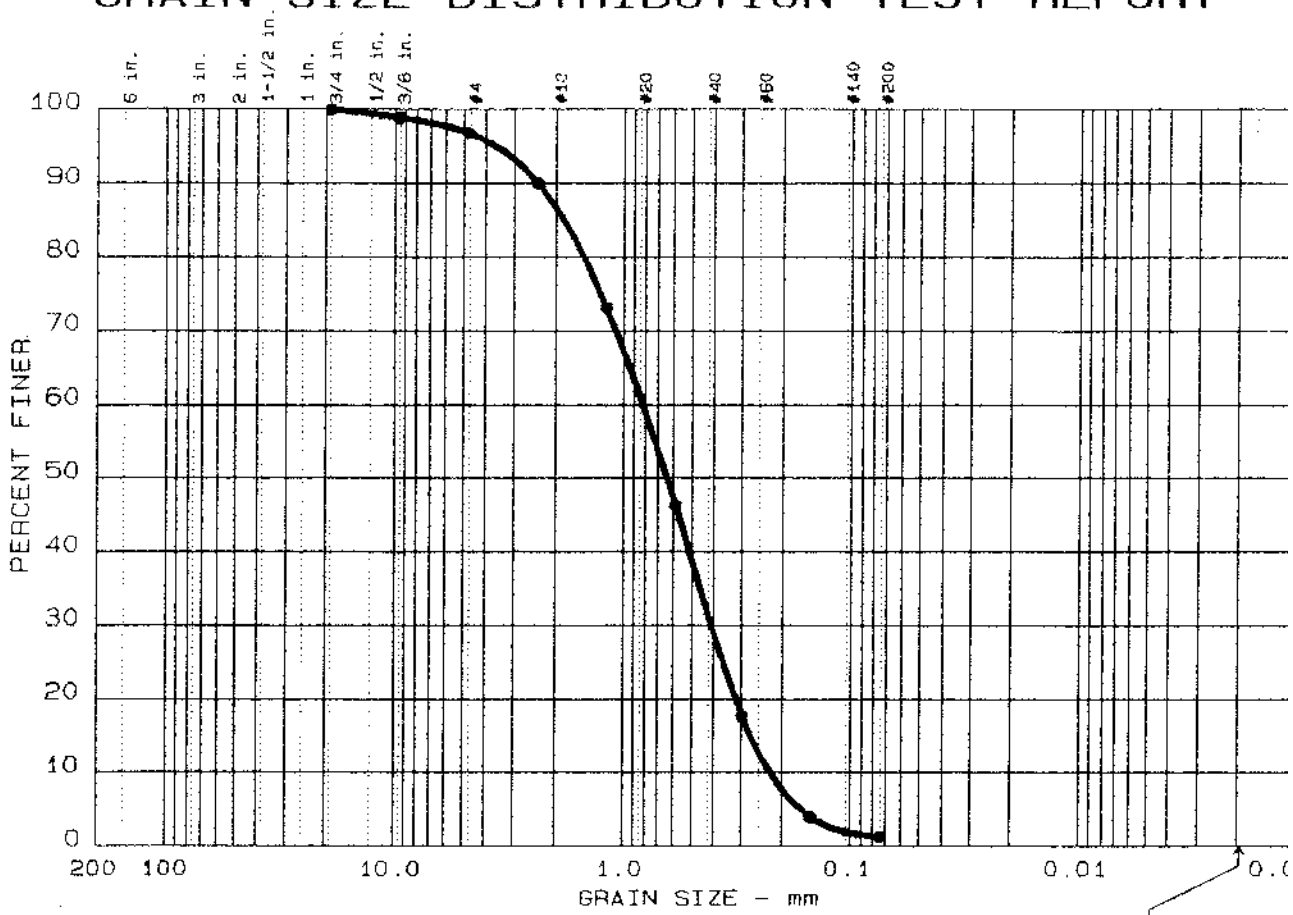
HYDROMETER ANALYSIS

HYDRO	#25625			DISPERSING AGENT		SODIUM HEX	
START		DATE				AMOUNT	125 ML
TIME	TEMP C	HYD READ	HYD CORR	COR READ	% TOT PAS	PART DIA.	REMARKS
1 MIN	20	32.0	6.30	25.70	51.40%	.037 MM	
4 MIN	20	27.5	6.30	21.20	42.40%	.019 MM	
19 MIN	20	24.5	6.30	18.20	36.40%	.009 MM	
60 MIN	20	23.0	6.30	16.70	33.40%	.005 MM	
7HR 15MIN				0.00	0.00%	.002 MM	
25H 45MIN				0.00	0.00%	.001 MM	

SOILS CLASSIFICATION AND COMMON NAME

s(CL) SANDY LEAN CLAY

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	0.0	3.2	95.5	1.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			1.84	0.82	0.64	0.409	0.2729	0.2218	0.92	3.7

MATERIAL DESCRIPTION	USCS	AASHTO
● SAND	SP	

Project No.: 23272
Project: ELKHEAD DAM
● Location: FILTER SAND FROM HARD ROCK SAND AND GRAVEL

Date: 7-30-93

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WOODWARD-CLYDE CONSULTANTS

Figure No.

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP27/#2	Project ELKHEAD RESERVOIR	Feature 3.0 TO 7.0 FEE

Tested By	BT	Computed By	BT	Date	7-16-93	Checked By	JB

Blows per layer 25 No. of layers 3 Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.			X	X	X			
Wet unit wieght determinations								
Water added	(g or ml)	0%	4%	6%	8%	10%	12%	
Mass of mold + wet soil	(lbm)	13.38	13.76	13.9	14.17	14.05	13.96	
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95	7.95	
Mass of wet soil	(lbm)	5.43	5.81	5.95	6.22	6.1	6.01	
Wet unit weight	(lbf/ft3)	108.6	116.2	119	124.4	122	120.2	
Wet Unit wt. / water added	(lbf/ft3)	108.60	111.73	112.26	115.19	110.91	107.32	
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0		
Penrtrometer reading (lbf)	2	0	0	0	0	0		
	3	0	0	0	0	0		
Average reading	(lbf)	0	0	0	0	0		
Penetration resistance	(lbf/in2)	0	0	0	0	0		
Moisture content determinations								
Dish No.		#T306	#26	#2	#99	#T305	#40	
Mass of dish + wet soil	(g)	344.3	280.3	328.2	377.1	315.4	391.2	
Mass of dish + dry soil	(g)	316.1	252.6	298.8	334.5	277.2	344.5	
Mass of dish	(g)	123.2	102.5	160.6	141.3	125.5	169.3	
Mass of water	(g)	28.2	27.7	29.4	42.6	38.2	46.7	
Mass of dry soil	(g)	192.9	150.1	138.2	193.2	151.7	175.2	
Moisture content	(% of dry mass)	14.6%	18.5%	21.3%	22.0%	25.2%	26.7%	
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	94.75	98.10	98.13	101.93	97.46	94.90	

Remarks

OPT. MOISTURE = 23.2

MAX. DRY UNIT WT = 104.4

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP28/#1	Project ELKHEAD RESERVOIR	Feature 0 to 3.3 FEET
Tested By BT	Computed By BT Date 7-16-93	Checked By JB

Blows per layer 25 No. of layers 3 Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.		X	X	X			
Wet unit wieght determinations							
Water added (g or ml)	-2%	0%	6%	8%	10%		
Mass of mold + wet soil (lbm)	13.2	13.34	13.78	13.85	13.93		
Mass of mold (lbm)	7.95	7.95	7.95	7.95	7.95		
Mass of wet soil (lbm)	5.25	5.39	5.83	5.9	5.98		
Wet unit weight (lbf/ft3)	105	107.8	116.6	118	119.6		
Wet Unit wt. / water added (lbf/ft3)	107.1	107.8	110.0	109.3	108.7		
Penetration resistance determinations							
Needle No.							
Area of needle (in2)	1/40	1/20	1/4	1/2	1/1		
Penrtrometer reading (lbf) 1	0	0	0	0	0		
Penrtrometer reading (lbf) 2	0	0	0	0	0		
Penrtrometer reading (lbf) 3	0	0	0	0	0		
Average reading (lbf)	0	0	0	0	0		
Penetration resistance (lbf/in2)	0	0	0	0	0		
Moisture content determinations							
Dish No.	#L102	#T305	#89	#108	#60		
Mass of dish + wet soil (g)	291	274.4	463.1	423.5	386.7		
Mass of dish + dry soil (g)	277	259.5	415.8	380.2	344.9		
Mass of dish (g)	17	125.4	141.7	152.4	143.3		
Mass of water (g)	14	14.9	47.3	43.3	41.8		
Mass of dry soil (g)	157.3	134.1	274.1	227.8	201.6		
Moisture content (% of dry mass)	8.9%	11.1%	17.3%	19.0%	20.7%		
Dry unit weight determinations							
Dry unit weights (lbf/ft3)	96.4	97.0	99.4	99.2	99.1		

Remarks

OPT. MOISTURE = 17.1

MAX. DRY UNIT WT = 99.4

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP29/#1	Project ELKHEAD RESERVOIR	Feature 1.0 TO 2.0 FEET

Tested By	BT	Computed By	BT	Date	7-16-93	Checked By	COMP

Blows per layer 25 No. of layers 3 Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.			X	X	X			
Wet unit wieght determinations								
Water added	(g or ml)	8%	10%	12%	14%	16%		
Mass of mold + wet soil	(lbm)	13.78	14.09	14.23	14.24	14.08		
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95		
Mass of wet soil	(lbm)	5.83	6.14	6.28	6.29	6.13		
Wet unit weight	(lbf/ft3)	116.6	122.8	125.6	125.8	122.6		
Wet Unit wt. / water added	(lbf/ft3)	107.96	111.64	112.14	110.35	105.69		
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0		
Penrtrometer reading (lbf)	2	0	0	0	0	0		
	3	0	0	0	0	0		
Average reading	(lbf)	0	0	0	0	0		
Penetration resistance	(lbf/in2)	0	0	0	0	0		
Moisture content determinations								
Dish No.		#40	#42	#99	#T306	#26		
Mass of dish + wet soil	(g)	438.8	428.8	455.5	343.2	432.7		
Mass of dish + dry soil	(g)	408.6	391.1	410	308.5	376		
Mass of dish	(g)	169.1	144	141.3	123.9	103		
Mass of water	(g)	30.2	37.7	45.5	34.7	56.7		
Mass of dry soil	(g)	239.5	247.1	268.7	184.6	273		
Moisture content	(% of dry mass)	12.6%	15.3%	16.9%	18.8%	20.8%		
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	103.54	106.54	107.41	105.89	101.52		

Remarks

OPT. MOISTURE = 16.8

MAX. DRY UNIT WT = 107.4

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP31/#1 | Project ELKHEAD RESERVOIR | Feature 1.0 ro 2.0 feet

Tested By BT | Computed By BT | Date 7-16-93 | Checked By JB

Blows per layer 25 | No. of layers 3 | Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm | Volume of mold 0.0500 ft3

Specimen No.			X	X	X			
Wet unit wieght determinations								
Water added	(g or ml)	4%	6%	8%	10%	12%		
Mass of mold + wet soil	(lbm)	13.58	13.8	14.05	14.07	14.15		
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95		
Mass of wet soil	(lbm)	5.63	5.85	6.1	6.12	6.2		
Wet unit weight	(lbf/ft3)	112.6	117	122	122.4	124		
Wet Unit wt. / water added	(lbf/ft3)	108.3	110.4	113.0	111.3	110.7		
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0	0	0
Penrtrometer reading (lbf)	2	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0
Average reading	(lbf)	0	0	0	0	0	0	0
Penetration resistance	(lbf/in2)	0	0	0	0	0	0	0
Moisture content determinations								
Dish No.		#60	#108	#16	#20	#89		
Mass of dish + wet soil	(g)	371.6	466	446.1	380.7	344.1		
Mass of dish + dry soil	(g)	348.4	428.3	404.1	345.9	309.9		
Mass of dish	(g)	143.5	152.2	140.6	143.3	141.6		
Mass of water	(g)	23.2	37.7	42	34.8	34.2		
Mass of dry soil	(g)	204.9	276.1	263.5	202.6	168.3		
Moisture content	(% of dry mass)	11.3%	13.7%	15.9%	17.2%	20.3%		
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	101.1	102.9	105.2	104.5	103.1		

Remarks

OPT. MOISTURE = 15.9

MAX. DRY UNIT WT. = 105.2

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP32/#1 | Project ELKHEAD RESERVOIR | Feature 1.0 to 4.0 FEE

Tested By BT | Computed By BT | Date 7-16-93 | Checked By COMP

Blows per layer 25 | No. of layers 3 | Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm | Volume of mold 0.0500 ft3

Specimen No.		X	X	X			
Wet unit wieght determinations							
Water added	(g or ml)	6%	8%	10%	12%	14%	
Mass of mold + wet soil	(lbm)	13.64	13.95	14.26	14.35	14.21	
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95	
Mass of wet soil	(lbm)	5.69	6	6.31	6.4	6.26	
Wet unit weight	(lbf/ft3)	113.8	120	126.2	128	125.2	
Wet Unit wt. / water added	(lbf/ft3)	107.4	111.1	114.7	114.3	109.8	
Penetration resistance determinations							
Needle No.							
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1	
	1	0	0	0	0	0	
Penrtrometer reading (lbf)	2	0	0	0	0	0	
	3	0	0	0	0	0	
Average reading	(lbf)	0	0	0	0	0	
Penetration resistance	(lbf/in2)	0	0	0	0	0	
Moisture content determinations							
Dish No.		#70	#35	#L100	#15	#T314	
Mass of dish + wet soil	(g)	402.5	485.2	436.5	478.5	267.8	
Mass of dish + dry soil	(g)	381.7	449.1	401.1	435.1	247.6	
Mass of dish	(g)	148.9	100.3	117.7	137.9	124.4	
Mass of water	(g)	20.8	36.1	35.4	43.4	20.2	
Mass of dry soil	(g)	232.8	348.8	283.4	297.2	123.2	
Moisture content	(% of dry mass)	8.9%	10.3%	12.5%	14.6%	16.4%	
Dry unit weight determinations							
Dry unit weights	(lbf/ft3)	104.5	108.7	112.2	111.7	107.6	

Remarks

OPT. MOISTURE = 13.3

MAX. DRY UNIT WT = 112.4

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP32/#2 | Project ELKHEAD RESERVOIR | Feature 4.0 to 10.0 FE

Tested By BT | Computed By BT | Date 7-16-93 | Checked By COMP

Blows per layer 25 | No. of layers 3 | Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm | Volume of mold 0.0500 ft3

Specimen No.			X	X	X			
Wet unit wieght determinations								
Water added	(g or ml)	6%	8%	10%	12%	14%		
Mass of mold + wet soil	(lbm)	13.62	13.97	14.31	14.35	14.27		
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95		
Mass of wet soil	(lbm)	5.67	6.02	6.36	6.4	6.32		
Wet unit weight	(lbf/ft3)	113.4	120.4	127.2	128	126.4		
Wet Unit wt. / water added	(lbf/ft3)	107.0	111.5	115.6	114.3	110.9		
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0		
Penrtrometer reading (lbf)	2	0	0	0	0	0		
	3	0	0	0	0	0		
Average reading	(lbf)	0	0	0	0	0		
Penetration resistance	(lbf/in2)	0	0	0	0	0		
Moisture content determinations								
Dish No.		#22	#91	#T312	#7	#57		
Mass of dish + wet soil	(g)	440.4	466.7	395.9	421.3	394.2		
Mass of dish + dry soil	(g)	411.1	432.3	362.3	382.6	354.8		
Mass of dish	(g)	120	142.2	120.9	136.8	136.3		
Mass of water	(g)	29.3	34.4	33.6	38.7	39.4		
Mass of dry soil	(g)	291.1	290.1	241.4	245.8	218.5		
Moisture content	(% of dry mass)	10.1%	11.9%	13.9%	15.7%	18.0%		
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	103.0	107.6	111.7	110.6	107.1		

Remarks

OPT. MOISTURE = 14.4

MAX. DRY UNIT WT = 111.8

7-1391 (12-96)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No.TP33/#1	Project ELKHEAD RESERVOIR	Feature 1.0 to 2.8 FEE
Tested By BT	Computed By BT Date 7-16-93	Checked By COMP

Blows per layer 25 No. of layers 3 Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.		1	2	3	4	5		
Wet unit wieght determinations								
Water added	(g or ml)	6%	8%	10%	12%	14%		
Mass of mold + wet soil	(lbm)	13.48	13.79	14.19	14.22	14.25		0
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95		0
Mass of wet soil	(lbm)	5.53	5.84	6.24	6.27	6.3	0	0
Wet unit weight	(lbf/ft3)	110.6	116.8	124.8	125.4	126	0	0
Wet Unit wt./ water added	(lbf/ft3)	104.3	108.1	113.5	112.0	110.5	0.0	0.0
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0	0	0
Penrtrometer reading (lbf)	2	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0
Average reading	(lbf)	0	0	0	0	0	0	0
Penetration resistance	(lbf/in2)	0	0	0	0	0	0	0
Moisture content determinations								
Dish No.		#T312	7A	A-14	7A	#12		
Mass of dish + wet soil	(g)	498.4	520.3	448.9	468.2	424.4	0	0
Mass of dish + dry soil	(g)	463.2	480.1	408.6	423.2	388.5	0	0
Mass of dish	(g)	129.2	157	135.1	157.5	193.3	0	0
Mass of water	(g)	35.2	40.2	40.3	45	35.9	0	0
Mass of dry soil	(g)	334	323.1	273.5	265.7	195.2	0	0
Moisture content	(% of dry mass)	10.5%	12.4%	14.7%	16.9%	18.4%	ERR	ERR
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	100.1	103.9	108.8	107.2	106.4	ERR	ERR

Remarks MOISTURE CONTENT ON POINT #1 WAS CORRECTED BY JOHN BUCK.

15.2 OPT. MOISTURE

108.9 MAX. DRY UNIT WT

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP33/#2	Project ELKHEAD RESERVOIR	Feature 2.8 to 4.2 FEE
Tested By BT	Computed By BT Date 7-16-93	Checked By COMP

Blows per layer 25 No. of layers 3 Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.		X	X	X			
Wet unit wieght determinations							
Water added (g or ml)	6%	8%	10%	12%	14%		
Mass of mold + wet soil (lbm)	13.59	14.02	14.33	14.43	14.31		
Mass of mold (lbm)	7.95	7.95	7.95	7.95	7.95		
Mass of wet soil (lbm)	5.64	6.07	6.38	6.48	6.36		
Wet unit weight (lbf/ft3)	112.8	121.4	127.6	129.6	127.2		
Wet Unit wt. / water added (lbf/ft3)	106.4	112.4	116.0	115.7	111.6		
Penetration resistance determinations							
Needle No.							
Area of needle (in2)	1/40	1/20	1/4	1/2	1/1		
Penrtrometer reading (lbf) 1	0	0	0	0	0		
Penrtrometer reading (lbf) 2	0	0	0	0	0		
Penrtrometer reading (lbf) 3	0	0	0	0	0		
Average reading (lbf)	0	0	0	0	0		
Penetration resistance (lbf/in2)	0	0	0	0	0		
Moisture content determinations							
Dish No.	#91	#15	#57	#22	A-14		
Mass of dish + wet soil (g)	463.87	413.01	547.14	320.19	342.32		
Mass of dish + dry soil (g)	436.8	383.1	498.9	293.3	310.7		
Mass of dish (g)	142.23	137.93	136.21	119.53	134.81		
Mass of water (g)	27.07	29.91	48.24	26.89	31.62		
Mass of dry soil (g)	294.57	245.17	362.69	173.77	175.89		
Moisture content (% of dry mass)	9.2%	12.2%	13.3%	15.5%	18.0%		
Dry unit weight determinations							
Dry unit weights (lbf/ft3)	103.3	108.2	112.6	112.2	107.8		

Remarks

14.3 OPT. MOISTURE

113.9 MAX. DRY UNIT WT

7-1391 (12-86) Bureau of Reclamation	Laboratory Compaction Test	Designation USBR
Sample No.TP34/#1	Project ELKHEAD RESERVOIR	Feature 1.0 to 2.0 FEE
Tested By BT	Computed By BT Date 7-16-93	Checked By COMP

Blows per layer 25 No. of layers 3 Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.			X	X	X			
Wet unit wieght determinations								
Water added	(g or ml)	6%	8%	10%	12%	14%		
Mass of mold + wet soil	(lbm)	13.47	13.69	14.09	14.08	14.07		
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95		
Mass of wet soil	(lbm)	5.52	5.74	6.14	6.13	6.12		
Wet unit weight	(lbf/ft3)	110.4	114.8	122.8	122.6	122.4		
Wet Unit wt. / water added	(lbf/ft3)	104.2	106.3	111.6	109.5	107.4		
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0		
Penrtrometer reading (lbf)	2	0	0	0	0	0		
	3	0	0	0	0	0		
Average reading	(lbf)	0	0	0	0	0		
Penetration resistance	(lbf/in2)	0	0	0	0	0		
Moisture content determinations								
Dish No.		#70	#T312	#L100	#7	#T314		
Mass of dish + wet soil	(g)	452.37	459.92	456.91	490.12	427.5		
Mass of dish + dry soil	(g)	421	418.8	412.5	437.2	377.6		
Mass of dish	(g)	148.87	120.73	136.83	136.83	124.52		
Mass of water	(g)	31.37	41.12	44.41	52.92	49.9		
Mass of dry soil	(g)	272.13	298.07	275.67	300.37	253.08		
Moisture content	(% of dry mass)	11.5%	13.8%	16.1%	17.6%	19.7%		
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	99.0	100.9	105.8	104.2	102.2		

Remarks

16.2 OPT. MOISTURE

105.8 MAX. DRY UNIT WT

COMPACTION TEST REPORT

Project No.: 23272 Date: 8-1-93

Project: ELKHEAD DAM

Location: TP-34/#2 @ 2.0-9.0'

Elev/Depth:

Remarks:

MATERIAL DESCRIPTION

Description: CLAY, SANDY

Classifications: USCS: CL AASHTO:

Nat. Moist. = % Sp.G. = 2.65

Liquid Limit = Plasticity Index =

%> No. 4 = 0%

TEST RESULTS
Maximum dry density = 103.4 pcf
Optimum moisture = 18.6 %

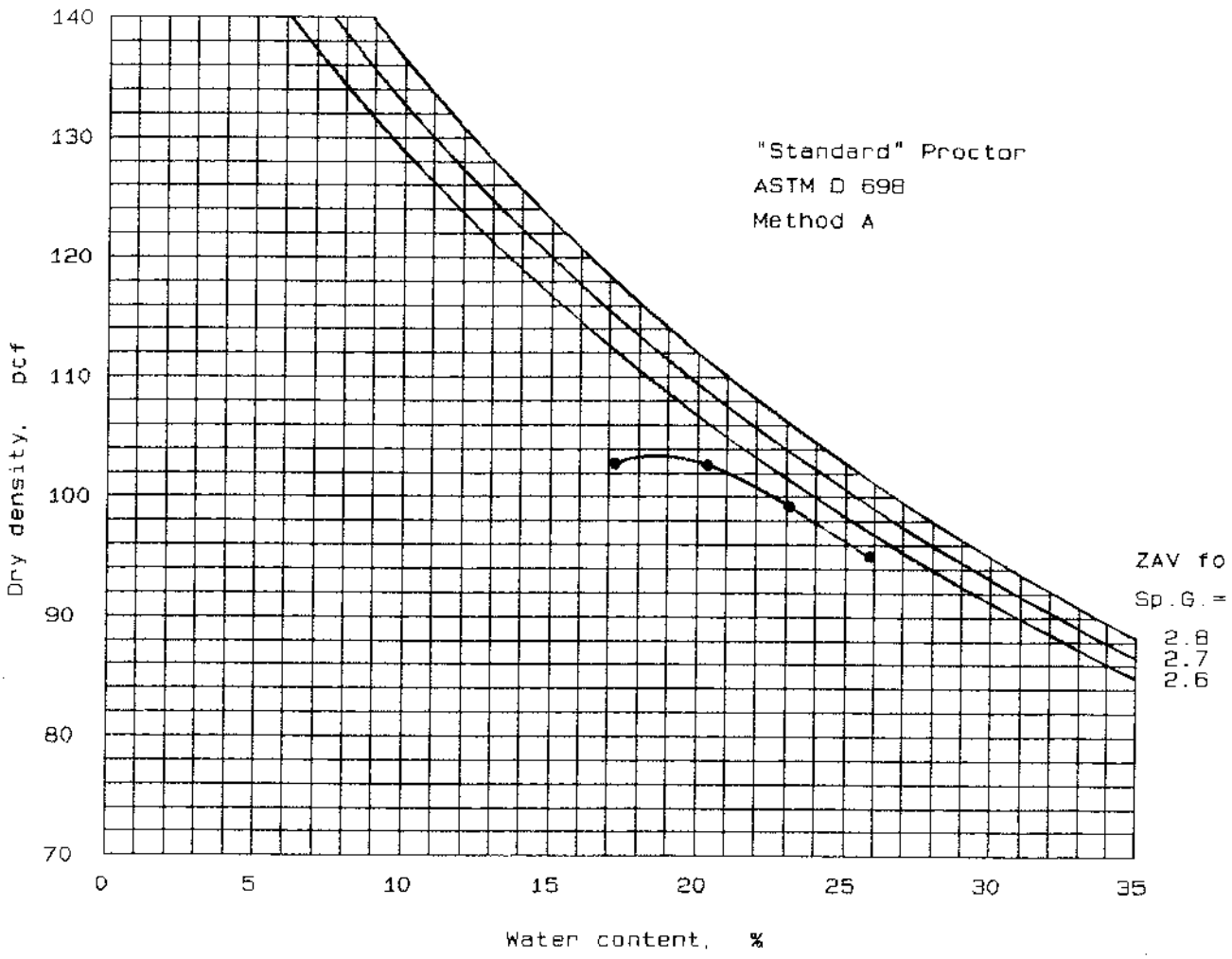


Figure No. _____

WOODWARD-CLYDE CONSULTANTS

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR _____

Sample No. TP34/#3 | Project ELKHEAD RESERVOIR | Feature

Tested By BT | Computed By BT | Date 7-16-93 | Checked By COMP

Blows per layer 25 | No. of layers 3 | Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm | Volume of mold 0.0500 ft3

Specimen No.			X	X	X		
Wet unit wieght determinations							
Water added	(g or ml)	6%	8%	10%	12%	14%		
Mass of mold + wet soil	(lbm)	13.24	13.84	14.02	14.1	14.05		0
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95		0
Mass of wet soil	(lbm)	5.29	5.89	6.07	6.15	6.1	0	0
Wet unit weight	(lbf/ft3)	105.8	117.8	121.4	123	122	0	0
Wet Unit wt. / water added	(lbf/ft3)	99.8	109.1	110.4	109.8	107.0	0.0	0.0
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0	0	0
Penrtrometer reading (lbf)	2	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0
Average reading	(lbf)	0	0	0	0	0	0	0
Penetration resistance	(lbf/in2)	0	0	0	0	0	0	0
Moisture content determinations								
Dish No.		#43	#35	#29	#0	#36		
Mass of dish + wet soil	(g)	188.1	251.7	236.5	222.5	224	0	0
Mass of dish + dry soil	(g)	175.2	228.5	210.8	197.8	197.6	0	0
Mass of dish	(g)	63.2	65.2	64.2	66.7	65.6	0	0
Mass of water	(g)	12.9	23.2	25.7	24.7	26.4	0	0
Mass of dry soil	(g)	112	163.3	146.6	131.1	132	0	0
Moisture content	(% of dry mass)	11.5%	14.2%	17.5%	18.8%	20.0%	ERR	ERR
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	94.9	103.1	103.3	103.5	101.7	ERR	ERR

Remarks

OPT. MOISTURE = 18.3

MAX. DRY UNIT WT. = 103.7

7-1391 (12-86) Bureau of Reclamation	Laboratory Compaction Test	Designation USBR
Sample No. TP-35/#1	Project ELKHEAD RESERVOIR	Feature 1.0 to 4.2 FEET
Tested By BT	Computed By BT Date 7-27-93	Checked By COMP

Blows per layer 25 No. of layers 3 Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.			X	X	X			
Wet unit wieght determinations								
Water added	(g or ml)	10%	12%	14%	16%	18%		
Mass of mold + wet soil	(lbm)	13.57	13.77	13.97	14.07	13.91		0
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95		0
Mass of wet soil	(lbm)	5.62	5.82	6.02	6.12	5.96	0	0
Wet unit weight	(lbf/ft3)	112.4	116.4	120.4	122.4	119.2	0	0
Wet Unit wt. / water added	(lbf/ft3)	102.2	103.9	105.6	105.5	101.0	0.0	0.0
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0		
Penrtrometer reading (lbf)	2	0	0	0	0	0		
	3	0	0	0	0	0		
Average reading	(lbf)	0	0	0	0	0		
Penetration resistance	(lbf/in2)	0	0	0	0	0		
Moisture content determinations								
Dish No.		#15	#7	#L100	#T312	#99		
Mass of dish + wet soil	(g)	466.8	461.5	458.5	349.6	442.7		
Mass of dish + dry soil	(g)	423.7	414.3	401	311.2	385.8		
Mass of dish	(g)	138.2	137.5	117.7	129.4	141.4		
Mass of water	(g)	43.1	47.2	57.5	38.4	56.9		
Mass of dry soil	(g)	285.5	276.8	283.3	181.8	244.4		
Moisture content	(% of dry mass)	15.1%	17.1%	20.3%	21.1%	23.3%		
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	97.7	99.4	100.1	101.1	96.7		

Remarks

OPTIMUM MOISTURE = 21.3

MAX. DRY UNIT WT = 101.1

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP35/#2	Project ELKHEAD RESERVOIR	Feature 4.2 to 7.5 FEET

Tested By	BT	Computed By	JD	Date	7-28-93	Checked By	COMP

Blows per layer 25 No. of layers 3 Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.			X	X	X			
Wet unit wieght determinations								
Water added	(g or ml)	8%	10%	12%	14%	16%		
Mass of mold + wet soil	(lbm)	13.57	13.77	14.08	14.15	14.09		
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95		
Mass of wet soil	(lbm)	5.62	5.82	6.13	6.2	6.14		
Wet unit weight	(lbf/ft3)	112.4	116.4	122.6	124	122.8		
Wet Unit wt. / water added	(lbf/ft3)	104.1	105.8	109.5	108.8	105.9		
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0		
Penrtrometer reading (lbf)	2	0	0	0	0	0		
	3	0	0	0	0	0		
Average reading	(lbf)	0	0	0	0	0		
Penetration resistance	(lbf/in2)	0	0	0	0	0		
Moisture content determinations								
Dish No.		#7	#L100	#99	#15	T312		
Mass of dish + wet soil	(g)	467.4	488.1	499	470	346.6		
Mass of dish + dry soil	(g)	429.1	440.3	448.4	418.1	307.5		
Mass of dish	(g)	136.8	117.7	141.2	137.7	129.6		
Mass of water	(g)	38.3	47.8	50.6	51.9	39.1		
Mass of dry soil	(g)	292.3	322.6	307.2	280.4	177.9		
Moisture content	(% of dry mass)	13.1%	14.8%	16.5%	18.5%	22.0%		
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	99.4	101.4	105.3	104.6	100.7		

Remarks

OPTIMUM MOISTURE = 17.3

MAX. DRY UNIT WT. = 105.7

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP36/#1	Project ELKHEAD RESERVOIR	Feature 1.5 to 3.0 FEET
Tested By BT	Computed By JD Date 7-28-93	Checked By COMP

Blows per layer 25 No. of layers 3 Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.			X	X	X			
Wet unit wieght determinations								
Water added	(g or ml)	6%	8%	10%	12%	14%		
Mass of mold + wet soil	(lbm)	13.42	13.72	14.07	14.17	14.23		
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95		
Mass of wet soil	(lbm)	5.47	5.77	6.12	6.22	6.28		
Wet unit weight	(lbf/ft3)	109.4	115.4	122.4	124.4	125.6		
Wet Unit wt. / water added	(lbf/ft3)	103.2	106.9	111.3	111.1	110.2		
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0		
Penrtrometer reading (lbf)	2	0	0	0	0	0		
	3	0	0	0	0	0		
Average reading	(lbf)	0	0	0	0	0		
Penetration resistance	(lbf/in2)	0	0	0	0	0		
Moisture content determinations								
Dish No.		#10	#16	A-14	#10A	#9		
Mass of dish + wet soil	(g)	333.9	308.8	468.9	502.6	458.2		
Mass of dish + dry soil	(g)	315.8	290.8	428.3	449.8	406.6		
Mass of dish	(g)	135.5	141	134.6	119.5	123.9		
Mass of water	(g)	18.1	18	40.6	52.8	51.6		
Mass of dry soil	(g)	180.3	149.8	293.7	330.3	282.7		
Moisture content	(% of dry mass)	10.0%	12.0%	13.8%	16.0%	18.3%		
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	99.4	103.0	107.5	107.3	106.2		

Remarks

OPTIMUM MOISTURE = 14.8

MAX. DRY UNIT WT. = 108.1

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP36/#2	Project ELKHEAD RESERVOIR	Feature 3.0 to 10.3 FEE
Tested By JD & EJ	Computed By JD Date 8-2-93	Checked By COMP

Blows per layer 25 No. of layers 3 Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.			X	X	X			
Wet unit wieght determinations								
Water added	(g or ml)	6%	8%	10%	12%	14%		
Mass of mold + wet soil	(lbm)	13.24	13.41	13.87	14.08	14.12		
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95		
Mass of wet soil	(lbm)	5.29	5.46	5.92	6.13	6.17		
Wet unit weight	(lbf/ft3)	105.8	109.2	118.4	122.6	123.4		
Wet Unit wt. / water added	(lbf/ft3)	99.8	101.1	107.6	109.5	108.2		
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0		
Penrtrometer reading (lbf)	2	0	0	0	0	0		
	3	0	0	0	0	0		
Average reading	(lbf)	0	0	0	0	0		
Penetration resistance	(lbf/in2)	0	0	0	0	0		
Moisture content determinations								
Dish No.		#T306	#T402	#20	#L100	#60		
Mass of dish + wet soil	(g)	361.3	339.1	349.3	287.8	355.7		
Mass of dish + dry soil	(g)	339.4	314.9	324.4	264.7	323.5		
Mass of dish	(g)	123.5	117.5	142.4	117.1	143.4		
Mass of water	(g)	21.9	24.2	24.9	23.1	32.2		
Mass of dry soil	(g)	215.9	197.4	182	147.6	180.1		
Moisture content	(% of dry mass)	10.1%	12.3%	13.7%	15.7%	17.9%		
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	96.1	97.3	104.2	106.0	104.7		

Remarks

OPTIMUM MOISTURE = 15.1

MAX. DRY UNIT WT. = 106.4

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No.TP38/#1	Project ELKHEAD RESERVOIR	Feature 1.0 to 2.5 FEET

Tested By	BT & BH	Computed By	BT	Date	7-16-93	Checked By	COMP

Blows per layer 25 No. of layers 3 Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.			X	X	X			
Wet unit wieght determinations								
Water added	(g or ml)	8%	10%	12%	14%	16%		
Mass of mold + wet soil	(lbm)	13.43	13.61	13.91	14.01	14.04		
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95		
Mass of wet soil	(lbm)	5.48	5.66	5.96	6.06	6.09		
Wet unit weight	(lbf/ft3)	109.6	113.2	119.2	121.2	121.8		
Wet Unit wt. / water added	(lbf/ft3)	101.5	102.9	106.4	106.3	105.0		
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0		
Penrtrometer reading (lbf)	2	0	0	0	0	0		
	3	0	0	0	0	0		
Average reading	(lbf)	0	0	0	0	0		
Penetration resistance	(lbf/in2)	0	0	0	0	0		
Moisture content determinations								
Dish No.		#9	#10	#22	#7	#T312		
Mass of dish + wet soil	(g)	457	508.8	354.1	447.3	436.6		
Mass of dish + dry soil	(g)	418.9	457.7	319.1	398.1	381.8		
Mass of dish	(g)	104.2	119.6	119.5	136.8	129.5		
Mass of water	(g)	38.1	51.1	35	49.2	54.8		
Mass of dry soil	(g)	314.7	338.1	199.6	261.3	252.3		
Moisture content	(% of dry mass)	12.1%	15.1%	17.5%	18.8%	21.7%		
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	97.8	98.3	101.4	102.0	100.1		

Remarks

OPT. MOISTURE = 19.0

MAX. DRY UNIT WT. = 102.0

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No.TP38/#2	Project ELKHEAD RESERVOIR	Feature 2.5 to 10.4 F
Tested By JD & EJ	Computed By JD Date 8-4-93	Checked By COMP

Blows per layer 25 No. of layers 3 Height of drop 18 in

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.		X	X	X			
Wet unit wieght determinations							
Water added	(g or ml)	8%	10%	12%	14%	16%	
Mass of mold + wet soil	(lbm)	13.24	13.59	14.01	14.07	14.16	
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95	
Mass of wet soil	(lbm)	5.29	5.64	6.06	6.12	6.21	
Wet unit weight	(lbf/ft3)	105.8	112.8	121.2	122.4	124.2	
Wet Unit wt. / water added	(lbf/ft3)	98.0	102.5	108.2	107.4	107.1	
Penetration resistance determinations							
Needle No.							
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1	
Penrtrometer reading (lbf)	1	0	0	0	0	0	
	2	0	0	0	0	0	
	3	0	0	0	0	0	
Average reading	(lbf)	0	0	0	0	0	
Penetration resistance	(lbf/in2)	0	0	0	0	0	
Moisture content determinations							
Dish No.		#60	#2	#20	#T402	#T310	
Mass of dish + wet soil	(g)	348.9	336.9	351.8	325.8	349.6	
Mass of dish + dry soil	(g)	327.5	315.7	322.1	294.6	312.5	
Mass of dish	(g)	144.1	161.2	144.1	118.4	128.5	
Mass of water	(g)	21.4	21.2	29.7	31.2	37.1	
Mass of dry soil	(g)	183.4	154.5	178	176.2	184	
Moisture content	(% of dry mass)	11.7%	13.7%	16.7%	17.7%	20.2%	
Dry unit weight determinations							
Dry unit weights	(lbf/ft3)	94.7	99.2	103.9	104.0	103.4	0.0 0

Remarks

OPT. MOISTURE = 17.7

MAX. DRY UNIT WT. = 104.0

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No.TP-40/#1	Project ELKHEAD RESERVOIR	Feature 1.0 to 5.0 FEE
Tested By JD & EJ	Computed By JD Date 8-4-93	Checked By COMP

Blows per layer 25 No. of layers 3 Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm Volume of mold 0.0500 ft3

Specimen No.		X	X	X			
Wet unit wieght determinations							
Water added (g or ml)	12%	14%	16%	18%	20%		
Mass of mold + wet soil (lbm)	13.82	13.98	14.1	14.04	13.95		
Mass of mold (lbm)	7.95	7.95	7.95	7.95	7.95		
Mass of wet soil (lbm)	5.87	6.03	6.15	6.09	6		
Wet unit weight (lbf/ft3)	117.4	120.6	123	121.8	120		
Wet Unit wt. / water added (lbf/ft3)	104.8	105.8	106.0	103.2	100.0		
Penetration resistance determinations							
Needle No.							
Area of needle (in2)	1/40	1/20	1/4	1/2	1/1		
1	0	0	0	0	0		
Penrtrometer reading (lbf) 2	0	0	0	0	0		
3	0	0	0	0	0		
Average reading (lbf)	0	0	0	0	0		
Penetration resistance (lbf/in2)	0	0	0	0	0		
Moisture content determinations							
Dish No.	#108	#L100	#119	#7A	#T312		
Mass of dish + wet soil (g)	390.7	339.4	369.5	364.9	364.9		
Mass of dish + dry soil (g)	357	305.4	327.2	326.4	326.4		
Mass of dish (g)	153.2	118.6	121.6	158.1	158.1		
Mass of water (g)	33.7	34	42.3	38.5	38.5		
Mass of dry soil (g)	203.8	186.8	205.6	168.3	168.3		
Moisture content (% of dry mass)	16.5%	18.2%	20.6%	22.9%	22.9%		
Dry unit weight determinations							
Dry unit weights (lbf/ft3)	100.7	102.0	102.0	99.1	97.7	0.0	0.0

Remarks

OPT. MOISTURE = 19.5

MAX. DRY UNIT WT. = 102.5

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP40/#2 | Project ELKHEAD RESERVOIR | Feature 5.0 to 10.0 FEE

Tested By JD & EJ | Computed By JD | Date 7-28-93 | Checked By COMP

Blows per layer 25 | No. of layers 3 | Height of drop 18 in.

Mass of tamping rod 5.5+/- lbm | Volume of mold 0.0500 ft3

Specimen No.			X	X	X			
Wet unit wieght determinations								
Water added	(g or ml)	8%	10%	12%	14%	16%		
Mass of mold + wet soil	(lbm)	13.52	13.84	14.16	14.27	14.2		
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95		
Mass of wet soil	(lbm)	5.57	5.89	6.21	6.32	6.25		
Wet unit weight	(lbf/ft3)	111.4	117.8	124.2	126.4	125		
Wet Unit wt. / water added	(lbf/ft3)	103.1	107.1	110.9	110.9	107.8		
Penetration resistance determinations								
Needle No.								
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1		
	1	0	0	0	0	0		
Penrtrometer reading (lbf)	2	0	0	0	0	0		
	3	0	0	0	0	0		
Average reading	(lbf)	0	0	0	0	0		
Penetration resistance	(lbf/in2)	0	0	0	0	0		
Moisture content determinations								
Dish No.		#119	#T314	#89	#16	#9		
Mass of dish + wet soil	(g)	332.4	371.4	372.4	387.3	376.9		
Mass of dish + dry soil	(g)	311.3	343.5	342.4	351.4	339.4		
Mass of dish	(g)	121.9	125.4	142.3	141.7	142.6		
Mass of water	(g)	21.1	27.9	30	35.9	37.5		
Mass of dry soil	(g)	189.4	218.1	200.1	209.7	196.8		
Moisture content	(% of dry mass)	11.1%	12.8%	15.0%	17.1%	19.1%		
Dry unit weight determinations								
Dry unit weights	(lbf/ft3)	100.2	104.4	108.0	107.9	105.0		

Remarks

OPTIMUM MOISTURE = 16.0

MAX. DRY UNIT WT. = 108.3

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP41/#1 | Project ELKHEAD RESERVOIR | Feature 0.7 to 7.8 F

Tested By BT | Computed By BT | Date 7-28-93 | Checked By COMI

Blows per layer 25 | No. of layers 3 | Height of drop 18 in

Mass of tamping rod 5.5+/- lbm | Volume of mold 0.0500 ft3

Specimen No.			X	X	X		
Wet unit wieght determinations							
Water added	(g or ml)	10%	12%	14%	16%	18%	
Mass of mold + wet soil	(lbm)	13.56	13.87	14.05	14.12	14.03	
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95	
Mass of wet soil	(lbm)	5.61	5.92	6.1	6.17	6.08	
Wet unit weight	(lbf/ft3)	112.2	118.4	122	123.4	121.6	
Wet Unit wt. / water added	(lbf/ft3)	102.0	105.7	107.0	106.4	103.1	
Penetration resistance determinations							
Needle No.							
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1	
Penrtrometer reading (lbf)	1	0	0	0	0	0	
	2	0	0	0	0	0	
	3	0	0	0	0	0	
Average reading	(lbf)	0	0	0	0	0	
Penetration resistance	(lbf/in2)	0	0	0	0	0	
Moisture content determinations							
Dish No.		#L100	#21	#T310	#20	#60	
Mass of dish + wet soil	(g)	482	455.9	424.7	413	402.6	
Mass of dish + dry soil	(g)	437.6	412.3	379.3	366.6	355.8	
Mass of dish	(g)	117.5	141.1	127.9	143.7	143.5	
Mass of water	(g)	44.4	43.6	45.4	46.4	46.8	
Mass of dry soil	(g)	320.1	271.2	251.4	222.9	212.3	
Moisture content	(% of dry mass)	13.9%	16.1%	18.1%	20.8%	22.0%	
Dry unit weight determinations							
Dry unit weights	(lbf/ft3)	98.5	102.0	103.3	102.1	99.6	

Remarks

OPTIMUM MOISTURE = 18.5

MAX. DRY UNIT WT. = 103.3

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP41/#2 | Project ELKHEAD RESERVOIR | Feature 7.8 to 10 FE

Tested By BT | Computed By BT | Date 8-6-93 | Checked By COM

Blows per layer 25 | No. of layers 3 | Height of drop 18 in

Mass of tamping rod 5.5+/- lbm | Volume of mold 0.0500 ft3

Specimen No.			X	X	X		
Wet unit wieght determinations							
Water added	(g or ml)	8%	10%	12%	14%	16%	
Mass of mold + wet soil	(lbm)	13.9	14.09	14.21	14.26	14.2	
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95	
Mass of wet soil	(lbm)	5.95	6.14	6.26	6.31	6.25	
Wet unit weight	(lbf/ft3)	119	122.8	125.2	126.2	125	
Wet Unit wt. / water added	(lbf/ft3)	110.2	111.6	111.8	110.7	107.8	
Penetration resistance determinations							
Needle No.							
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1	
Penrtrometer reading (lbf)	1	0	0	0	0	0	
	2	0	0	0	0	0	
	3	0	0	0	0	0	
Average reading	(lbf)	0	0	0	0	0	
Penetration resistance	(lbf/in2)	0	0	0	0	0	
Moisture content determinations							
Dish No.		#T314	#9	#T402	#2	#T307	
Mass of dish + wet soil	(g)	499.2	532.8	501.9	573.8	413.4	
Mass of dish + dry soil	(g)	456.2	479.3	446.5	507.6	363.9	
Mass of dish	(g)	124.6	124.1	117.8	160.6	128.7	
Mass of water	(g)	43	53.5	55.4	66.2	49.5	
Mass of dry soil	(g)	331.6	355.2	328.7	347	235.2	
Moisture content	(% of dry mass)	13.0%	15.1%	16.9%	19.1%	21.0%	
Dry unit weight determinations							
Dry unit weights	(lbf/ft3)	105.3	106.7	107.1	106.0	103.3	

Remarks

OPTIMUM MOISTURE = 16.6

MAX. DRY UNIT WT. = 107.1

7-1391 (12-86)
Bureau of Reclamation

Laboratory Compaction Test

Designation USBR

Sample No. TP-42/#1 | Project ELKHEAD RESERVOIR | Feature 1.0 to 5.0 F

Tested By BT | Computed By BT | Date 8-4-93 | Checked By COM

Blows per layer 25 | No. of layers 3 | Height of drop 18 in

Mass of tamping rod 5.5+/- lbm | Volume of mold 0.0500 ft3

Specimen No.		X	X	X			
Wet unit wieght determinations							
Water added	(g or ml)	10%	12%	14%	16%	18%	
Mass of mold + wet soil	(lbm)	13.84	14.03	14.23	14.16	14.03	
Mass of mold	(lbm)	7.95	7.95	7.95	7.95	7.95	
Mass of wet soil	(lbm)	5.89	6.08	6.28	6.21	6.08	
Wet unit weight	(lbf/ft3)	117.8	121.6	125.6	124.2	121.6	
Wet Unit wt. / water added	(lbf/ft3)	107.1	108.6	110.2	107.1	103.1	
Penetration resistance determinations							
Needle No.							
Area of needle	(in2)	1/40	1/20	1/4	1/2	1/1	
Penrtrometer reading (lbf)	1	0	0	0	0	0	
	2	0	0	0	0	0	
	3	0	0	0	0	0	
Average reading	(lbf)	0	0	0	0	0	
Penetration resistance	(lbf/in2)	0	0	0	0	0	
Moisture content determinations							
Dish No.		#7A	#15	#99	T312A	#T306	
Mass of dish + wet soil	(g)	561.2	528.1	550.1	514.9	432.9	
Mass of dish + dry soil	(g)	512.3	473.8	486.4	448.8	377.3	
Mass of dish	(g)	157.2	137.9	143	120.5	123.8	
Mass of water	(g)	48.9	54.3	63.7	66.1	55.6	
Mass of dry soil	(g)	355.1	335.9	343.4	328.3	253.5	
Moisture content	(% of dry mass)	13.8%	16.2%	18.5%	20.1%	21.9%	
Dry unit weight determinations							
Dry unit weights	(lbf/ft3)	103.5	104.7	105.9	103.4	99.7	0.0	0.

Remarks

OPT. MOISTURE = 17.8

MAX. DRY UNIT WT. = 106.1

COMPACTION TEST REPORT

Project No.: 23272
Project: ELKHEAD DAM
Location: TP-42/#2 @ 5.0-10.0'

Date: 7-30-93

Elev/Depth:
Remarks:

MATERIAL DESCRIPTION

Description: CLAY
Classifications: USCS: CL
AASHTO:
Nat. Moist. = %
Sp.G. = 2.65
Liquid Limit =
Plasticity Index =
%> No. 4 = 0%

TEST RESULTS
Maximum dry density = 101.0 pcf
Optimum moisture = 20.9 %

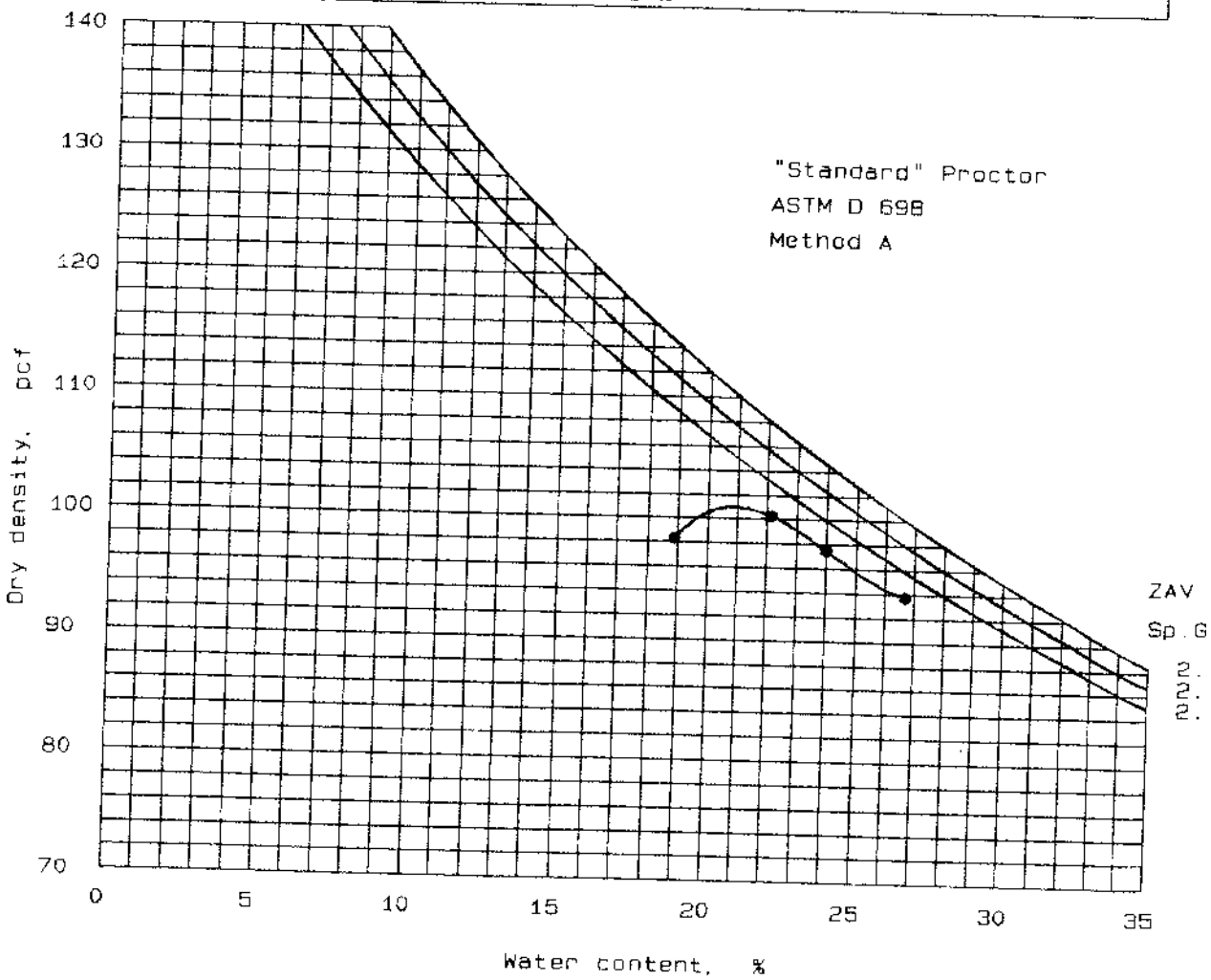


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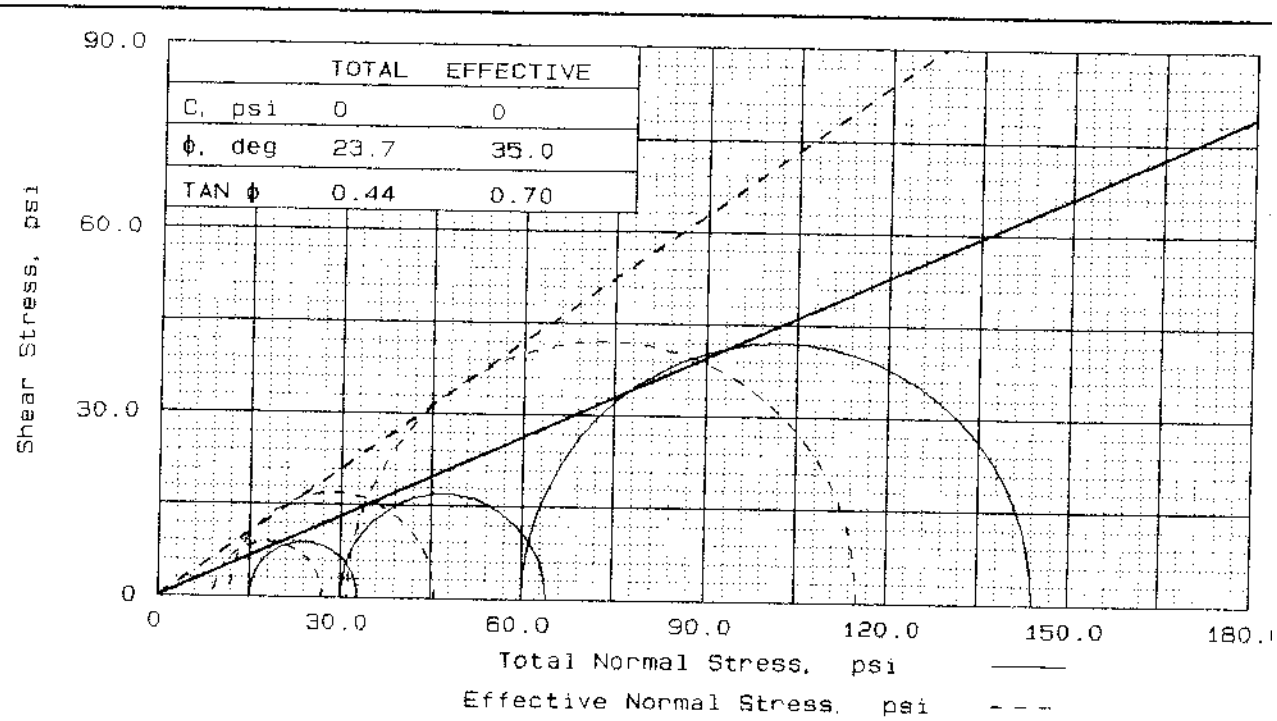
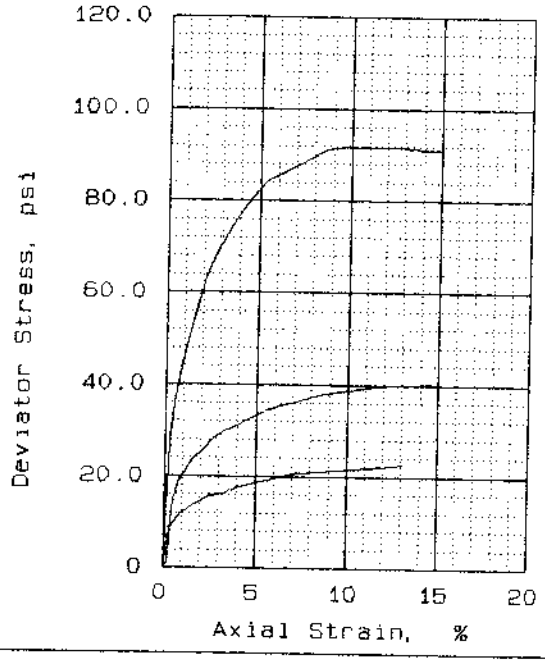
Figure No. ___





SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	20.9	21.9	20.0
	DRY DENSITY, pcf	104.7	105.3	106.0
	SATURATION, %	95.4	101.4	94.4
	VOID RATIO	0.580	0.572	0.560
	DIAMETER, in	2.84	2.82	2.83
	HEIGHT, in	5.54	5.16	6.04
AT TEST	WATER CONTENT, %	21.6	20.5	19.3
	DRY DENSITY, pcf	105.3	107.3	109.6
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.572	0.543	0.510
	DIAMETER, in	2.79	2.76	2.73
	HEIGHT, in	5.44	5.04	5.82
Strain rate, in/min		0.002	0.002	0.002
BACK PRESSURE, psi		57.2	51.9	57.2
CELL PRESSURE, psi		72.2	81.9	117.2
FAILURE STRESS, psi		17.8	33.9	84.2
PORE PRESSURE, psi		63.1	70.2	86.1
ULTIMATE STRESS, psi				
PORE PRESSURE, psi				
$\bar{\sigma}_1$ FAILURE, psi		26.9	45.6	115.3
$\bar{\sigma}_3$ FAILURE, psi		9.1	11.7	31.1

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: SHELBY TUBE
DESCRIPTION: CLAY, SANDY

SPECIFIC GRAVITY= 2.65
REMARKS:

CLIENT:

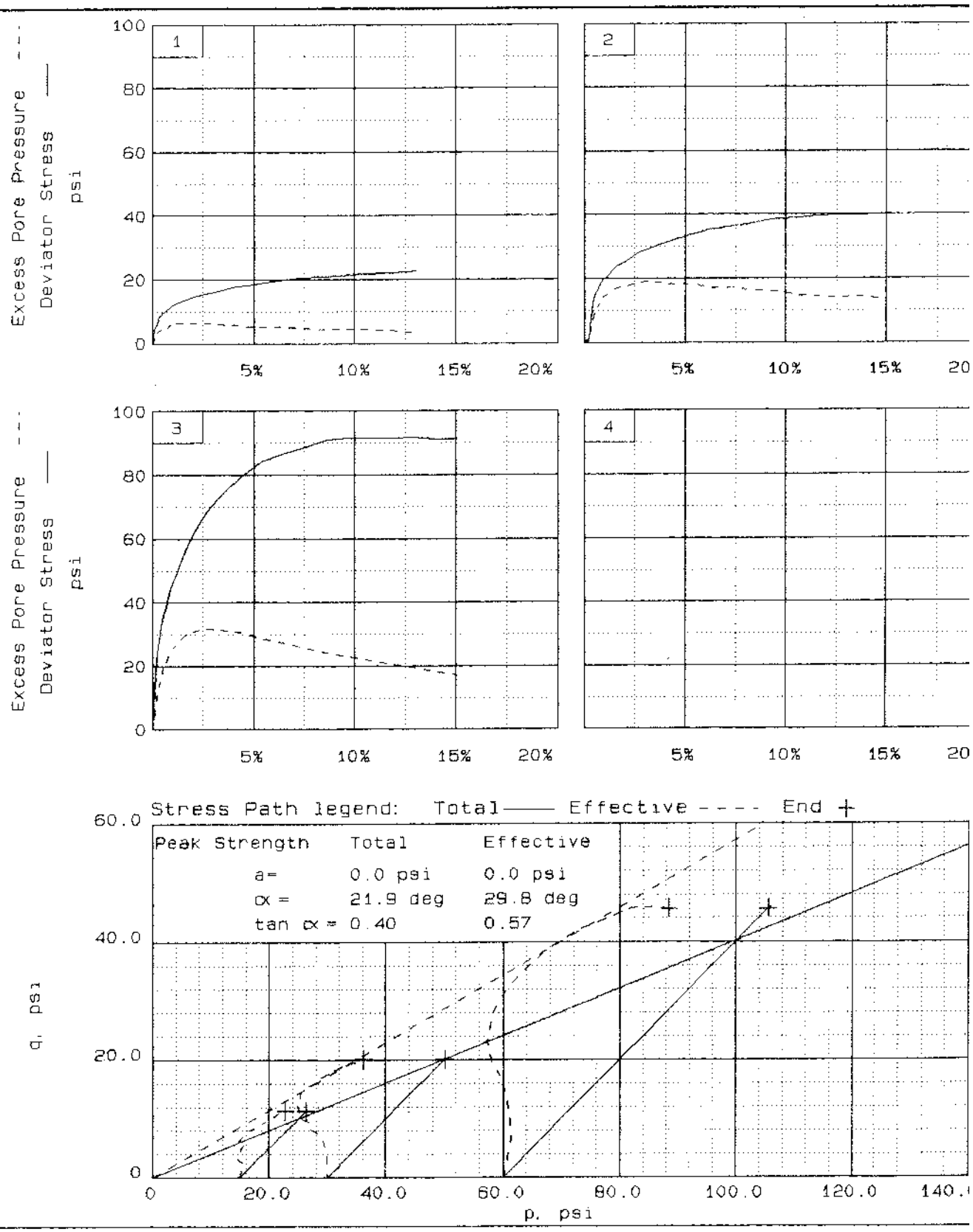
PROJECT: ELKHEAD DAM

SAMPLE LOCATION: WC-2 @ 30-32'

PROJ. NO.: 23272 DATE: 8-17-93

TRIAXIAL SHEAR TEST REPORT

WOODWARD-CLYDE CONSULTANTS

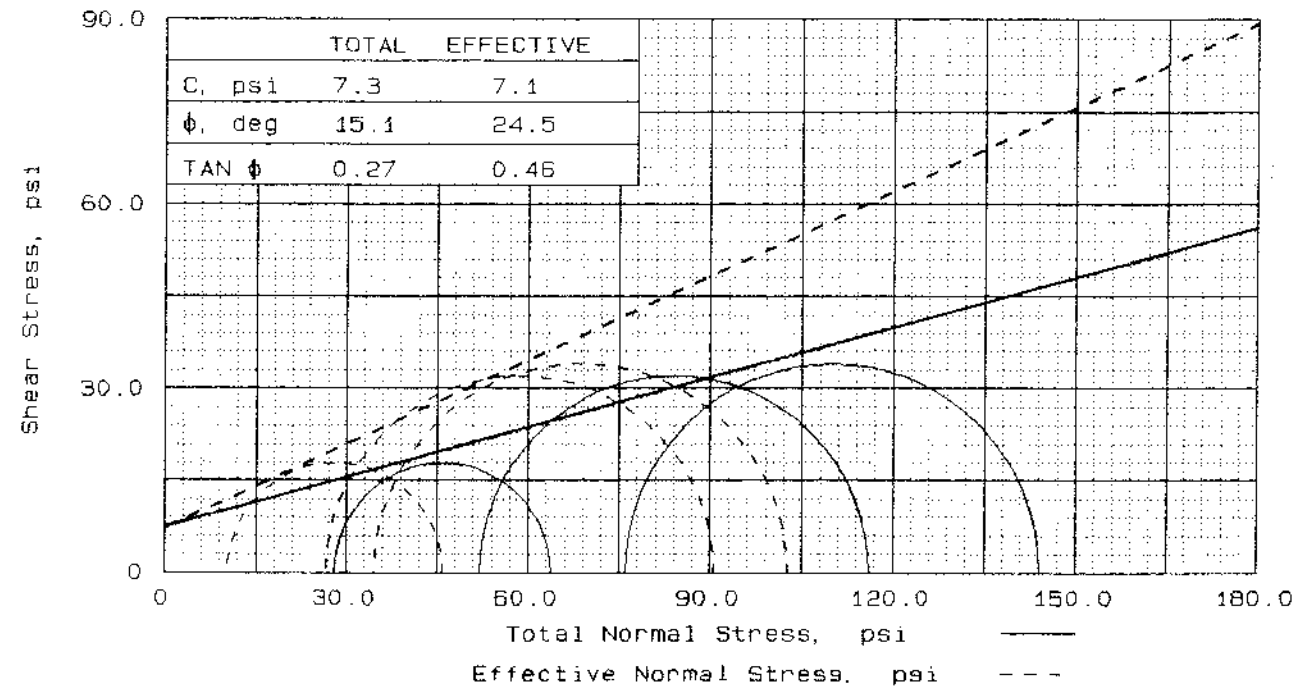


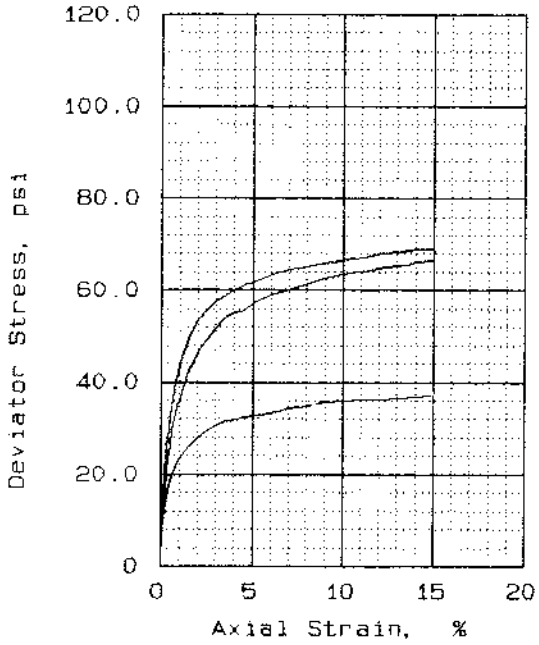
Client:

Project: ELKHEAD DAM

Location: WC-2 @ 30-32'

File: ELK-2 Project No.: 23272 Page 2/2





SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	18.0	18.1	18.2
	DRY DENSITY, pcf	102.0	102.5	100.9
	SATURATION, %	76.5	77.9	75.2
	VOID RATIO	0.623	0.614	0.640
	DIAMETER, in	1.93	1.94	1.92
	HEIGHT, in	3.98	3.99	4.00
AT TEST	WATER CONTENT, %	22.1	20.2	20.2
	DRY DENSITY, pcf	104.4	107.7	107.8
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.585	0.536	0.535
	DIAMETER, in	1.90	1.89	1.85
	HEIGHT, in	3.91	3.89	3.86
Strain rate, in/min		0.002	0.002	0.002
BACK PRESSURE, psi		52.6	60.0	56.8
CELL PRESSURE, psi		80.6	112.0	132.8
FAILURE STRESS, psi		35.7	64.0	68.1
PORE PRESSURE, psi		70.4	85.4	98.3
ULTIMATE STRESS, psi				
PORE PRESSURE, psi				
$\bar{\sigma}_1$ FAILURE, psi		45.9	90.6	102.6
$\bar{\sigma}_3$ FAILURE, psi		10.2	26.6	34.5

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: REMOLDED
DESCRIPTION: CLAY, SANDY

SPECIFIC GRAVITY= 2 65
REMARKS:

CLIENT:

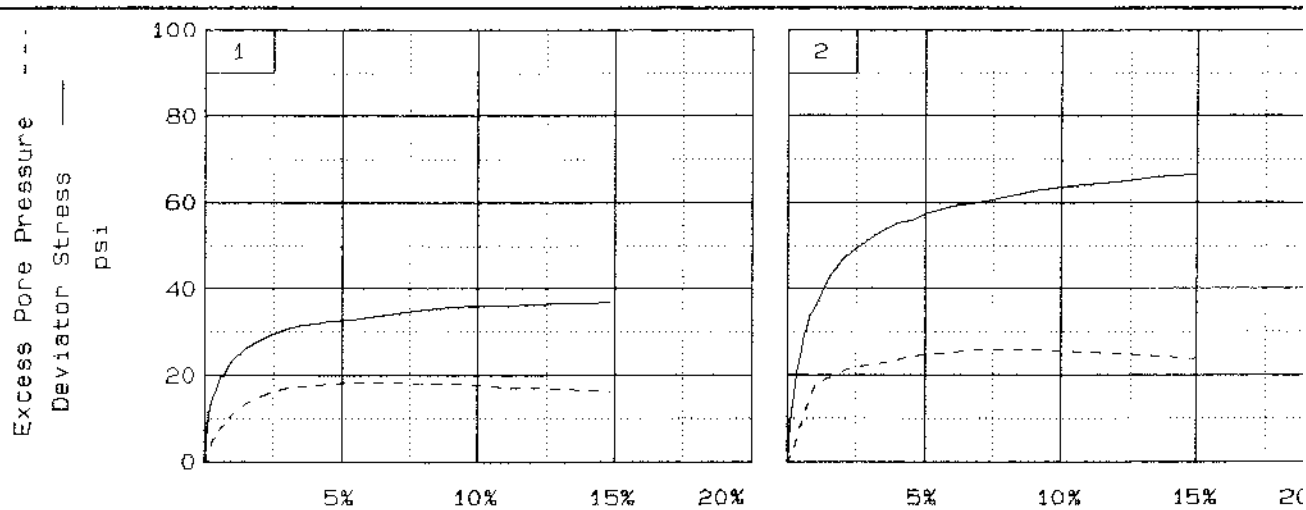
PROJECT: ELKHEAD DAM

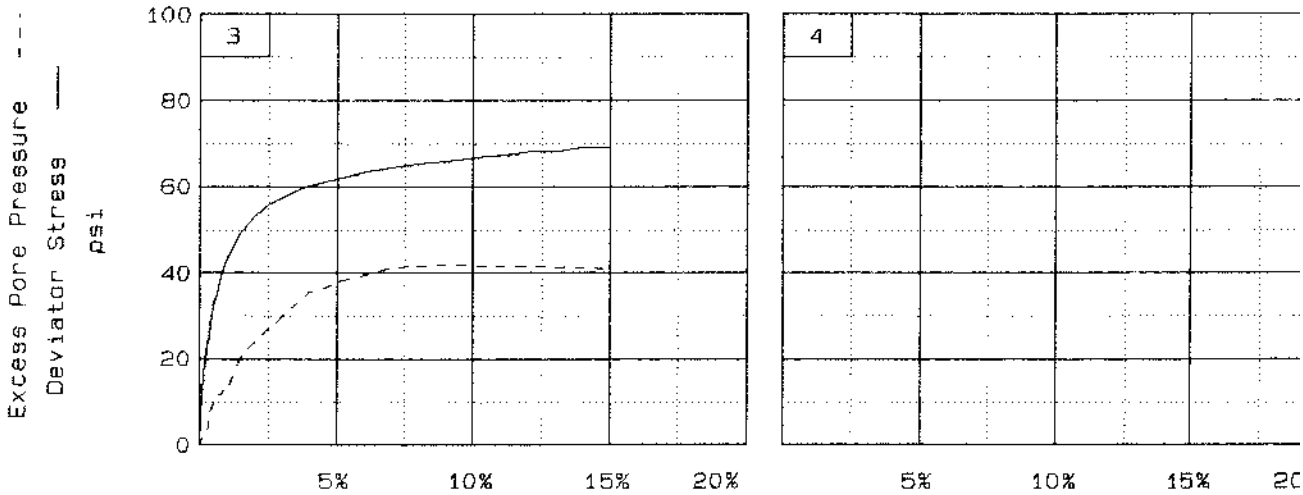
SAMPLE LOCATION: TP-34/#2 @ 2.0-9.0'

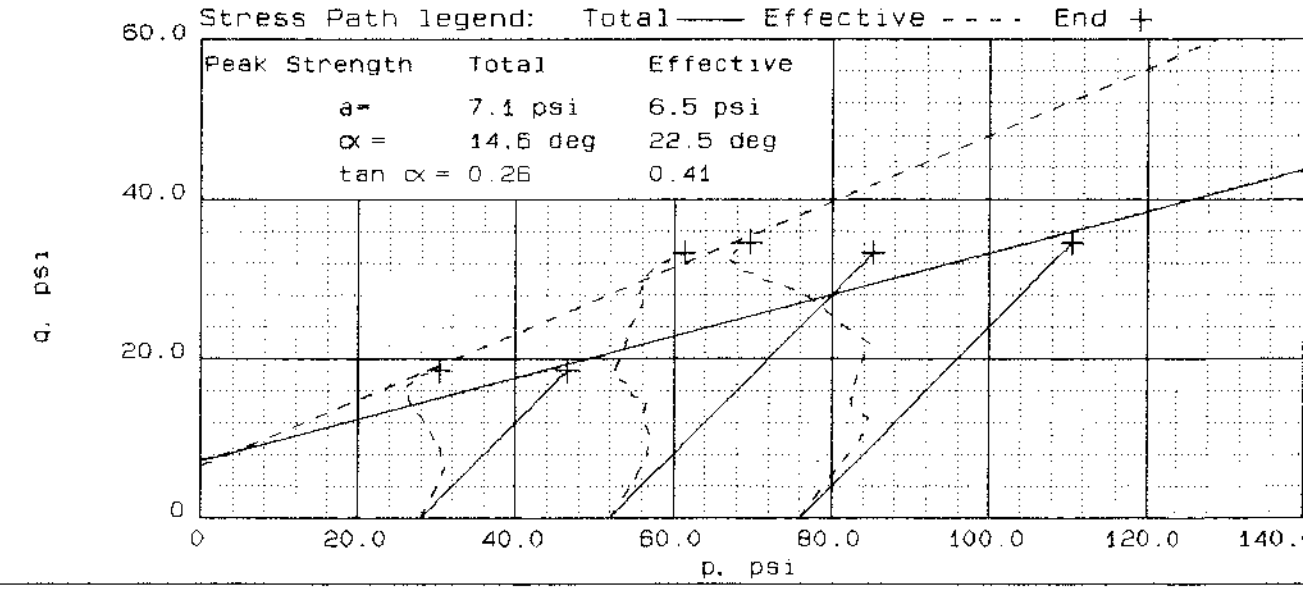
PROJ. NO.: 23272 DATE: 8-23-93

TRIAXIAL SHEAR TEST REPORT

WOODWARD-CLYDE CONSULTANTS





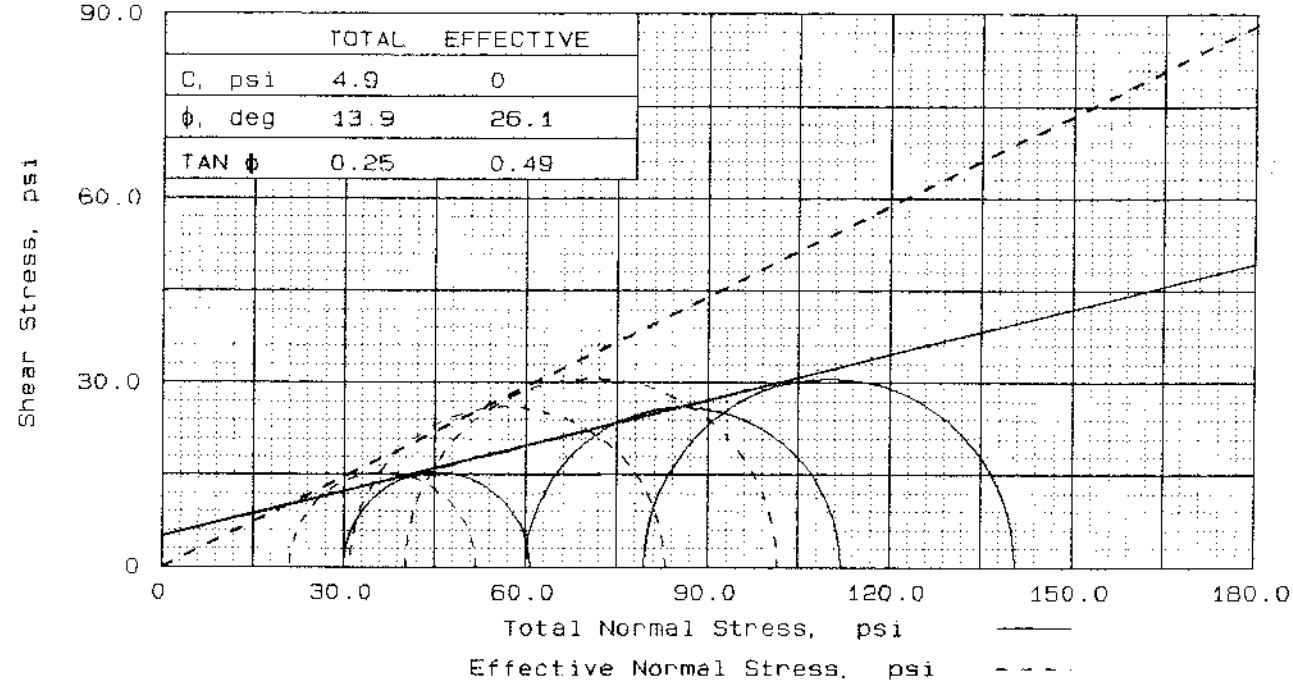


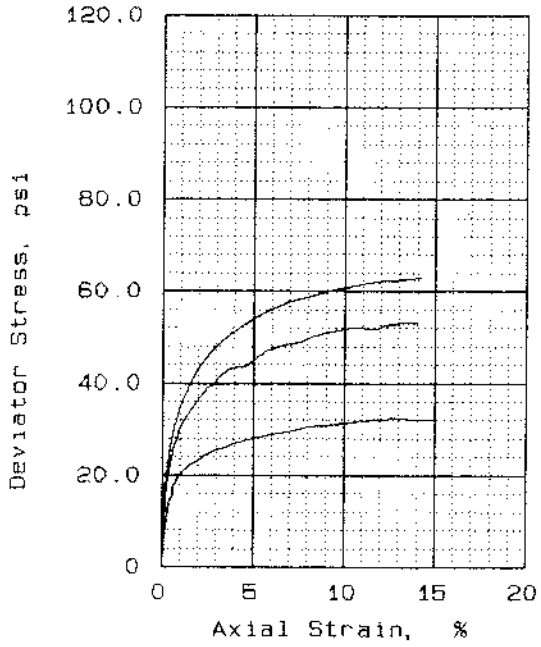
Client:

Project: ELKHEAD DAM

Location: TP-34/#2 @ 2.0-9.0'

File: ELK-34 Project No.: 23272 Page 2/2





SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	22.3	22.5	23.4
	DRY DENSITY, pcf	99.6	98.7	98.6
	SATURATION, %	89.4	88.1	87.8
	VOID RATIO	0.662	0.676	0.678
	DIAMETER, in	1.93	1.93	1.93
	HEIGHT, in	4.02	4.01	4.01
AT TEST	WATER CONTENT, %	24.2	22.5	22.2
	DRY DENSITY, pcf	100.9	103.7	104.2
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.640	0.596	0.588
	DIAMETER, in	1.93	2.00	2.00
	HEIGHT, in	4.04	4.15	4.16
Strain rate, in/min		0.002	0.002	0.002
BACK PRESSURE, psi		53.5	56.4	48.7
CELL PRESSURE, psi		83.5	116.4	128.1
FAILURE STRESS, psi		30.7	52.0	61.4
PORE PRESSURE, psi		62.4	85.5	87.9
ULTIMATE STRESS, psi				
PORE PRESSURE, psi				
$\bar{\sigma}_1$ FAILURE, psi		51.8	82.9	101.6
$\bar{\sigma}_3$ FAILURE, psi		21.1	30.9	40.2

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: REMOLDED
DESCRIPTION: CLAY, SANDY

SPECIFIC GRAVITY= 2.65
REMARKS:

CLIENT:

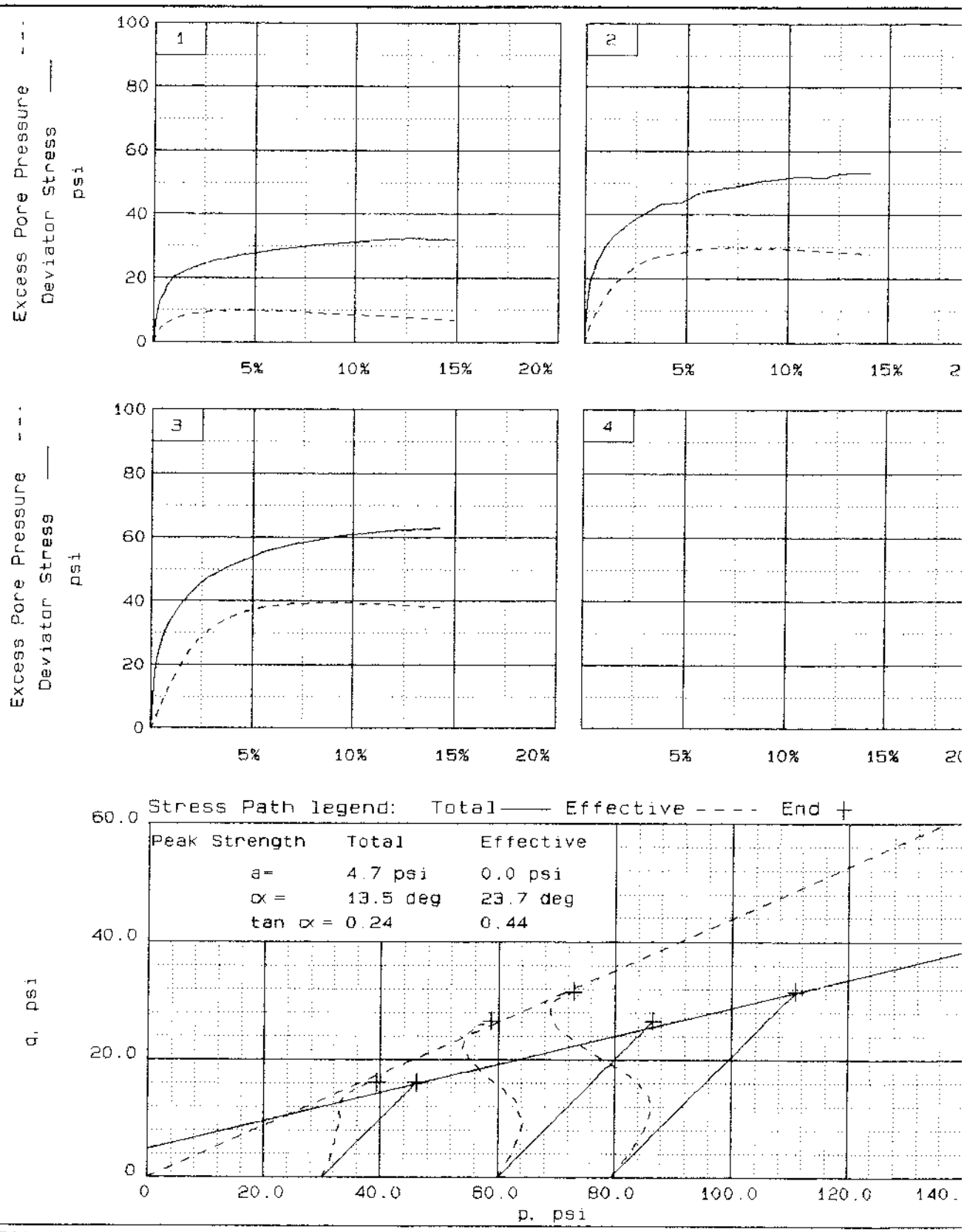
PROJECT: ELKHEAD DAM

SAMPLE LOCATION: TP-42/#2 @ 5.0-10.0'

PROJ. NO.: 23272 DATE: 8-17-93

TRIAXIAL SHEAR TEST REPORT

WOODWARD-CLYDE CONSULTANTS



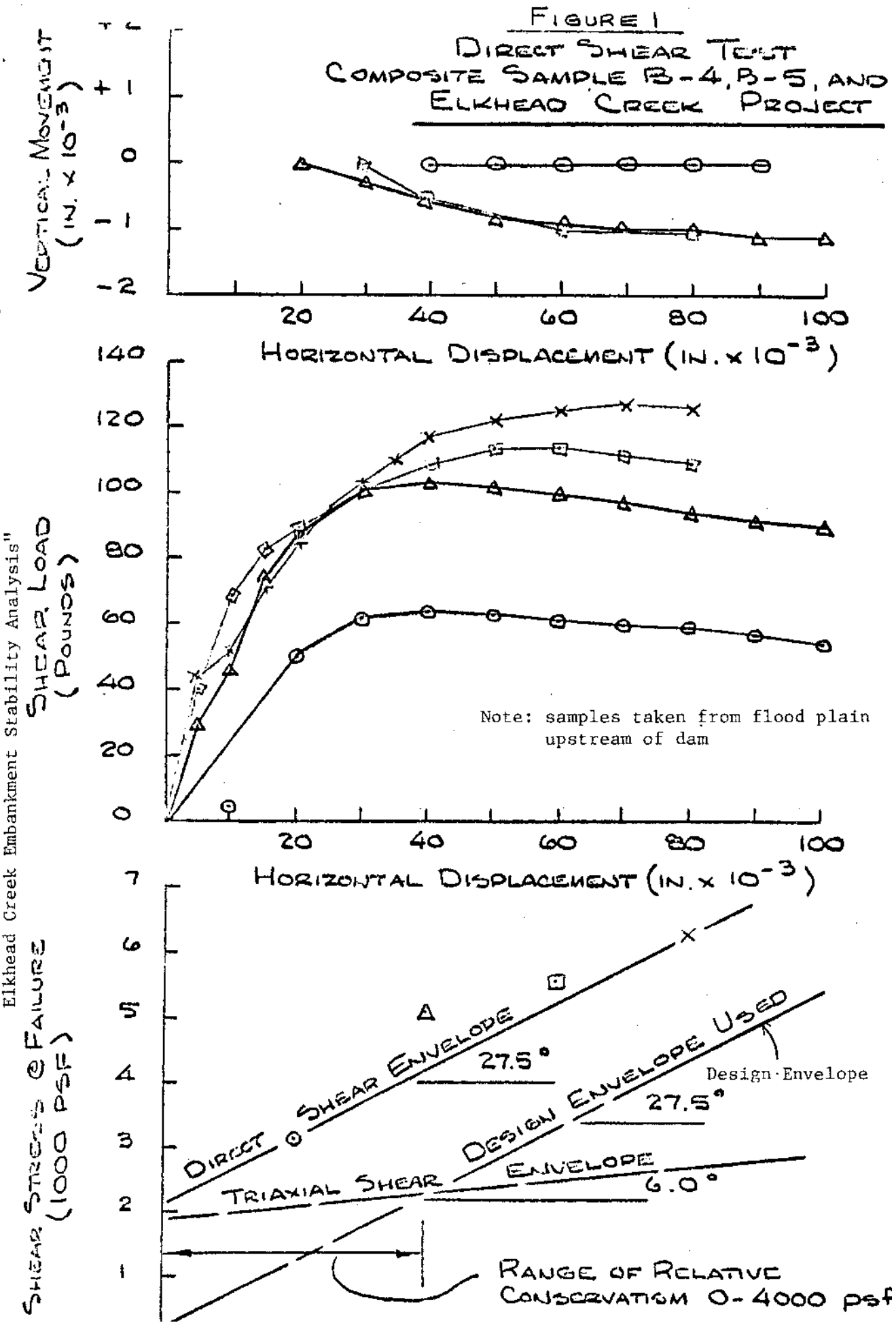
Client:

Project: ELKHEAD DAM

Location: TP-42/#2 @ 5.0-10.0'

File: ELK-42 Project No.: 23272 Page 2/2

From ECI Memorandum dated January 20, 1972, entitled "Revised Report on Elkhead Creek Embankment Stability Analysis"



From ECI Memorandum dated January 20, 1972m entitled, " Revised Report on Elkhead Creek Embankment Stability Analysis"

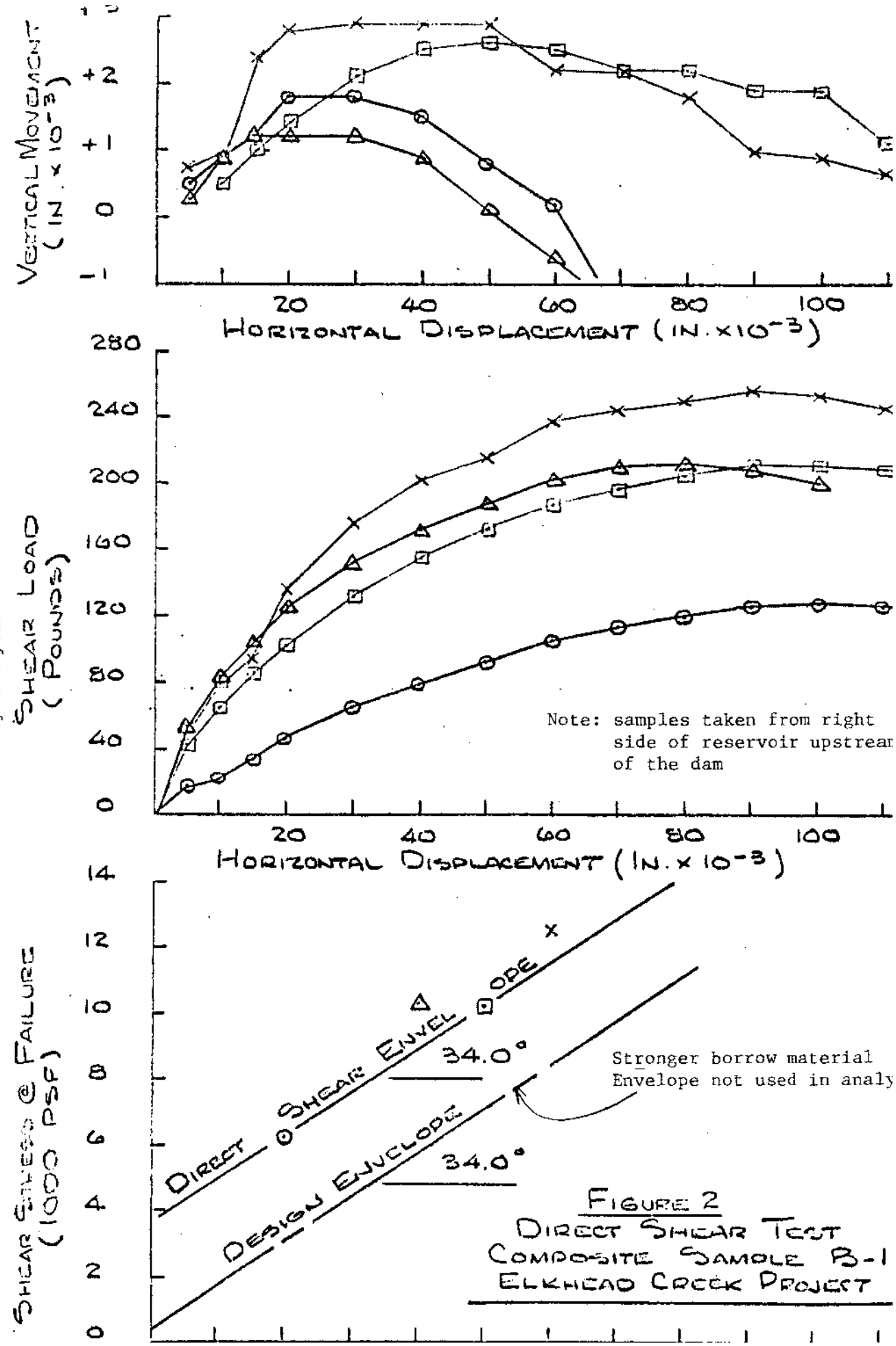
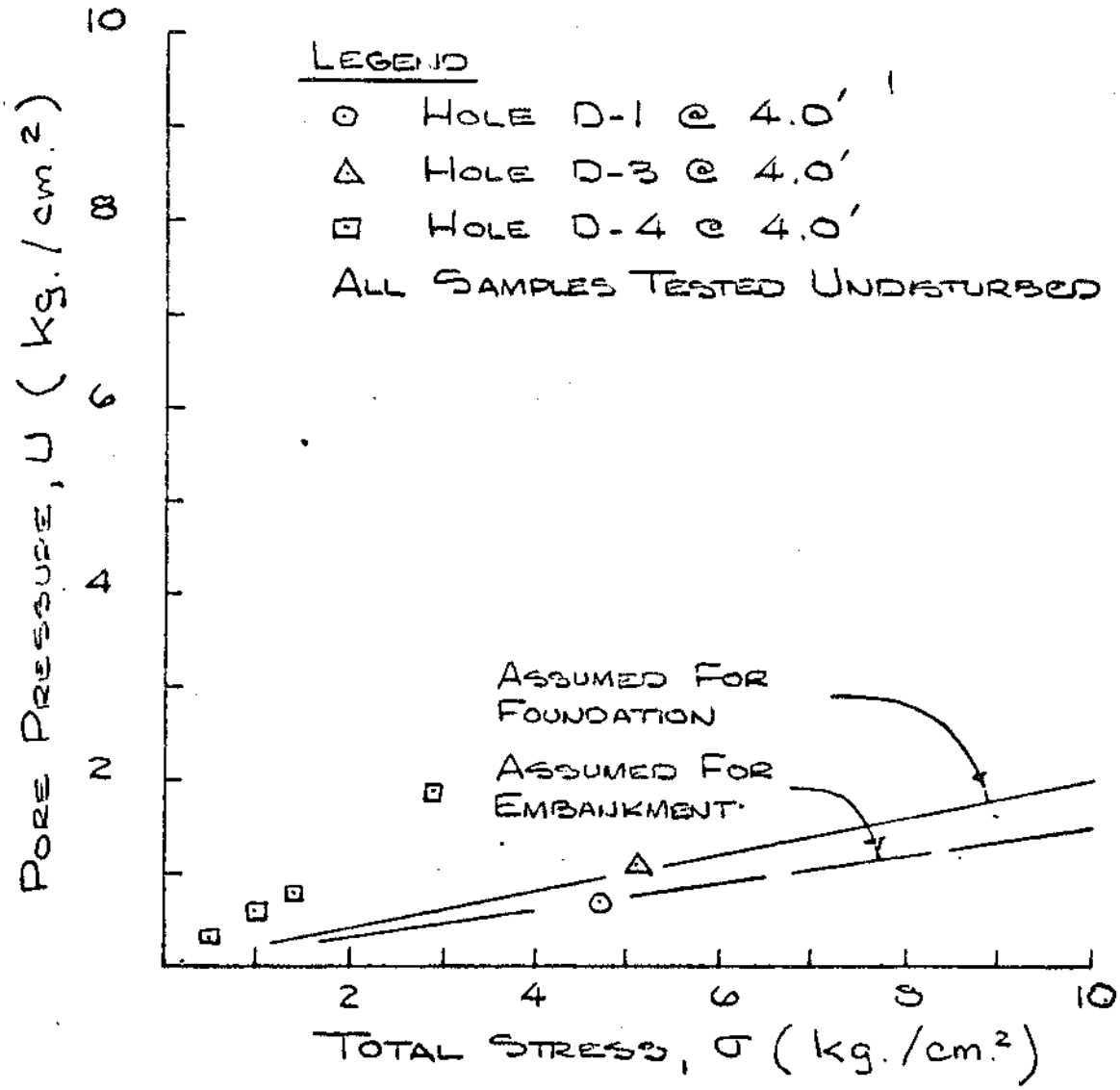


Figure 2
Direct Shear Test
Composite Sample B-1
Elkhead Creek Project

From ECI Memorandum dated January, 20, 1972, entitled, "Revised Report on Elkhead Creek Stability Analysis"



SAMPLE	DRY DENSITY	MOISTURE CONTENT	PERCENT SATURATION
D-1 @ 4.0	96.4	9.8	38
D-3 @ 4.0	90.3	20.1	71
D-4 @ 4.0	100.0	19.2	78

Note: Pore pressure ratios of 0.15 for the embankment and 0.20 for the foundation were assumed for the end of construction case

FIGURE 3