APPENDIX C

ANALYTICAL DATA FOR THE RILEY PASS SITE
Data Compiled by Pioneer Technical Services, Inc. (1999-2000)

1999 and 2000

SAMPLE SUMMARY SHEETS

TABLE C-1
RILEY PASS SITE
TOTAL METALS IN SOURCE AREA SOILS

Riley Pass USFS #3806
Total Metals in source area soils
Results per dry weight basis

Sample Identification	Description	Date	As mg/Kg	Cu mg/Kg	Pb mg/Kg	Mo mg/Kg	Se mg/Kg	Th mg/Kg	U mg/Kg	V mg/Kg	Ra 226 pCi/g	U 235 pCi/g
RP-SS-X	Composite Soil	08/99	332	93.0	68.4	135	90.0	4.7	228	99.5	2.2	0.3 U
RP-SS-X2	Composite Soil	08/00	35.8	11.8	17.5	8.0	8.5 U	6.5 U	4.5	32.7	2.2	0.5 U
RP-SS-X3	Composite Soil	08/00	9.0	6.8	13.8	1.5 U	7.7 U	5.9 U	1.0	14.8	0.8	0.4 U
RP-SS-X4	Composite Soil	08/00	42.7	8.2	16.9	11.7	8.1 U	6.2 U	7.0	21.2	3.5	0.6
	Avg. Background		105	29.9	29.2	39.1	28.6	5.8	60.1	42.1	2.2	0.5
	3x Avg. Background		315	89.8	87.5	117	85.8	17.4	180	126	6.5	1.4
RP-SS-A	Composite Soil	08/99	203	11.8	5.9 U	1,970	9.4 U	7.30	377	33.5	85.8	8.3
RP-SS-B1	Composite Soil	08/99	43.7	11.7	13.8	17.2	7.7 U	6.73	23.6 B	21.3	9.8	2.1
RP-SS-B2	Lignite	08/99	2,190	40.4	16.4	1,940	9.2 U	200	12,800	0.67 U	915	203
RP-SS-C	Composite Soil	08/99	807	60.8	62.7	477	43.3	46.0	2,930	168	314	28.8
RP-SS-D	Composite Soil	08/99	521	64.2	55.5	251	49.3	9.14	517	99.0	80.3	11.3
RP-SS-E	Composite Soil	08/99	28.6	11.4	16.8	1.3	7.8 U	5.51	16.2 U	38.5	42.6	5.8
RP-SS-F	Composite Soil	08/99	222	29.9	40.2	189	36.5	8.08	159	67.2	26.6	3.8
RP-SS-G1	Composite Soil	08/99	399	21.1	16.4	352	7.4 U	9.92	293	41.2	53.2	9.6
RP-SS-G2	Lignite	08/99	2,880	9.2	12.3	2,970	21.9	40.5	2,410	7.5	903	48.0
RP-SS-H1	Composite Soil	08/99	538	12.8	11.7	1,660	8.6 U	10.30	466	53.5	49.9	12.5
RP-SS-H2	Composite Soil	08/99	34.6	13.7	16.0	3.5	7.8 U	8.32	16.2 U	20.1	3.6	0.5 U
RP-SS-H3	Lignite	08/99	2,140	11.8	6.1 U	5,730	19.8	43.3	2,810	41.6	250	71.3
RP-SS-I1	Composite Soil	08/99	35.5	15.0	16.4	11.7	7.3 U	8.56	15.2 U	34.6	2.9	0.7 U
RP-SS-I2	Composite Soil	08/99	276	24.4	26.4	6.5	7.6 U	7.99	15.7 U	43.3	4.0	1.4
RP-SS-J1	Lignite	08/00	105	28.3	13.2	439	9.1 U	15.0	821	54.3	171	12.4
RP-SS-J2	Composite Soil	08/00	49.9	10.1	12.7	17.4	9.4 U	7.1 U	37.1	14.3	7.7	0.7
RP-SS-K1	Lignite	08/00	1,310	51.3	41.4	125	27.4	23.4	389	163	154	5.1
RP-SS-K2	Composite Soil	08/00	47.0	16.3	19.7	4.5	8.0 U	7.8	9.3	26.3	2.7	0.5 U
RP-SS-L1	Composite Soil	08/00	16.2	9.9	10.4	1.6 U	8.2 U	6.2 U	3.1	21.0	1.4	0.3 U

TABLE C-2
RILEY PASS SITE
TOTAL AND DISSOLVED METALS IN WATER

Riley Pass USFS #3806
Metals in Water

Total Metals Analysis		As ug/L	Cu ug/L	Pb ug/L	Mo ug/L	Se ug/L	Th ug/L	U ug/L	V ug/L	Ra 226 pCi/L	U 235 pCi/L	pH	TSS mg/L
RP-SW-X1	08/99	27.1	8.8	6.4	5.5 U	3.5	5.3 U	74.6 U	23.3	0.1	0.8	8.3	192
RP-SW-X2	08/00	5.1	2.0 U	1.6	8.85	0.61 U	5.3 U	10.0 U	4.4 U	1.2	0.3 U	7.0	4
3x Background		48.3	16.2	12.0	21.5	6.2	15.9	126.9	41.6	2.0	1.7		294
RP-SW-B3	08/99	27.0	4.7	1.7	16.4	2.8	5.3 U	74.6 U	3.4 U	0.1 U	1.3	8.61	36
RP-SW-I1	08/99	185	158	154	67.7	32.8	57.2	74.6 U	381	16.2	1.4	7.23	4740
RP-SW-J2	08/00	17.6	2.6	2.3	18.7	0.97	5.3 U	10.0 U	4.4 U	0.7 U	0.2 U	8.4	8
RP-SW-J3	08/00	25.8	4.3	2.8	17.8	0.61 U	5.3 U	10.0 U	8.2	0.7 U	0.2 U	8.5	22
RP-SW-SP1	08/99	825	182	167	164	6.2	56.8	74.6 U	370	7.0	2.6	7.94	1770
RP-SW-SP2	08/99	1420	442	442	335	15.4	201	194	944	10.3	2.2	7.43	18000
RP-SW-SP3	08/99	541	275	261	35.9	21.6	126	74.6 U	638	14.9	1.5	8.21	2940
RP-SW-SP4	08/99	789	434	415	30.4	34.2	207	74.6 U	799	9.6	1.8	8.52	13200
RP-SW-SP5	08/99	783	440	406	37.0	23.0	203	90.3	846	11.5	1.4	8.22	12800
RP-SW-SP6	08/99	526	275	255	28.3	25.7	123	74.6 U	575	7.4	1.2	8.02	4840
RP-SW-SP7	08/99	176	29.0	24.6	47.9	6.8	11.5	74.6 U	76.7	0.9	1.3	9.53	730
RP-SW-SD2	08/00	95.1	4.2	3.0	10.7	0.61 U	5.3 U	10.0 U	8.8	0.7 U	0.3 U	8.6	36
RP-SW-SP8	08/99	65.3	7.2	5.0	18.6	1.8	5.3 U	74.6 U	19.9	0.5	0.3	9.30	157
RP-SW-SD1	08/00	263	2.0 U	1.4	21.4	0.61 U	5.3 U	10.0 U	4.4 U	0.8	0.3 U	7.4	59
RP-SW-I1	08/99	185	158	154	67.7	32.8	57.2	74.6 U	381	16.2	1.4	7.23	4740
RP-SW-I5-DUP	08/99	213	173	163	72.2	19.2	34.3	95.5	450	17.5	1.7		
RPD		14%	9%	6%	6%	52%	50%	25%	17%	8%	19%		

Dissolved Metals Analysis									
RP-SW-X2 Diss	08/00	8.6	2.0 U	1.5	7.65	0.61 U	5.3 U	10.0 U	4.4 U
3x Diss Backgrd		25.8	6.0	4.5	23.0	1.8	15.9	30.0	13.2
RP-SW-J2 Diss	08/00	20	4.7	2.0	19.7	0.61 U	5.3 U	10.0 U	4.6
RP-SW-J3 Diss	08/00	25.5	2.4	1.6	17.9	0.86	5.3 U	10.0 U	6.0
RP-SW-SD1 Diss	08/00	217	2.0 U	1.3	20.6	0.61 U	5.3 U	10.0 U	4.4 U
RP-SW-SD2 Diss	08/00	119	2.0 U	1.3	10.1	0.61 U	5.3 U	10.0 U	4.4 U

TABLE C-3
RILEY PASS SITE
TOTAL METALS IN SEDIMENT

Riley Pass USFS #3806
Total Metals in sediment
Results per dry weight basis

Sample Identification	Description	Date	As mg/Kg	Cu mg/Kg	Pb mg/Kg	Mo mg/Kg	Se mg/Kg	Th mg/Kg	U mg/Kg	V mg/Kg	Ra 226 pCi/g	U 235 pCi/g
RP-SE-X1	Active Channel Seds	08/99	18.9	6.6	8.6	1.3	8.2 U	4.3	17.0 U	22.9	2.1	1.5
RP-SE-X2	Active Channel Seds	08/00	16.3	9.3	10.5	2.4 U	12.6 U	9.6 U	4.2	17.8	2.1	0.9 U
RP-SE-X3	Active Channel Seds	08/00	14.1	8.0	8.2	1.6 U	8.4 U	6.4 U	4.1	24.5	0.5	0.5 U
RP-SE-X4	Active Channel Seds	08/00	64.1	6.3	14.2	12.0	7.8 U	5.9 U	5.9	24.6	4.7	0.5 U
	Avg. Background		28.4	7.5	10.4	4.3	9.3	6.6	7.8	22.5	2.4	0.9
	3x Avg. Background		85.1	22.6	31.1	13.0	27.8	19.7	23.4	67.4	7.1	2.6
RP-SE-A1	Drainage Soil	08/99	34.5	10.1	8.4	12.0	6.9 U	4.9	14.3 U	23.3	3.1	0.9 U
RP-SE-A2	Drainage Soil	08/99	46.6	10.0	9.8	8.2	7.1 U	5.3	14.8 U	21.3	2.8	1.0 U
RP-SE-B1	Drainage Soil	08/99	49.6	6.9	6.0	10.7	7.9 U	3.4	16.3 U	20.1	3.9	1.1
RP-SE-B2	Active Channel Seds	08/99	23.7	6.2	8.4	1.3	8.1 U	2.7	16.8 U	16.0	1.8	0.3 U
RP-SE-B3	Active Channel Seds	08/99	32.8	21.8	18.9 U	10.0	30.2 U	9.3	62.6 U	34.6	6.4	2.7
RP-SE-B4	Active Channel Seds	08/99	44.9	28.1	28.9	30.1	16.4 U	12.0	33.9 U	41.0	7.2	1.0 U
RP-SE-C1	Drainage Soil	08/99	26.8	8.5	8.5	11.1	8.1 U	3.6	16.9 U	30.3	4.9	0.9 U
RP-SE-C2	Drainage Soil	08/99	42.0	12.0	12.7	31.3	10.6 U	4.3	98.6	25.7	31.1	4.8
RP-SE-D1	Drainage Soil	08/99	25.2	9.9	10.4	13.8	8.6 U	4.1	19.3	19.8	6.6	2.8
RP-SE-D2	Drainage Soil	08/99	125	11.9	12.5	45.9	8.0 U	4.1	96.8	35.7	22.8	5.3
RP-SE-E1	Drainage Soil	08/99	14.2	8.8	15.2	6.1	8.8 U	3.7	18.1 U	18.2	5.8	0.6 U
RP-SE-E2	Drainage Soil	08/99	31.6	5.0	6.2	10.3	7.3 U	2.2	16.0	19.2	5.3	1.7
RP-SE-F1	Drainage Soil	08/99	304	16.2	19.0	176	7.8 U	9.0	278	34.2	47.4	9.3
RP-SE-F2	Drainage Soil	08/99	43.2	8.0	6.3	15.5	7.9 U	3.3	16.3 U	17.0	13.4	1.3 U
RP-SE-G1	Drainage Soil	08/99	84.2	9.1	10.1	17.6	7.3 U	4.8	15.2 U	18.2	3.8	0.5 U
RP-SE-G2	Drainage Soil	08/99	102	9.2	10.9	34.7	7.1 U	4.5	14.7 U	17.5	5.1	1.5
RP-SE-H1	Drainage Soil	08/99	52.4	11.5	6.9	7.6	7.6 U	6.2	15.7 U	20.4	3.5	1.6
RP-SE-H2	Drainage Soil	08/99	140	8.0	8.3	180	7.2 U	5.6	14.8 U	24.8	5.9	1.6
RP-SE-H3	Drainage Soil	08/99	31.7	17.9	11.8	7.2	11.9 U	8.1	24.6 U	17.6	4.1	0.6 U
RP-SE-H4	Active Channel Seds	08/99	24.4	17.4	13.4	19.2	13.0 U	7.1	27.0 U	20.7	7.2	1.1 U
RP-SE-I1	Drainage Soil	08/99	25.4	5.2	6.9	6.7	10.0	3.8	19.5 U	17.9	3.8	1.2
RP-SE-I2	Drainage Soil	08/99	84.9	13.3	10.9	5.2	7.7 U	4.7	15.9 U	24.4	4.1	0.9 U
RP-SE-I3	Drainage Soil	08/99	22.4	13.4	10.5	2.1	7.7 U	7.0	15.9 U	17.5	2.8	0.3 U
RP-SE-I4	Drainage Soil	08/99	43.4	9.3	17.9	15.4	7.3 U	4.3	15.1 U	21.3	4.6	1.2 U
RP-SE-J1	Active Channel Seds	08/00	20.8	9.9	11.5	2.7	9.3 U	7.1 U	6.7	19.9	3.3	0.4 U
RP-SE-J2	Active Channel Seds	08/00	16.0	4.2	8.3 U	2.2 U	11.5 U	8.8 U	4.5	18.0	2.1	0.3 U
RP-SE-J3	Active Channel Seds	08/00	13.5	3.4	7.2 U	1.9 U	10.0 U	7.6 U	1.9	14.6	1.5	0.3 U
RP-SE-K1	Drainage Soil	08/00	27.3	4.3	7.6	3.0	8.3 U	7.0	3.6	52.2	2.3	0.3 U
RP-SE-K2	Drainage Soil	08/00	10.1	4.8	7.5	1.8	8.5 U	6.5 U	5.7	11.8	2.3	0.4 U
RP-SE-K3	Drainage Soil	08/00	40.7	7.3	11.1	2.1	14.1	5.9 U	3.6	17.8	1.8	0.3 U
RP-SE-L1	Drainage Soil	08/00	29.1	8.1	11.4	2.3	8.0 U	6.1 U	3.9	26.7	1.8	0.4 U
RP-SE-L2	Active Channel Seds	08/00	12.5	11.6	11.6	1.6 U	8.5 U	6.5 U	1.1	22.1	1.7	0.5
RP-SE-SP1	Active Channel Seds	08/99	28.5	8.2	6.4 U	10.3	10.3 U	3.1	21.3 U	11.6	3.4	0.5 U
RP-SE-SP2	Active Channel Seds	08/99	77.4	17.7	14.2	18.3	12.4 U	9.1	25.6 U	24.4	6.7	0.8 U
RP-SE-SP3	Active Channel Seds	08/99	32.5	17.7	10.9 U	3.2	17.5 U	8.1	36.2 U	25.9	2.1	1.5
RP-SE-SP4	Active Channel Seds	08/99	52.1	26.5	28.4	4.6 U	29.9 U	14.6	62.1 U	43.9	4.6	1.1 U
RP-SE-SP5	Active Channel Seds	08/99	27.9	14.5	12.3	3.3	10.6 U	6.6	22.0 U	19.9	3.3	0.5 U
RP-SE-SP6	Active Channel Seds	08/99	21.8	18.7	18.5	5.8	18.1 U	9.1	37.4 U	34.4	4.3	1.4 U
RP-SE-SP7	Active Channel Seds	08/99	22.6	20.4	20.7	5.0	21.6 U	10.9	44.7 U	37.0	2.9	3.7
RP-SE-SP8	Active Channel Seds	08/99	31.3	17.2	20.7	6.0	12.7 U	10.1	26.3 U	36.7	2.8	1.3 U

TABLE C-4
RILEY PASS SITE
SUPPLEMENTAL SAMPLING AGRONOMIC PROPERTIES

Sample ID	Organic Matter (%)	RECOMMENDED FERTILIZER APPLICATION RATE			Nitrate (ppm)	Weak Phosphorus (ppm)	Bicarbonate P (ppm)	Potassium (ppm)	Soil pH	Cation Exchange Capacity (meq / 100g)
		Nitrogen (lbs / ac)	Phosphate (P2O5) (lbs / ac)	Potash (K2O) (lbs / ac)						
A	8.4	NR	NR	NR	5	1	5	71	7.4	36.3
B1	1.2	NR	NR	NR	6	7	4	149	9.1	23.2
C	8.9	NR	NR	NR	4	32	41	132	7.5	22.4
D	9.4	NR	NR	NR	4	16	-----	102	6.9	16.1
E	9.9	NR	NR	NR	4	5	5	46	8.1	42.5
F	5.1	NR	NR	NR	6	14	-----	115	4.9	49.0
G	4.4	NR	NR	NR	76	34	-----	184	4.9	72.6
H1	6.5	NR	NR	NR	5	36	-----	130	4.8	25.5
H2	1.8	NR	NR	NR	3	16	-----	256	5.5	42.6
I1	1.2	NR	NR	NR	15	5	7	230	8.1	26.0
I2	4.8	NR	NR	NR	11	15	5	191	7.0	32.6
J1	6.3	40	25	30	3	7	-----	123	4.8	20.2
J2	13.0	35	23	30	15	9	-----	112	4.7	45.0
K1	2.3	45	20	-----	8	16	11	164	8.8	29.8
K2	1.5	35	25	-----	13	9	-----	183	5.9	41.6
L1	0.6	50	15	-----	3	20	12	152	7.4	28.2

NR: Analysis Not Requested

TABLE C-5
RILEY PASS SITE
SUPPLEMENTAL SAMPLING PHYSICAL PROPERTIES

Sample ID	Sample Date	Sample Description	USDA Sample Texture	Rapid Hydrometer Percent Course, Sand Silt and Clay				Field Capacity (1/3 Bar)	Wilting Point (15 Bar %)	Available Moisture (%)
				Coarse %	Sand %	Silt %	Clay %			
A	Aug-99	Bluff A	NR	NR	NR	NR	NR	40.80	27.19	13.62
B1	Aug-99	Bluff B	NR	NR	NR	NR	NR	40.36	22.22	18.13
C	Aug-99	Bluff C	NR	NR	NR	NR	NR	21.10	10.10	11.00
D	Aug-99	Bluff D	NR	NR	NR	NR	NR	20.72	10.96	9.76
E	Aug-99	Bluff E	NR	NR	NR	NR	NR	27.32	20.38	6.95
F	Aug-99	Bluff F	NR	NR	NR	NR	NR	23.16	14.16	9.00
G	Aug-99	Bluff G	NR	NR	NR	NR	NR	29.12	18.63	10.48
H1	Aug-99	Bluff H	NR	NR	NR	NR	NR	20.36	11.76	8.59
H2	Aug-99	Bluff H	NR	NR	NR	NR	NR	31.57	18.63	12.94
I1	Aug-99	Bluff I	NR	NR	NR	NR	NR	29.67	21.11	8.56
I2	Aug-99	Bluff I	NR	NR	NR	NR	NR	36.31	26.66	9.65
J1	Aug-00	Bluff J	Sandy Loam	0.0	76.3	16.3	7.5	16.96	10.70	6.26
J2	Aug-00	Bluff J	Loamy Sand	0.0	82.5	8.8	8.8	48.88	32.56	16.32
K1	Aug-00	Bluff K	Sandy Clay Loam/Clay Loam	0.0	45.0	21.9	33.1	31.01	18.12	12.90
K2	Aug-00	Bluff K	Sandy Clay Loam	0.0	48.8	21.3	30.0	30.95	18.99	11.96
L1	Aug-00	Bluff L	Sandy Clay Loam	0.0	48.8	21.3	30.0	24.84	14.84	10.00

NR: Analysis Not Requested

TABLE C-6
SUMMARY OF PHYSICAL PROPERTIES TEST RESULTS

LAB NUMBER	LOCATION	SAMPLE NUMBER	DEPTH RANGE	CLASSIFICATION SYMBOL	SMALLER THAN 0.005 mm	0.005 TO 0.075 mm	SAND NO. 200(0.075 mm) TO NO. 4(4.76 mm)	GRAVEL NO. 4(4.76 mm) TO 3 IN.(76.2 mm)	COBBLES 3 IN.(76.2 mm) TO 5 IN.(127 mm)	OVERSIZE LARGER THAN 5 IN.(127 mm)	LIQUID LIMIT - %	PLASTICITY INDEX - %	MAXIMUM DRY UNIT WEIGHT(D698)-pcf	OPTIMUM MOISTURE CONTENT - %	SPECIFIC GRAVITY(BULK)	ABSORPTION	MINUS #4 SPECIFIC GRAVITY	UNCONFINED COMPRESSION QU-ksf	CALIFORNIA BEARING RATIO	NATURAL MOISTURE - %
15662	RP-Proctor-A												86.5	25.6						
15663	RP-Proctor-B												104.9	17.4						
15664	RP-Proctor-D												95.1	20.7						
15665	RP-Proctor-F												102.4	21.7						
15666	RP-Proctor-I												90.2	26.3						
15667	RP-SE-H2				19		66	15	0											
15668	RP-SE-H4				60		40	0	0											
15669	RP-SE-I1				15		85	0	0											
15670	RP-SE-I2				67		33	0	0											
15671	RP-SE-I4				6		94	0	0											
15672	RP-SE-SP1				43		56	1	0											
15673	RP-SE-SP2				100		0	0	0											
15674	RP-SE-SP3				99		1	0	0											
15675	RP-SE-SP4				98		2	0	0											
15676	RP-SE-SP5				68		32	0	0											
15677	RP-SE-SP6				59		41	0	0											
15678	RP-SE-SP7				79		21.0	0	0											
15679	RP-SE-SP8				84		16	0	0											

1999

SOIL AND SEDIMENT SAMPLES

TOTAL METALS

PIONEER TECHNICAL SERVICES
Riley Pass USFS #3802
Metals in soils
Batch No.: C3854
Results per dry weight basis

SAMPLE ID	FIELD ID	As (mg/Kg)	Cu (mg/Kg)	Pb (mg/Kg)	Mo (mg/Kg)	Se (mg/Kg)	Th (mg/Kg)	U (mg/Kg)	V (mg/Kg)
DL	ARL 3560	7.4	0.22	4.5	1.1	7.2	1.1	14.9	0.52
S011437	RP-SE-A1	34.5	10.1	8.4 B	12.0	6.9 U	4.9	14.3 U	23.3
S011438	RP-SE-A2	46.6	10.0	9.8	8.2	7.1 U	5.3	14.8 U	21.3
S011439	RP-SE-B1	49.6	6.9	6.0 B	10.7	7.9 U	3.4	16.3 U	20.1
S011440	RP-SE-B2	23.7	6.2	8.4 B	1.3 B	8.1 U	2.7	16.8 U	16.0
S011441	RP-SE-B3	32.8 B	21.8	18.9 U	10.0	30.2 U	9.3	62.6 U	34.6 B
S011442	RP-SE-B4	44.9	28.1	28.9	30.1	16.4 U	12.0	33.9 U	41.0
S011443	RP-SE-C1	26.8	8.5	8.5 B	11.1	8.1 U	3.6	16.9 U	30.3
S011444	RP-SE-C2	42.0	12.0	12.7 B	31.3	10.6 U	4.3	98.6	25.7
S011445	RP-SE-D1	25.2	9.9	10.4 B	13.8	8.6 U	4.1	19.3 B	19.8
S011446	RP-SE-D2	125	11.9	12.5	45.9	8.0 U	4.1	96.8	35.7
S011447	RP-SE-E1	14.2 B	8.8	15.2	6.1	8.8 U	3.7	18.1 U	18.2
S011448	RP-SE-E2	31.6	5.0 B	6.2 B	10.3	7.3 U	2.2 B	16.0 B	19.2
S011449	RP-SE-X1	18.9	6.6	8.6 B	1.3 B	8.2 U	4.3	17.0 U	22.9
S011450	RP-SS-A	203	11.8	5.9 U	1970	9.4 U	7.3	377	33.5
S011451	RP-SS-C	807	60.8	62.7	477	43.3	46.0	2930	168
S011452	RP-SS-D	521	64.2	55.5	251	49.3	9.1	517	99.0
S011453	RP-SS-X	332	93.0	68.4	135	90.0	4.7	228	99.5
S011454	RP-SS-E	28.6	11.4	16.8	1.3 B	7.8 U	5.5	16.2 U	38.5

B.K.H.
Review

PIONEER TECHNICAL SERVICES
Riley Pass USFS #3802
Metals in soils
Batch No.: C3855
Results per dry weight basis

SAMPLE ID	FIELD ID	As (mg/Kg)	Cu (mg/Kg)	Pb (mg/Kg)	Mo (mg/Kg)	Se (mg/Kg)	Th (mg/Kg)	U (mg/Kg)	V (mg/Kg)
IDL	ARL 3560	7.4	0.22	4.5	1.1	7.2	1.1	14.9	0.52
S011506	RP-SE-F1	304	16.2	19.0	176	7.8 U	9.0	278	34.2
S011507	RP-SE-F2	43.2	8.0	6.3 B	15.5	7.9 U	3.3	16.3 U	17.0
S011508	RP-SE-G2	102	9.2	10.9	34.7	7.1 U	4.5	14.7 U	17.5
S011509	RP-SE-G1	84.2	9.1	10.1	17.6	7.3 U	4.8	15.2 U	18.2
S011510	RP-SE-H1	52.4	11.5	6.9 B	7.6	7.6 U	6.2	15.7 U	20.4
S011511	RP-SE-H2	140	8.0	8.3 B	180	7.2 U	5.6	14.8 U	24.8
S011512	RP-SE-H3	31.7	17.9	11.8 B	7.2	11.9 U	8.1	24.6 U	17.6
S011513	RP-SE-H4	24.4 B	17.4	13.4 B	19.2	13.0 U	7.1	27.0 U	20.7
S011514	RP-SE-I1	25.4	5.2 B	6.9 B	6.7	10.0 B	3.8	19.5 U	17.9
S011515	RP-SE-I2	84.9	13.3	10.9	5.2	7.7 U	4.7	15.9 U	24.4
S011516	RP-SE-I3	22.4	13.4	10.5	2.1 B	7.7 U	7.0	15.9 U	17.5
S011517	RP-SE-I4	43.4	9.3	17.9	15.4	7.3 U	4.3	15.1 U	21.3
S011518	RP-SE-SP1	28.5	8.2	6.4 U	10.3	10.3 U	3.1	21.3 U	11.6 B
S011519	RP-SE-SP2	77.4	17.7	14.2 B	18.3	12.4 U	9.1	25.6 U	24.4
S011520	RP-SE-SP3	32.5 B	17.7	10.9 U	3.2 B	17.5 U	8.1	36.2 U	25.9

B.K.H.
Review

'IONEER TECHNICAL SERVICES
Riley Pass USFS #3802
Metals in soils
Batch No.: C3856
Results per dry weight basis

SAMPLE ID	FIELD ID	As (mg/Kg)	Cu (mg/Kg)	Pb (mg/Kg)	Mo (mg/Kg)	Se (mg/Kg)	Th (mg/Kg)	U (mg/Kg)	V (mg/Kg)
DL	ARL 3560	7.4	0.22	4.5	1.1	7.2	1.1	14.9	0.52
3011521	RP-SE-SP4	52.1 B	26.5	28.4 B	4.6 U	29.9 U	14.6	62.1 U	43.9
3011522	RP-SE-SP5	27.9	14.5	12.3 B	3.3	10.6 U	6.6	22.0 U	19.9
3011523	RP-SE-SP6	21.8 B	18.7	18.5 B	5.8	18.1 U	9.1	37.4 U	34.4
3011524	RP-SE-SP7	22.6 B	20.4	20.7 B	5.0 B	21.6 U	10.9	44.7 U	37.0
3011525	RP-SE-SP8	31.3	17.2	20.7	6.0	12.7 U	10.1	26.3 U	36.7
3011526	RP-SS-B1	43.7	11.7	13.8	17.2	7.7 U	6.7	23.6 B	21.3
3011527	RP-SS-B2	2190	40.4	16.4	1940	9.2 U	200	12800	0.67 U
3011528	RP-SS-F	222	29.9	40.2	189	36.5	8.1	159	67.2
3011529	RP-SS-G1	399	21.1	16.4	352	7.4 U	9.9	293	41.2
3011530	RP-SS-G2	2880	9.2	12.3	2970	21.9	40.5	2410	7.5 B
3011531	RP-SS-H1	538	12.8	11.7	1660	8.6 U	10.3	466	53.5
3011532	RP-SS-H2	34.6	13.7	16.0	3.5	7.8 U	8.3	16.2 U	20.1
3011533	RP-SS-H3	2140	11.8	6.1 U	5730	19.8	43.3	2810	41.6
3011534	RP-SS-I1	35.5	15.0	16.4	11.7	7.3 U	8.6	15.2 U	34.6
3011535	RP-SS-I2	276	24.4	26.4	6.5	7.6 U	8.0	15.7 U	43.3

B.K.H.
Review

PIONEER ... CHNICAL SERVICES
QA/QC Summary
Metals in Soils
Batch No.: C3854
Values in mg/Kg

SAMPLE ID	FIELD ID	As (mg/Kg)	Cu (mg/Kg)	Pb (mg/Kg)	Mo (mg/Kg)	Se (mg/Kg)	Th (mg/Kg)	U (mg/Kg)	V (mg/Kg)
IDL	ARL 3560	7.4	0.22	4.5	1.1	7.2	1.1	14.9	0.52
PBS		7.4 U	0.22 U	4.5 U	1.1 U	7.2 U	1.1 U	14.9 U	0.52 U
LCSS		58.10	114.25	75.96	75.50	40.19	179.62	167.71	47.84
% RECOVERY		96.5	105.8	101.1	100.3	78.0	94.3	88.0	91.1
S011437	RP-SE-A1	34.51	10.09	8.35 B	12.01	6.89 U	4.89	14.28 U	23.33
S011437D	RP-SE-A1D	32.44	9.26	10.51	11.05	7.29 U	5.58	15.10 U	20.18
RPD		6.2	8.5	22.9	8.3	<IDL	13.2	<IDL	14.5
S011437S	RP-SE-A1S	402.58	59.50	103.18	12.79	350.62	188.66	172.47	118.50
S011437	RP-SE-A1	34.51	10.09	8.35 B	12.01	6.89 U	4.89	14.28 U	23.33
SPIKE ADDED		404.86	50.61	101.21		404.86	202.43	202.43	101.21
% RECOVERY		90.9	97.6	93.7	N/A	86.6	90.8	85.2	94.0

B.K.H.
Review

PIONEER TECHNICAL SERVICES
QA/QC Summary
Metals in Soils
Batch No.: C3855
Values in mg/Kg

SAMPLE ID	FIELD ID	As (mg/Kg)	Cu (mg/Kg)	Pb (mg/Kg)	Mo (mg/Kg)	Se (mg/Kg)	Th (mg/Kg)	U (mg/Kg)	V (mg/Kg)
IDL	ARL 3560	7.4	0.22	4.5	1.1	7.2	1.1	14.9	0.52
PBS		7.4 U	0.22 U	4.5 U	1.1 U	7.2 U	1.1 U	14.9 U	0.52 U
LCSS		57.80	107.22	71.91	73.75	42.77	167.24	180.06	50.98
% RECOVERY		96.0	99.3	95.8	97.9	83.1	87.8	94.5	97.1
S011506	RP-SE-F1	304.43	16.16	18.96	175.63	7.80 U	9.01	278.02	34.22
S011506D	RP-SE-F1D	352.50	17.80	16.19	191.60	7.80 U	8.90	360.15	35.91
RPD		14.6	9.7	15.7	8.7	<IDL	1.3	25.7	4.8
S011506S	RP-SE-F1S	625.73	67.14	114.29	147.11	366.79	232.62	506.31	133.02
S011506	RP-SE-F1	304.43	16.16	18.96	175.63	7.80 U	9.01	278.02	34.22
SPIKE ADDED		433.39	54.17	108.35		433.39	216.70	216.70	108.35
% RECOVERY		74.1	94.1	88.0	N/A	84.6	103.2	105.4	91.2

B.K.H.
Review

PIONEER TECHNICAL SERVICES
QA/QC Summary
Metals in Soils
Batch No.: C3856
Values in mg/Kg

SAMPLE ID	FIELD ID	As (mg/Kg)	Cu (mg/Kg)	Pb (mg/Kg)	Mo (mg/Kg)	Se (mg/Kg)	Th (mg/Kg)	U (mg/Kg)	V (mg/Kg)
IDL	ARL 3560	7.4	0.22	4.5	1.1	7.2	1.1	14.9	0.52
PBS		7.4 U	0.22 U	4.5 U	1.1 U	7.2 U	1.1 U	14.9 U	0.52 U
LCSS		62.76	114.39	79.82	78.39	41.61	173.14	173.98	50.25
% RECOVERY		104.3	105.9	106.3	104.1	80.8	90.9	91.3	95.7
S011528	RP-SS-F	222.32	29.94	40.20	189.07	36.48	8.08	158.90	67.16
S011528D	RP-SS-FD	165.66	29.22	28.98	102.84	24.81	8.03	128.70	50.64
RPD		29.2	2.4	32.4	59.1	38.1	0.7	21.0	28.0
S011528S	RP-SS-FS	540.74	84.15	128.45	123.94	360.04	214.09	373.08	157.85
S011528	RP-SS-F	222.32	29.94	40.20	189.07	36.48	8.08	158.90	67.16
SPIKE ADDED		437.37	54.67	109.34		437.37	218.69	218.69	109.34
% RECOVERY		72.8	99.2	80.7	N/A	74.0	94.2	97.9	82.9

B.K.H.
Review

2000

SOIL AND SEDIMENT SAMPLES

TOTAL METALS

PIONEER [illegible]HNICAL SERVICES
RILEY PASS
Metals in soils
Batch No.: C4287
Results per dry weight basis

SAMPLE ID	FIELD ID	As (mg/Kg)	Cu (mg/Kg)	Pb (mg/Kg)	Mo (mg/kg)	Se (mg/kg)	Th (mg/kg)	U (mg/kg)	V (mg/kg)
IDL	ARL 3560	7.0	0.40	5.5	1.5	7.7	5.8	0.80	0.88
000807Q006	RP-SS-K1	1310	51.3	41.4	125	27.4	23.4	389	163
000807Q007	RP-SS-K2	47.0	16.3	19.7	4.5	8.0 U	7.8	9.3	26.3
000807Q008	RP-SE-K3	40.7	7.3	11.1 B	2.1 B	14.1 B	5.9 U	3.6	17.8
000807Q009	RP-SE-J1	20.8	9.9	11.5 B	2.7 B	9.3 U	7.1 U	6.7	19.9
000807Q010	RP-SE-J2	16.0 B	4.2 B	8.3 U	2.2 U	11.5 U	8.8 U	4.5	18.0
000807Q011	RP-SS-J2	49.9	10.1	12.7 B	17.4	9.4 U	7.1 U	37.1	14.3
000807Q012	RP-SS-J1	105	28.3	13.2	439	9.1 U	15.0	821	54.3
000807Q013	RP-SE-J3	13.5 B	3.4 B	7.2 U	1.9 U	10.0 U	7.6 U	1.9 B	14.6
000807Q014	RP-SE-X3	14.1 B	8.0	8.2 B	1.6 U	8.4 U	6.4 U	4.1	24.5
000807Q015	RP-SE-L2	12.5 B	11.6	11.6 B	1.6 U	8.5 U	6.5 U	1.1 B	22.1
000807Q016	RP-SS-X3	9.0 B	6.8	13.8	1.5 U	7.7 U	5.9 U	1.0 B	14.8
000807Q017	RP-SS-L1	16.2	9.9	10.4 B	1.6 U	8.2 U	6.2 U	3.1	21.0
000807Q018	RP-SSE-L1	29.1	8.1	11.4 B	2.3 B	8.0 U	6.1 U	3.9	26.7
000807Q019	RP-SS-X2	35.8	11.8	17.5	8.0	8.5 U	6.5 U	4.5	32.7
000807Q020	RP-SE-X2	16.3 B	9.3	10.5 B	2.4 U	12.6 U	9.6 U	4.2	17.8
000807Q021	RP-SS-X4	42.7	8.2	16.9	11.7	8.1 U	6.2 U	7.0	21.2
000807Q022	RP-SE-X4	64.1	6.3	14.2	12.0	7.8 U	5.9 U	5.9	24.6
000807Q023	RP-SE-K1	27.3	4.3 B	7.6 B	3.0 B	8.3 U	7.0	3.6	52.2
000807Q024	RP-SE-K2	10.1 B	4.8 B	7.5 B	1.8 B	8.5 U	6.5 U	5.7	11.8

Review

PIONEER TECHNICAL SERVICES
QA/QC Summary
Metals in Soils
Batch No.: C4287
Values in mg/Kg

SAMPLE ID	FIELD ID	As (mg/Kg)	Cu (mg/Kg)	Pb (mg/Kg)	Mo (mg/kg)	Se (mg/Kg)	Th (mg/Kg)	U (mg/Kg)	V (mg/Kg)
IDL	ARL 3560	7.0	0.40	5.5	1.5	7.7	5.8	0.80	0.88
PB		7.0 U	0.40 U	5.5 U	1.5 U	7.7 U	5.8 U	1.6 B	0.88 U
LCS		68.18	125.68	90.63	84.66	49.32	234.46	178.85	59.95
% RECOVERY		113.3	116.4	120.7	112.4	95.8	121.9	93.0	114.2
000807Q006	RP-SS-K1	1309.91	51.30	41.38	124.76	27.42	23.36	389.01	163.18
000807Q006D	RP-SS-K1D	1211.46	87.05	47.18	149.77	35.29	20.51	187.82	428.82
RPD		7.8	51.7	13.1	18.2	25.1	13.0	69.8	89.7
000807Q006S	RP-SS-K1S	2026.88	127.88	190.09	414.72	560.84	361.21	546.30	311.94
000807Q006	RP-SS-K1	1309.91	51.30	41.38	124.76	27.42	23.36	389.01	163.18
SPIKE ADDED		617.46	77.18	154.37	308.73	617.46	308.73	308.73	154.37
% RECOVERY		116.1	99.2	96.3	93.9	86.4	109.4	50.9	96.4

Review

HKM Laboratory Services

1999

SURFACE WATER SAMPLES

TOTAL METALS, pH, AND TSS

IONEER TECHNICAL SERVICES
iley Pass USFS #3802
otal Metals
ISE Batch No.: C3851/C3852
esults in ug/L

AMPLE D	FIELD ID	As	Cu	Pb	Mo	Se	Th	U	V
DL		0.77	1.1	0.69	5.5	0.68	5.3	74.6	2.6
V035244	RP-SW-SP1	825	182	167	164	6.2	56.8	74.6 U	370
V035245	RP-SW-SP2	1420	442	442	335	15.4	201	194	944
V035246	RP-SW-SP3	541	275	261	35.9	21.6	126	74.6 U	638
V035247	RP-SW-SP4	789	434	415	30.4	34.2	207	74.6 U	799
V035248	RP-SW-SP5	783	440	406	37.0	23.0	203	90.3 B	846
V035249	RP-SW-SP6	526	275	255	28.3	25.7	123	74.6 U	575
V035250	RP-SW-SP7	176	29.0	24.6	47.9	6.8	11.5	74.6 U	76.7
V035251	RP-SW-SP8	65.3	7.2 B	5.0	18.6	1.8 B	5.3 U	74.6 U	19.9 B
V035252	RP-SW-X1	27.1	8.8 B	6.4	5.5 U	3.5 B	5.3 U	74.6 U	23.3 B
V035253	RP-SW-I1	185	158	154	67.7	32.8	57.2	74.6 U	381
V035254	RP-SW-I5	213	173	163	72.2	19.2	34.3	95.5 B	450

B.K.H.
Review

PIONEER TECHNICAL SERVICES
Riley Pass USFS #3802
Total Metals
MSE Batch No.: C3849/C3850
Results in ug/L

SAMPLE ID	FIELD ID	As	Cu	Pb	Mo	Se	Th	U	V
DL		1.7	2.2	0.88	6.7	1.2	5.3	74.6	3.4
W035156	RP-SW-B3	27.0	4.7 B	1.7 B	16.4	2.8 B	5.3 U	74.6 U	3.4 U

B.K.H.
Review

CLIENT: PIONEER TECH.-RILEY PASS Report Date: 8/30/99 Page 1
DATE RECEIVED: 8/16/99
BIF: 005951

pH

Field ID	Sampled Date\Time	Results	Units	MSE Lab No.
RP-SW-SP1	08/12/99 10:25:0	7.94	SU	(W035244)
RP-SW-SP2	08/12/99 11:00:0	7.43	SU	(W035245)
RP-SW-SP3	08/12/99 16:30:0	8.21	SU	(W035246)
RP-SW-SP4	08/12/99 16:00:0	8.52	SU	(W035247)
RP-SW-SP5	08/12/99 14:44:0	8.22	SU	(W035248)
RP-SW-SP6	08/12/99 14:00:0	8.02	SU	(W035249)
RP-SW-SP7	08/12/99 13:15:0	9.53	SU	(W035250)
RP-SW-SP8	08/12/99 12:25:0	9.30	SU	(W035251)
RP-SW-X1	08/12/99 18:00:0	8.30	SU	(W035252)
RP-SW-I1	08/12/99 11:00:0	7.23	SU	(W035253)

B.K.H.

ds Suspended (TSS)

Field ID	Sampled Date\Time	Results	Units	MSE Lab No.
RP-SW-SP1	08/12/99 10:25:0	1760	mg/L	(W035244)
RP-SW-SP2	08/12/99 11:00:0	18000	mg/L	(W035245)
RP-SW-SP3	08/12/99 16:30:0	2940	mg/L	(W035246)
RP-SW-SP4	08/12/99 16:00:0	13200	mg/L	(W035247)
RP-SW-SP5	08/12/99 14:44:0	12800	mg/L	(W035248)
RP-SW-SP6	08/12/99 14:00:0	4840	mg/L	(W035249)
RP-SW-SP7	08/12/99 13:15:0	730	mg/L	(W035250)
RP-SW-SP8	08/12/99 12:25:0	157	mg/L	(W035251)
RP-SW-X1	08/12/99 18:00:0	192	mg/L	(W035252)
RP-SW-I1	08/12/99 11:00:0	4740	mg/L	(W035253)

B.K.H.
Review

CLIENT: PIONEER TECH.-RILEY PASS Report Date: 9/14/99 Page 1
FIELD ID: RP-SW-B3
LAB ID: W035156
DATE/TIME SAMPLED: 08/10/99 19:25:0
[E RECEIVED: 8/13/99
Bir: 005938

GENERAL

pH	8.61	SU
Solids Suspended (TSS)	36	mg/L

B.K.H.
Review

PIONEER TECHNICAL SERVICES
QA/QC SUMMARY
MSE Batch No.: C3849/C3850
Results in ug/L

SAMPLE ID	FIELD ID	As	Cu	Pb	Mo	Se	Th	U	V
IDL		1.7	2.2	0.88	6.7	1.2	5.3	74.6	3.4
PBW		1.7 U	2.4 B	0.88 U	6.7 U	1.2 U	5.3 U	74.6 U	3.4 U
LCSW		438.00	395.93	386.40	373.80	357.60	1027.00	962.80	379.20
% RECOVERY		109.5	99.0	96.6	93.5	89.4	102.7	96.3	94.8
W035156	RP-SW-B3	26.98	4.70 B	1.67 B	16.40	2.82 B	5.31 U	74.60 U	3.40 U
W035156D	RP-SW-B3D	26.54	3.73 B	1.97 B	16.73	1.23 U	5.31 U	74.60 U	3.40 U
RPD		1.6	22.9	16.5	2.0	<IDL	<IDL	<IDL	<IDL
W035156	RP-SW-B3	26.98	4.70 B	1.67 B	16.40	2.82 B	5.31 U	74.60 U	3.40 U
W035156S	RP-SW-B3S	64.30	254.80	20.88	928.70	10.11	1033.00	937.50	481.50
% RECOVERY		93.3	100.0	96.1	91.2	72.9	103.3	93.8	95.6

B.K.H.
Review

PIONEER TECHNICAL SERVICES
QA/QC SUMMARY
MSE Batch No.: C3851/C3852
Results in ug/L

SAMPLE ID	FIELD ID	As	Cu	Pb	Mo	Se	Th	U	V
IDL		0.77	1.1	0.69	5.5	0.68	5.3	74.6	2.6
PBW		0.77 U	1.1 U	0.69 U	5.5 U	1.7 B	5.3 U	74.6 U	2.6 U
LCSW		417.00	397.47	420.20	398.40	439.00	1011.50	884.00	398.57
% RECOVERY		104.3	99.4	105.1	99.6	109.8	101.2	88.4	99.6
W035252	RP-SW-X1	27.09	8.80 B	6.42	5.50 U	3.53 B	5.31 U	74.60 U	23.27 B
W035252D	RP-SW-X1D	22.69	10.30 B	6.52	8.17 B	4.32 B	5.31 U	74.60 U	21.33 B
RPD		17.7	15.7	1.5	<IDL	20.1	<IDL	<IDL	8.7
W035252	RP-SW-X1	27.09	8.80 B	6.42	5.50 U	3.53 B	5.31 U	74.60 U	23.27 B
W035252S	RP-SW-X1S	63.76	245.73	24.20	928.43	12.23	956.00	790.00	499.73
% RECOVERY		91.7	94.8	88.9	92.3	87.0	95.6	79.0	95.3

B.K.H.
Review

REPORT DATE: September 17, 1999

QA/QC SUMMARY

pH (results as SU)

W035566	6.50	
R-W035566	6.52	0.3% (RPD)
LCS-Q4123 (9.08 SU)	9.16	101% (KSA)

Total Suspended Solids (results in mg/L)

ICV-Q4137 (78.0 mg/L)	81.0	104% (KSA)
CCV-Q4138 (75.4 mg/L)	68.0	90% (KSA)
W035156	36.0	
R-W035156	33.0	9% (RPD)
CCV-Q4138 (75.4 mg/L)	69.0	92% (KSA)

RPD = relative percent difference
KSA = known sample agreement
SSR = spiked sample recovery

B.K.H.
Anion Review

REPORT DATE: August 30, 1999

QA/QC SUMMARY

pH (results in SU)

ICV-Q4123 (9.08 SU)	9.06	100% (KSA)
CCV-Q4102 (8.70 SU)	8.58	99% (KSA)
CCV-Q4102 (8.70 SU)	8.68	100% (KSA)
W035253	7.23	
R-W035253	7.34	5% (RPD)
CCV-Q4102 (8.70 SU)	8.70	100% (KSA)

Total Suspended Solids (results in mg/L)

ICV-Q4137 (78 mg/L)	84.0	108% (KSA)
CCV-Q4138 (75.4 mg/L)	70.0	93% (KSA)
W035252	192	
R-W035252	168	13% (RPD)
CCV-Q4138 (75.4 mg/L)	72.0	95% (KSA)
W035253	4740	
R-W035253	3920	19% (RPD)
CCV-Q4138 (75.4 mg/L)	68.0	90% (KSA)

RPD = relative percent difference
KSA = known sample agreement
SSR = spiked sample recovery

B.K.H.
Anion Review

2000

SURFACE WATER SAMPLES

TOTAL AND DISSOLVED METALS, pH, AND TSS

PIONEER TECHNICAL SERVICES
QA/QC SUMMARY
HKM Batch No.: C4283/C4284
Results in ug/L

SAMPLE ID	FIELD ID	As	Cu	Pb	Mo	Se	Th	U	V
IDL		2.0	2.0	0.90	7.4	0.61	5.3	10.0	4.4
PB		2.0 U	2 U	0.90 U	7.4 U	0.61 U	5.3 U	10.0	4.4 U
LCS		443.60	402.25	390.00	400.85	454.60	1132.00	884.40	393.10
% RECOVERY		110.9	100.6	97.5	100.2	113.7	113.2	88.4	98.3
000807Q001	RP-SW-J2	19.97	4.65 B	2.00 B	19.65	0.61 U	5.30 U	10.00 U	4.60 B
000807Q001D	RP-SW-J2D	19.49	2.70 B	1.71 B	16.15	0.61 U	5.30 U	10.00 U	5.00 B
RPD		2.4	53.1	15.6	19.6	<IDL	<IDL	<IDL	8.3
000807Q001	RP-SW-J2	19.97	4.65 B	2.00 B	19.65	0.61 U	5.3 U	10.00 U	4.60 B
000807Q001S	RP-SW-J2S	66.52	247.75	20.78	16.15	9.25	1073.6	806.80	493.35
% RECOVERY		116.4	97.2	93.9	N/A	92.5	107.4	80.7	97.8

Review

PIONEER ..HNICAL SERVICES
Riley Pass
Total Metals
HKM Batch No.: C4280/C4281
BIF: 007503
Results in ug/L

SAMPLE ID	FIELD ID	As	Cu	Pb	Mo	Se	Th	U	V
IDL		2.0	2.0	0.90	7.4	0.61	5.3	10.0	4.4
000807Q001	RP-SW-J2	17.6	2.6 B	2.3 B	18.7	0.97 B	5.3 U	10.0 U	4.4 U
000807Q002	RP-SW-J3	25.8	4.3 B	2.8 B	17.8	0.61 U	5.3 U	10.0 U	8.2 B
000807Q003	RP-SW-X2	5.1 B	2.0 U	1.6 B	8.85 B	0.61 U	5.3 U	10.0 U	4.4 U
000807Q004	RP-SW-SD1	263	2.0 U	1.4 B	21.4	0.61 U	5.3 U	10.0 U	4.4 U
000807Q005	RP-SW-SD2	95.1	4.2 B	3.0 B	10.7 B	0.61 U	5.3 U	10.0 U	8.8 B

Review

PIONEER TECHNICAL SERVICES
Riley Pass
Dissolved Metals
HKM Batch No.: C4283/C4284
BIF: 007503
Results in ug/L

SAMPLE ID	FIELD ID	As	Cu	Pb	Mo	Se	Th	U	V
IDL		2.0	2.0	0.90	7.4	0.61	5.3	10.0	4.4
000807Q001	RP-SW-J2	20.0	4.7 B	2.0 B	19.7	0.61 U	5.3 U	10.0 U	4.6 B
000807Q002	RP-SW-J3	25.5	2.4 B	1.6 B	17.9	0.86 B	5.3 U	10.0 U	6.0 B
000807Q003	RP-SW-X2	8.6 B	2.0 U	1.5 B	7.65 B	0.61 U	5.3 U	10.0 U	4.4 U
000807Q004	RP-SW-SD1	217	2.0 U	1.3 B	20.6	0.61 U	5.3 U	10.0 U	4.4 U
000807Q005	RP-SW-SD2	119	2.0 U	1.3 B	10.1 B	0.61 U	5.3 U	10.0 U	4.4 U

Review

Client: PIONEER TECH-RILEY PASS

Report Date: 09/19/2000

Sample ID	Field ID	Collected	pH (SU)	TSS (mg\L)
000807Q001	RP-SW-J2	08/02/2000	8.4	8.0
000807Q002	RP-SW-J3	08/02/2000	8.5	22.0
000807Q003	RP-SW-X2	08/03/2000	7.0	< 4
000807Q004	RP-SW-SD1	08/03/2000	7.4	59.0
000807Q005	RP-SW-SD2	08/03/2000	8.6	36.0

Review

PIONEER TECHNICAL SERVICES
QA/QC SUMMARY
HKM Batch No.: C4280/C4281
Results in ug/L

SAMPLE ID	FIELD ID	As	Cu	Pb	Mo	Se	Th	U	V
IDL		2.0	2.0	0.90	7.4	0.61	5.3	10.0	4.4
PB		2.0 U	2 U	0.90 U	7.4 U	0.61 U	5.3 U	10.0 U	4.4 U
LCS		405.00	404.40	403.00	401.85	414.20	1103.6	926.00	397.85
% RECOVERY		101.3	101.1	100.8	100.5	103.6	110.4	92.6	99.5
000807Q001	RP-SW-J2	17.62	2.55 B	2.34 B	18.65	0.97 B	5.30 U	10.00 U	4.40 U
000807Q001D	RP-SW-J2D	16.99	2.80 B	2.27 B	24.60	0.61 U	5.30 U	10.00 U	6.05 B
RPD		3.6	9.3	3.0	27.5	<IDL	<IDL	<IDL	<IDL
000807Q001	RP-SW-J2	17.62	2.55 B	2.34 B	18.65	0.97 B	5.30 U	10.00 U	4.40 U
000807Q001S	RP-SW-J2S	62.56	248.50	22.84	24.60	8.03	982.40	739.60	504.20
% RECOVERY		112.4	98.4	102.5	N/A	70.6	98.2	74.0	100.8

Review

REPORT DATE: September 20, 2000

QA/QC SUMMARY

pH (results as SU)

ICV-Q4211 (9.23 SU)	8.94	97% (KSA)
CCV-Q4230 (9.07 SU)	8.77	97% (KSA)
000807Q005	8.59	
R-000807Q005	8.59	0% (RPD)
CCV-Q4230 (9.07 SU)	8.81	97% (KSA)

Total Suspended Solids (results in mg/L)

ICV-Q4253 (159.1 mg/L)	145	91% (KSA)
CCV-Q4252 (82 mg/L)	74.0	90% (KSA)
000807Q005	38.0	
R-000807Q005	37.0	3% (RPD)
CCV-Q4252 (82 mg/L)	75.0	91% (KSA)

RPD = relative percent difference
KSA = known sample agreement
SSR = spiked sample recovery

Anion Review

1999

SOIL SAMPLES

AGRONOMICS

Midwest Laboratories, Inc.
13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121

REPORT NUMBER: 99-232-0083 **Date: 8/24/99** M1

SUBJECT: Report of Analysis

MSE/HKM LABORATORIES SERVICES #2760
ATTN: BETTY O'DONNELL
P.O. BOX 3588 106 S. PARKMONT
BUTTE MT 59702-3588

Laboratory Number	Sample ID	Field Capacity 1/3 Bar %	Wilting Point 15 Bar %	Available Moisture %
83653	RR-SSA	40.80	27.19	13.62
83654	RR-SS-C	21.10	10.10	11.00
83655	RR-SS-D	20.72	10.96	9.76
83656	RR-SS-E	27.32	20.38	6.95
83657	RR-SS-F	23.16	14.16	9.00

Respectfully submitted,

John P. Menghini, CPAg
Agronomic Service Representative

The above analytical results apply only to the sample(s) submitted.

REPORT NUMBER

9-232-0083

REPORT DATE

08/20/99

ACCOUNT NO.

2760

GROWER

PO# 16-9439
RILEY PASS-USFS

TO:

MSE/HKM LABORATORIES SERVICES
ATTN: BETTY O'DONNELL
P.O. BOX 3588 106 S. PARKMONT
BUTTE MT 59702-3588

COPY TO:

90001

Midwest Laboratories, Inc.
13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121

SOIL ANALYSIS REPORT

(SEE EXPLANATION ON BACK)

LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER WALKLEY BLACK PERCENT RATE	PHOSPHORUS P_1 (WEAK BRAY) ppm	PHOSPHORUS RATE	PHOSPHORUS P_2 (STRONG BRAY) ppm	PHOSPHORUS RATE	BICARBONATE P ppm	BICARBONATE P RATE	NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE) POTASSIUM K ppm	POTASSIUM RATE	MAGNESIUM Mg ppm	MAGNESIUM RATE	CALCIUM Ca ppm	CALCIUM RATE	SODIUM Na ppm	SODIUM RATE	pH SOIL pH 1:1	BUFFER INDEX	CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTED) % K	% Mg	% Ca	% H	% Na
83653	RR-SSA	8.4VH	1VL		3VL		5VL		71VL		1321VH		1981VL		3508VH		7.4		36.3	0.5	30.3	27.3	0.04	2
83654	RR-SS-C	8.9VH	32VH		52H		41VH		132L		610VH		2481M		1059VH		7.5		22.4	1.5	22.7	35.3	0.02	0
83655	RR-SS-D	9.4VH	16M		25M				102L		640VH		1729M		425VH		6.9		16.1	1.6	33.2	50.7	0.01	1
83656	RR-SS-E	9.9VH	5VL		7VL		5VL		46VL		1533VH		2016VL		4499VH		8.1		42.5	0.3	30.0	23.7	0.04	6
83657	RR-SS-F	5.1VH	14L		24M				115VL		570H		1876VL		2995VH		4.9	6.1	49.0	0.6	9.7	19.1	44	26

DTPA EXTRACTION

NITRATE - N (FIA) 0- 6 IN ppm	NITRATE - N (FIA) 0- 6 IN lbs/A	IN ppm	IN lbs/A	IN ppm	IN lbs/A	Total lbs/A	SULFUR S ICAP ppm	SULFUR RATE	ZINC Zn ppm	ZINC RATE	MANGANESE Mn ppm	MANGANESE RATE	IRON Fe ppm	IRON RATE	COPPER Cu ppm	COPPER RATE	BORON B WATER SOLUBLE ppm	BORON RATE	EXCESS LIME RATE	SOLUBLE SALTS 1:1 mmhos/cm	SOLUBLE SALTS RATE
5	9					9													L	1.6M	
4	7					7													L	0.4L	
4	7					7													L	0.1L	
4	7					7													L	0.8L	
6	11					11													L	2.9H	

COMMENTS:

This report applies only to the sample(s) tested. Samples are retained a maximum of thirty days after testing.

Allen Pahlman/John Menghini
AL Rev. A.O DH 341-Z
(402)474-1403

REV. 1-96

Midwest Laboratories, Inc.
13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121

REPORT NUMBER: 99-232-0084 **Date: 8/24/99** **M1**

SUBJECT: Report of Analysis

MSE/HKM LABORATORIES SERVICES #2760
ATTN: BETTY O'DONNELL
P.O. BOX 3588 106 S. PARKMONT
BUTTE MT 59702-3588

Laboratory Number	Sample ID	Field Capacity 1/3 Bar %	Wilting Point 15 Bar %	Available Moisture %
83658	RR-SS-G	29.12	18.63	10.48
83659	RR-SS-B1	40.36	22.22	18.13
83660	RR-SS-H1	20.36	11.76	8.59
83661	RR-SS-H2	31.57	18.63	12.94
83662	RR-SS-I1	29.67	21.11	8.56

Respectfully submitted,

John P. Menghini, CPAg
Agronomic Service Representative

The above analytical results apply only to the sample(s) submitted.

'ORT NUMBER

FX 9-232-0084

'ORT DATE

08/20/99

ACCOUNT NO.

2760

Midwest Laboratories, Inc.

13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121

GROWER

PO# 16-9439
RILEY PASS-USFS

TO:

MSE/HKM LABORATORIES SERVICES
ATTN: BETTY O'DONNELL
P.O. BOX 3588 106 S. PARKMONT
BUTTE MT 59702-3588

COPY TO:

90001

SOIL ANALYSIS REPORT

(SEE EXPLANATION ON BACK)

AB MBER	SAMPLE IDENTIFICATION	ORGANIC MATTER WALKLEY BLACK PERCENT RATE	PHOSPHORUS P1 (WEAK BRAY) ppm RATE	PHOSPHORUS P2 (STRONG BRAY) ppm RATE	BICARBONATE P ppm RATE	NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE) POTASSIUM K ppm RATE	MAGNESIUM Mg ppm RATE	CALCIUM Ca ppm RATE	SODIUM Na ppm RATE	pH SOIL pH 1:1	pH BUFFER INDEX	CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTED) % K	% Mg	% Ca	% H	% Na
658	RR-SS-6	4.4H	34VH	67VH		184L	1468VH	1477VL	4733VH	4.9	6.4	72.6	0.6	16.8	10.2	44	28
659	RR-SS-B1	1.2VL	7VL	64VH	4VL	149M	464VH	1461L	2678VH	9.1		23.2	1.6	16.7	31.5	0.050	
660	RR-SS-H1	6.5VH	36VH	51H		130L	226M	1858L	458VH	4.8	6.0	25.5	1.3	7.4	36.5	47	7.8
661	RR-SS-H2	1.8L	16M	100VH		256M	1450VH	2009VL	2011VH	5.5	6.1	42.6	1.5	28.4	23.6	26	20
662	RR-SS11	1.2VL	5VL	77VH	7L	230H	782VH	1661L	2437VH	8.1		26.0	2.3	25.1	31.9	0.040	

NITRATE - N (FIA) 0- 6 IN lbs/A	IN ppm	IN lbs/A	IN ppm	IN lbs/A	Total lbs/A	SULFUR S ICAP ppm RATE	DTPA EXTRACTION ZINC Zn ppm RATE	MANGANESE Mn ppm RATE	IRON Fe ppm RATE	COPPER Cu ppm RATE	BORON B WATER SOLUBLE ppm RATE	EXCESS LIME RATE	AUTOFAX SOLUBLE SALTS 1:1 mmhos/cm RATE
5 137					137							L	5.6H
6 11					11							L	0.6L
5 9					9							L	1.0L
3 5					5							L	3.0H
5 27					27							L	1.6M

MENTS:

This report applies only to the sample(s) tested. Samples are retained a maximum of thirty days after testing.

Ken Portmann Bob Verghini

AL Rev 0. H 541 2 A

(406)494-1403

REV. 1-96

Midwest Laboratories, Inc.
13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121

REPORT NUMBER: 99-232-0085 Date: 8/25/99 M1

SUBJECT: Report of Analysis

MSE/HKM LABORATORIES SERVICES #2760
ATTN: BETTY O'DONNELL
P.O. BOX 3588 106 S. PARKMONT
BUTTE MT 59702-3588

Laboratory Number	Sample ID	Field Capacity 1/3 Bar %	Wilting Point 15 Bar %	Available Moisture %
83663	RR-SS-I2	36.31	26.66	9.65

Respectfully submitted,

John P. Menghini, CPAg
Agronomic Service Representative

The above analytical results apply only to the sample(s) submitted.

REPORT NUMBER

FX 9-232-0085

REPORT DATE

08/20/99

ACCOUNT NO.

2760

GROWER

PO# 16-9439
RILEY PASS-USFS

Midwest Laboratories, Inc.
13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121

TO:

MSE/HKM LABORATORIES SERVICES
ATTN: BETTY O'DONNELL
P.O. BOX 3588 105 S. PARKMONT
BUTTE MT 59702-3588

COPY TO:

70001

SOIL ANALYSIS REPORT

(SEE EXPLANATION ON BACK)

LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER WALKLEY BLACK PERCENT RATE	PHOSPHORUS P_1 (WEAK BRAY) ppm	RATE	PHOSPHORUS P_2 (STRONG BRAY) ppm	RATE	BICARBONATE P ppm	RATE	NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE) POTASSIUM K ppm	RATE	MAGNESIUM Mg ppm	RATE	CALCIUM Ca ppm	RATE	SODIUM Na ppm	RATE	pH SOIL pH 1:1	BUFFER INDEX	CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTED) % K	% Mg	% Ca	% H	% Na
83663	RR-SS-12	4.0VH	13M		48H		5VL		191L		962VH		2496L		2663VH		7.0		32.6	1.5	24.4	73.3	0.0	0.5

DTPA EXTRACTION — AUTOFAX

NITRATE - N (FIA) 0-6 IN ppm	0-6 IN lbs/A	IN ppm	IN lbs/A	IN ppm	IN lbs/A	Total lbs/A	SULFUR S ICAP ppm	RATE	ZINC Zn ppm	RATE	MANGANESE Mn ppm	RATE	IRON Fe ppm	RATE	COPPER Cu ppm	RATE	BORON B WATER SOLUBLE ppm	RATE	EXCESS LIME RATE	SOLUBLE SALTS 1:1 mmhos/cm	RATE
11	20					20													L	1.7M	

COMMENTS:

This report applies only to the sample(s) tested. Samples are retained a maximum of thirty days after testing.

Ken Pohlman/John Menghini
Al Nos. A-13 DH 541-2

REV. 1-96

(402)334-1403

2000

SOIL SAMPLES

AGRONOMICS

Midwest Laboratories, Inc.
13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121

REPORT NUMBER: 00-224-0146

Date: 8/15/00 M 5

SUBJECT: Report of Analysis

MSE/HKM LABORATORIES SERVICES #2760
ATTN: BETTY O'DONNELL
P.O. BOX 3588 106 S. PARK
BUTTE MT
59702-3588

PO# 16-0342
PIONEER RILEY PASS

Laboratory Number		Sample ID	Field Capacity 1/3 Bar %	Wilting Point 15 Bar %	Available Moisture %
95114	SS-K1	807Q006	31.01	18.12	12.90
95115	SS-K2	807Q007	30.95	18.99	11.96
95116	SS-J2	807Q011	48.88	32.56	16.32
95117	SS-J1	807Q012	16.96	10.70	6.26
95118	SS-L1	807Q017	24.84	14.84	10.00

Respectfully submitted,

John P. Menghini, CPAg
Agronomic Service Representative

The above analytical results apply only to the sample(s) submitted.

PORT NUMBER
0-224-0146

PORT DATE
AUG 24, 2000

ACCOUNT NO.
2760

MidWest Laboratories, Inc.

13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121

PAGE 1/1

GROWER

PO#16-0342
PIONEER RILEY PASS

RX
AF

TO: MSE/HKM LABORATORIES SERVI
ATTN: BETTY O'DONNELL
P.O. BOX 3588 106 S. PARK
BUTTE MT
59702-3588

COPY TO:

BM

SOIL ANALYSIS REPORT

(SEE EXPLANATION ON BACK)

Info Sheet:

LAB NUMBER **	SAMPLE IDENTIFICATION	ORGANIC MATTER WALKLEY BLACK PERCENT	RATE	PHOSPHORUS P_1 (WEAK BRAY) ppm	RATE	PHOSPHORUS P_2 (STRONG BRAY) ppm	RATE	BICARBONATE P ppm	RATE	NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE) POTASSIUM K ppm	RATE	MAGNESIUM Mg ppm	RATE	CALCIUM Ca ppm	RATE	SODIUM Na ppm	RATE	pH SOIL pH 1:1	BUFFER INDEX	CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTED) % K	% Mg	% Ca	% H	% Na
5114	807Q006	2.3L		16	M	40	H	11M		164	L	733	VH	2347L		2645VH		8.8		29.8	1.4	20.5	39.4	0.0	38.6
5115	807Q007	1.5VL		9	L	27	M			183	L	909	VH	2191VL		3557VH		5.9	6.3	41.6	1.1	18.2	26.3	17	37.2
5116	807Q011	13.VH		9	L	12	L			112	VL	590	H	2000VL		1630VH		4.7	5.2	45.0	.6	10.9	22.2	51	15.7
5117	807Q012	6.3VH		7	VL	16	L			123	L	244	H	1295L		426VH		4.8	6.2	20.2	1.6	10.1	32.1	47	9.2
5118	807Q017	0.6VL		20	M	98	VH	12M		152	L	797	VH	1520VL		3118VH		7.4		28.2	1.4	23.6	27.0	0.0	48.1

NITRATE - N (FIA) 0-6 IN lbs/A	6-12 IN ppm	6-12 IN lbs/A	12-24 IN ppm	12-24 IN lbs/A	Total lbs/A	SULFUR S ICAP ppm	RATE	ZINC Zn ppm	RATE	MANGANESE Mn ppm	RATE	IRON Fe ppm	RATE	COPPER Cu ppm	RATE	BORON B WATER SOLUBLE ppm	RATE	EXCESS LIME RATE	SOLUBLE SALTS 1:1 mmhos/cm	RATE
14					14													M	1.5	M
23					23													L	3.8	H
27					27													L	1.1	M
5					5													L	0.5	L
5					5													L	2.2	M

MENTS:
e sodium levels are very high and the ammendments will not be
ective unless the internal drainage can be improved. Faxed to 4064941473

This report applies only to the sample(s) tested. Samples are retained a maximum of thirty days after testing.

Ken Pohlman/Joh Menghini
Rev.2000 Zor
(406)494.1403

REV. 1/96

REPORT NUMBER
0-224-0146

Midwest Laboratories, Inc.

13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121

REPORT DATE
AUG 24, 2000

ACCOUNT NUMBER
2760

GROWER

PO#16-0342
PIONEER RILEY PASS

SUBMITTED BY:

TO: MSE/HKM LABORATORIES SERVI
ATTN: BETTY O'DONNELL
P.O. BOX 3588 106 S. PARK
BUTTE MT
59702-3588

SOIL FERTILITY RECOMMENDATIONS (POUNDS PER ACRE)

YOUR SAMPLE NUMBER	CROP	YIELD GOAL	SOIL AMENDMENTS					N NITRO-GEN	P_2O_5 PHOS-PHATE	K_2O POTASH	Mg MAG-NESIUM	S SULFUR	Zn ZINC	Mn MANGA-NESE	Fe IRON	Cu COPPER	B BORON
			LIME LB/A OF $CaCO_3$	LIME TONS/A	GYPSUM TONS/A		ELEMENTAL SULFUR LBS/A										
807Q006	GRASS PASTURE(GRASS)	2					500	45	20	--	--						
807Q007	GRASS PASTURE(GRASS)	2			4	OR	500	35	25	--	--						
807Q011	GRASS PASTURE(GRASS)	2	9000	5.0	4	OR	500	35	25	30	--						
807Q012	GRASS PASTURE(GRASS)	2	5400	3.0	1.3	OR	230	40	25	30	--						
807Q017	GRASS PASTURE(GRASS)	2			4	OR	500	50	15	--	--						

MMENTS:

LAB NUMBERS
44-
95114
95115
95116
95117
95118

MIDWEST LABORATORIES, INC.

Ken Pohlman/John Menghini
Rev.7.0
(406)941.1403

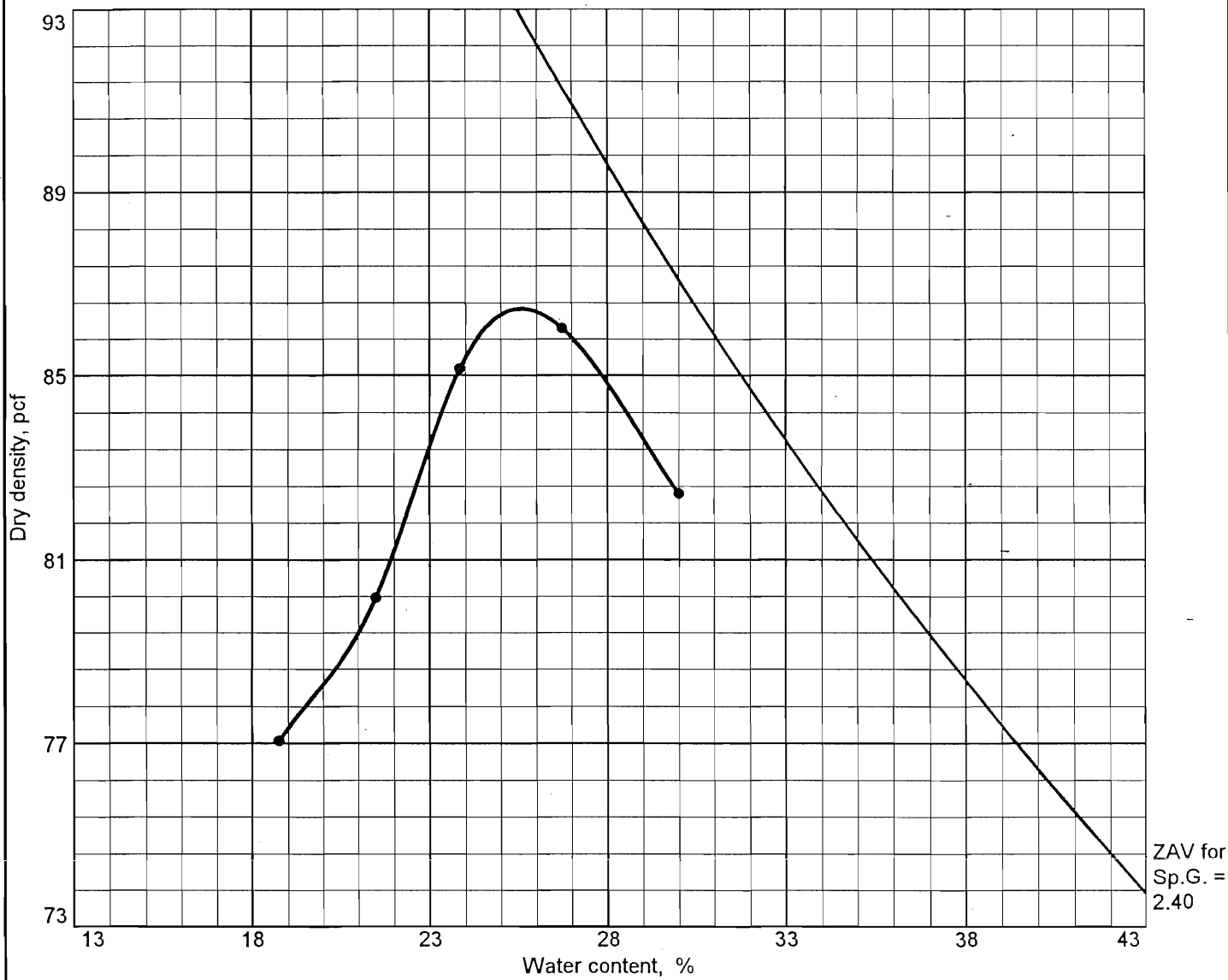
REV 6

1999

SOIL SAMPLES

MOISTURE DENSITY PROCTOR SAMPLES

MOISTURE - DENSITY RELATIONSHIP TEST



Test specification: ASTM D 698-91 Procedure A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	N/T	N/T	N/T	N/T	N/T	N/T	0.0	N/T

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 86.5 pcf Optimum moisture = 25.6 %	

Project No. 18A149.103 **Client:**
Project: Riley Pass

• **Location:** RP-Proctor-A

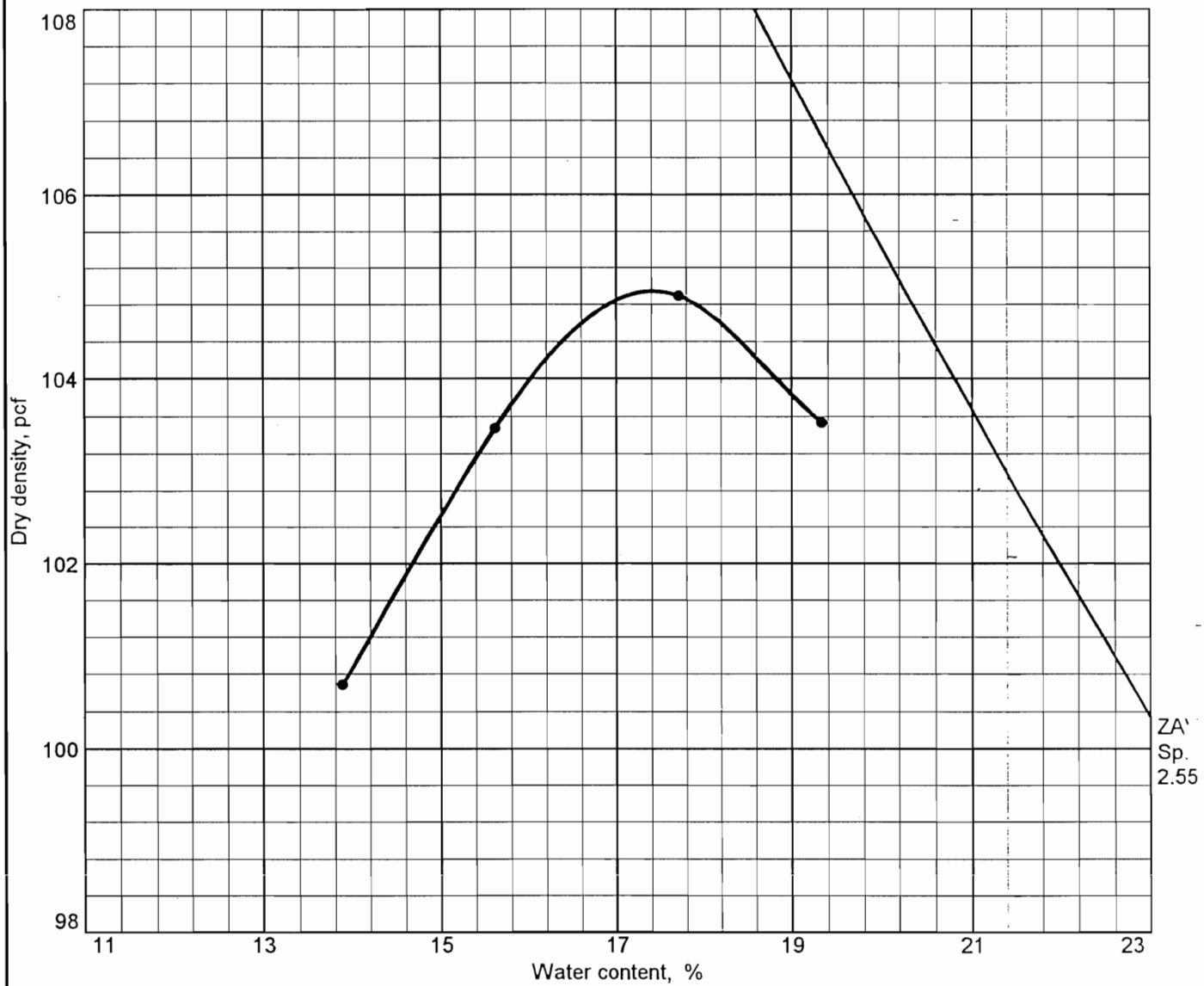
Remarks:
Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

MOISTURE - DENSITY RELATIONSHIP TEST

MSE-HKM, INC.

Figure 01

MOISTURE - DENSITY RELATIONSHIP TEST



Test specification: ASTM D 698-91 Procedure A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	N/T	N/T	N/T	N/T	N/T	N/T	0.0	N/T

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 104.9 pcf Optimum moisture = 17.4 %	

Project No. 18A149.103 **Client:**

Project: Riley Pass

• **Location:** RP-Proctor-B

Remarks:

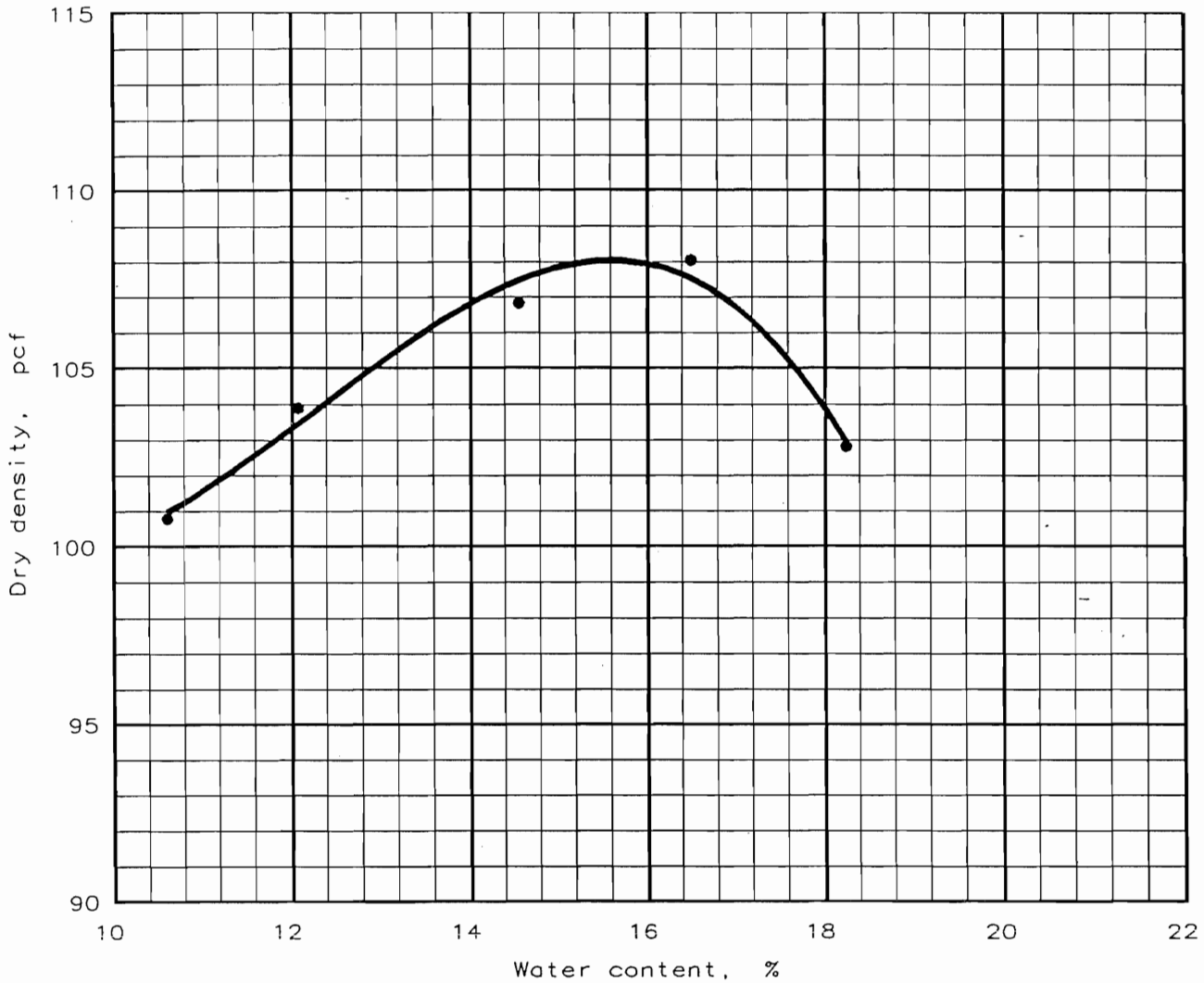
Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

MOISTURE - DENSITY RELATIONSHIP TEST

MSE-HKM, INC.

Figure 02

MOISTURE-DENSITY RELATIONSHIP TEST



Test specification: ASTM D 698-91 Procedure B, Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in	% < No.200
	USCS	AASHTO						
	NOT TESTED	NOT TESTED	2.2 %	NT	NT	NT	1.00 %	NT %

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 108.0 pcf Optimum moisture = 16.5 %	General Fill

Project No.: 18A149.108
Project: Riley Pass, USFS #3802
Location:

Date: September 2, 1999

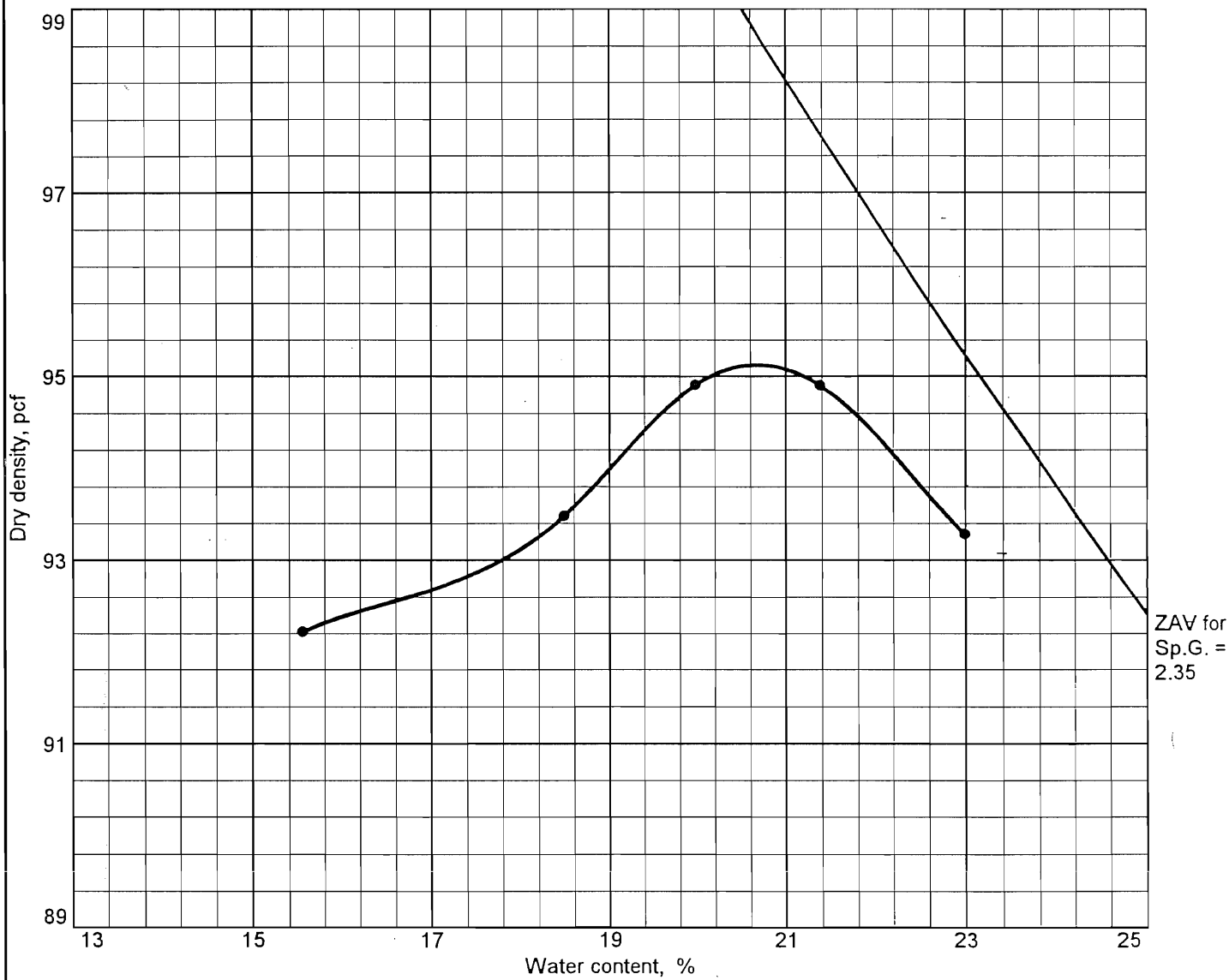
Remarks:
SAMP BY D. Clark/Pioneer
TEST BY RD MSE-HKM/08-24
Field ID = RP-Proctor-C

MOISTURE-DENSITY RELATIONSHIP TEST

MSE-HKM, INC.

Lab No: S011538

MOISTURE - DENSITY RELATIONSHIP TEST



Test specification: ASTM D 698-91 Procedure A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	N/T	N/T	N/T	N/T	N/T	N/T	0	N/T

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 95.1 pcf Optimum moisture = 20.7 %	

Project No. 18A149.103 **Client:**

Project: Riley Pass

• **Location:** RP-Proctor-D

Remarks:

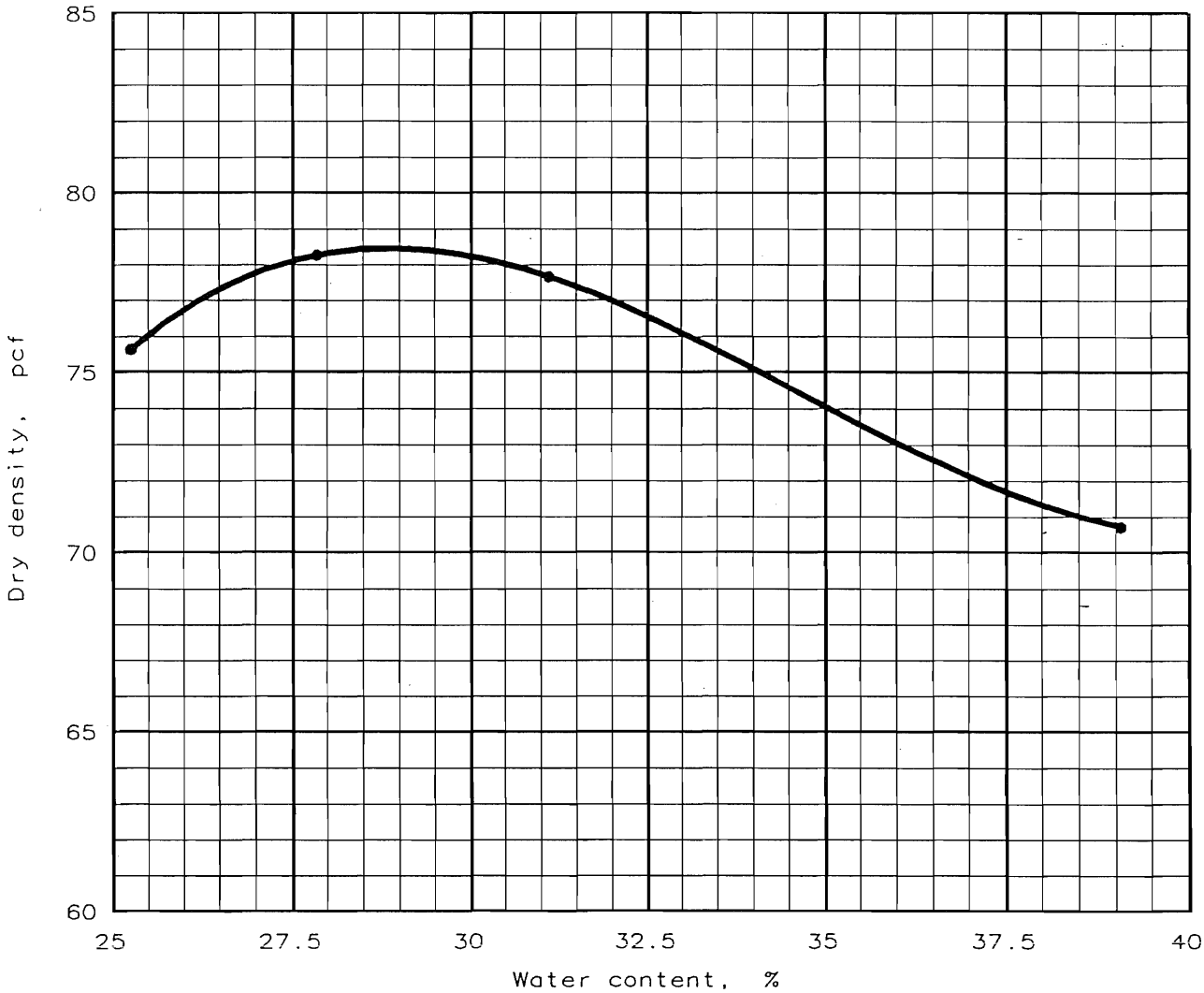
Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

MOISTURE - DENSITY RELATIONSHIP TEST

MSE-HKM, INC.

Figure 03

MOISTURE-DENSITY RELATIONSHIP TEST



Test specification: ASTM D 698-91 Procedure B, Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in	% < No.200
	USCS	AASHTO						
	NOT TESTED	NOT TESTED	N/T %	NT	NT	NT	4.73 %	NT %

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 78.5 pcf Optimum moisture = 28.9 %	General Fill

Project No.: 18A149.108
Project: Riley Pass, USFS #3802
Location:

Date: September 17, 1999

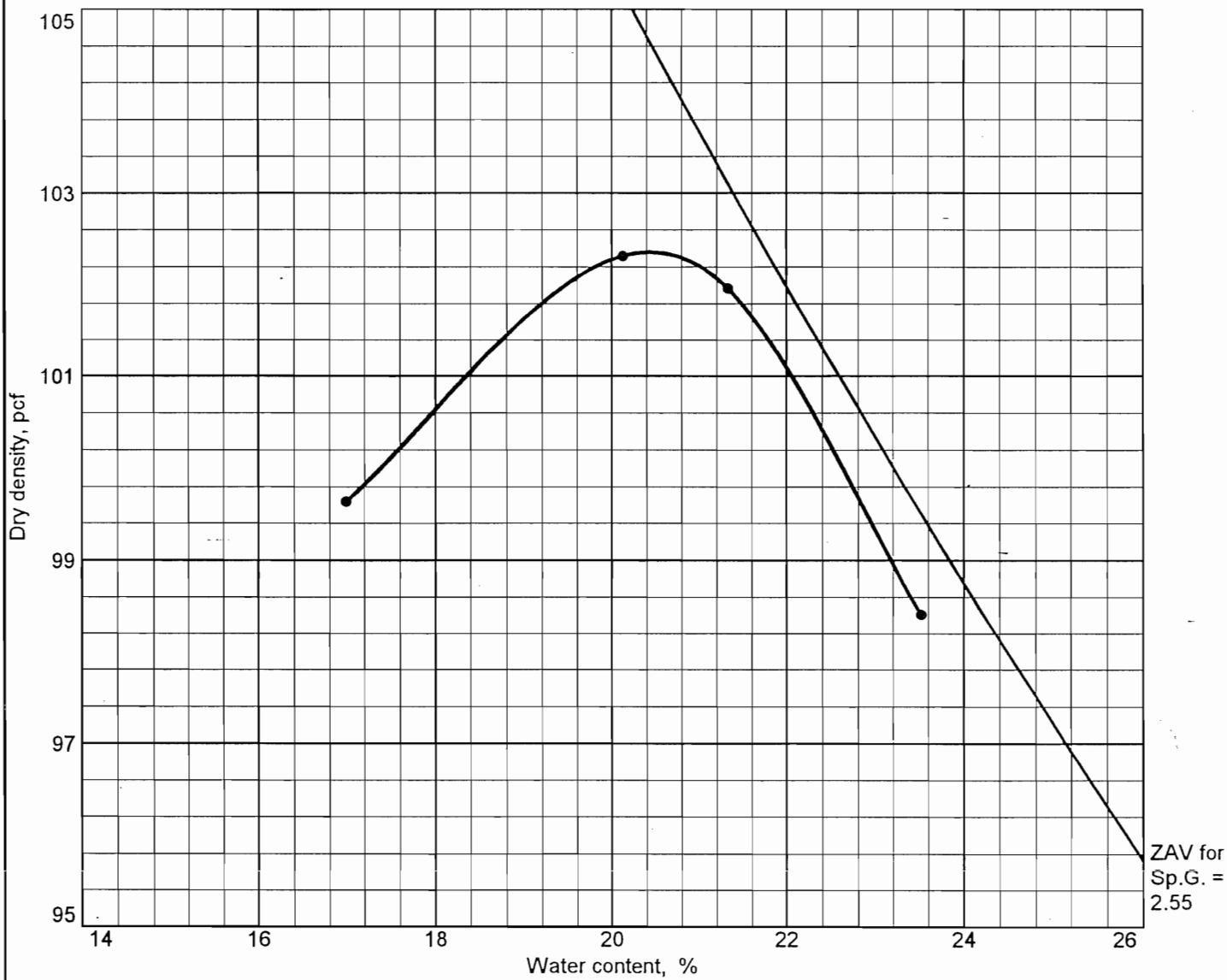
MOISTURE-DENSITY RELATIONSHIP TEST

MSE-HKM, INC.

Remorks:
SAMP BY D. Clark/Pioneer
TEST BY TE MSE/HKM 9/15
Field ID = RP-Proctor-E

Lab No: S011540

MOISTURE - DENSITY RELATIONSHIP TEST



Test specification: ASTM D 698-91 Procedure A Standard
Oversize correction applied to each point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	N/T	N/T	N/T	N/T	N/T	N/T	15	N/T

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 102.4 pcf	98.8 pcf	
Optimum moisture = 20.4 %	21.7 %	

Project No. 18A149.103 **Client:**
Project: Riley Pass

• **Location:** RP-Proctor-F

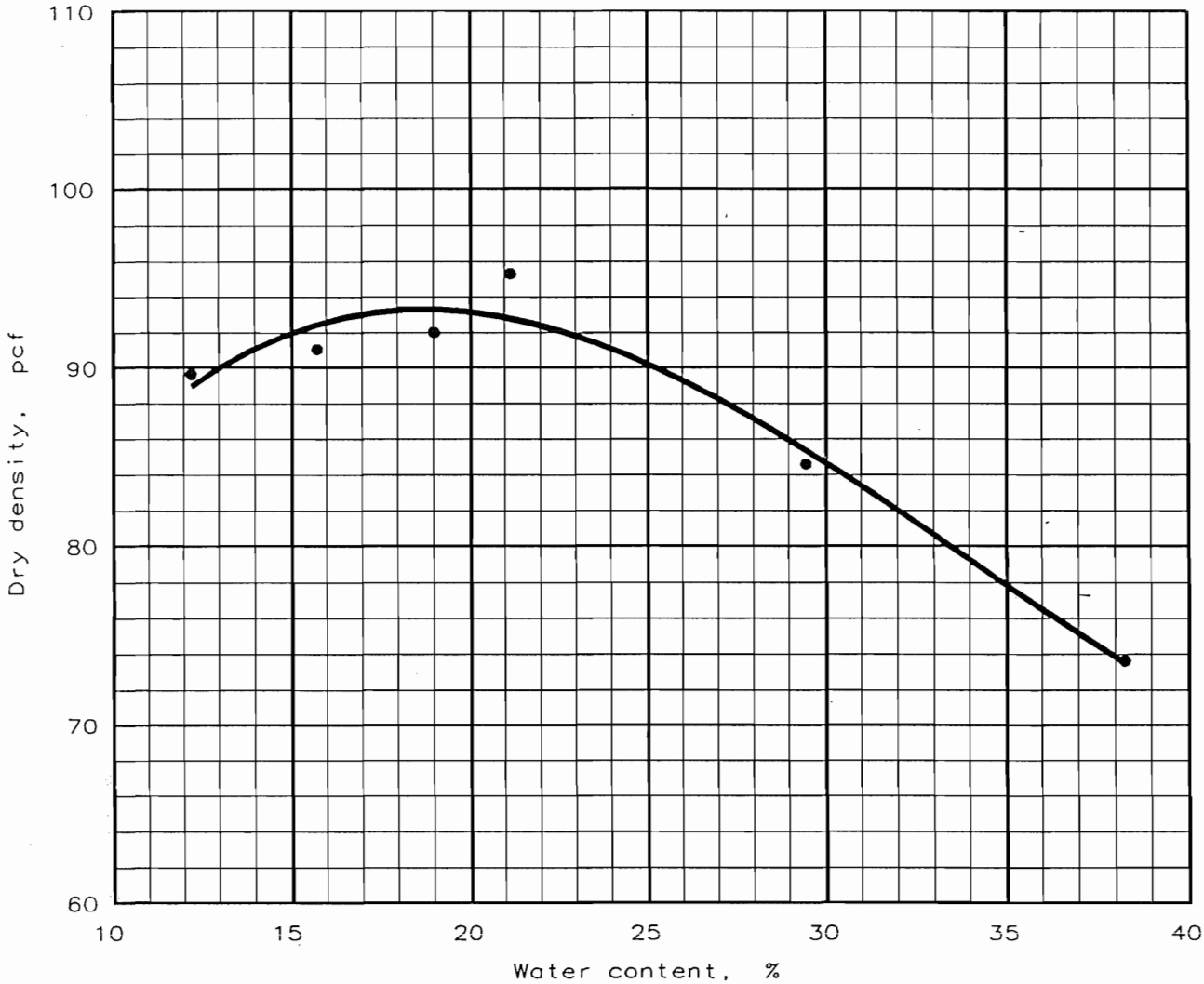
MOISTURE - DENSITY RELATIONSHIP TEST

MSE-HKM, INC.

Remarks:
Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

Figure 04

MOISTURE-DENSITY RELATIONSHIP TEST



Test specification: ASTM D 698-91 Procedure A, Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	NOT TESTED	NOT TESTED	N/T %	NT	NT	NT	3.85 %	NT %

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 95.3 pcf Optimum moisture = 21.2 %	General Fill

Project No.: 18A149.108
Project: Riley Pass, USFS #3802
Location:

Date: September 17, 1999

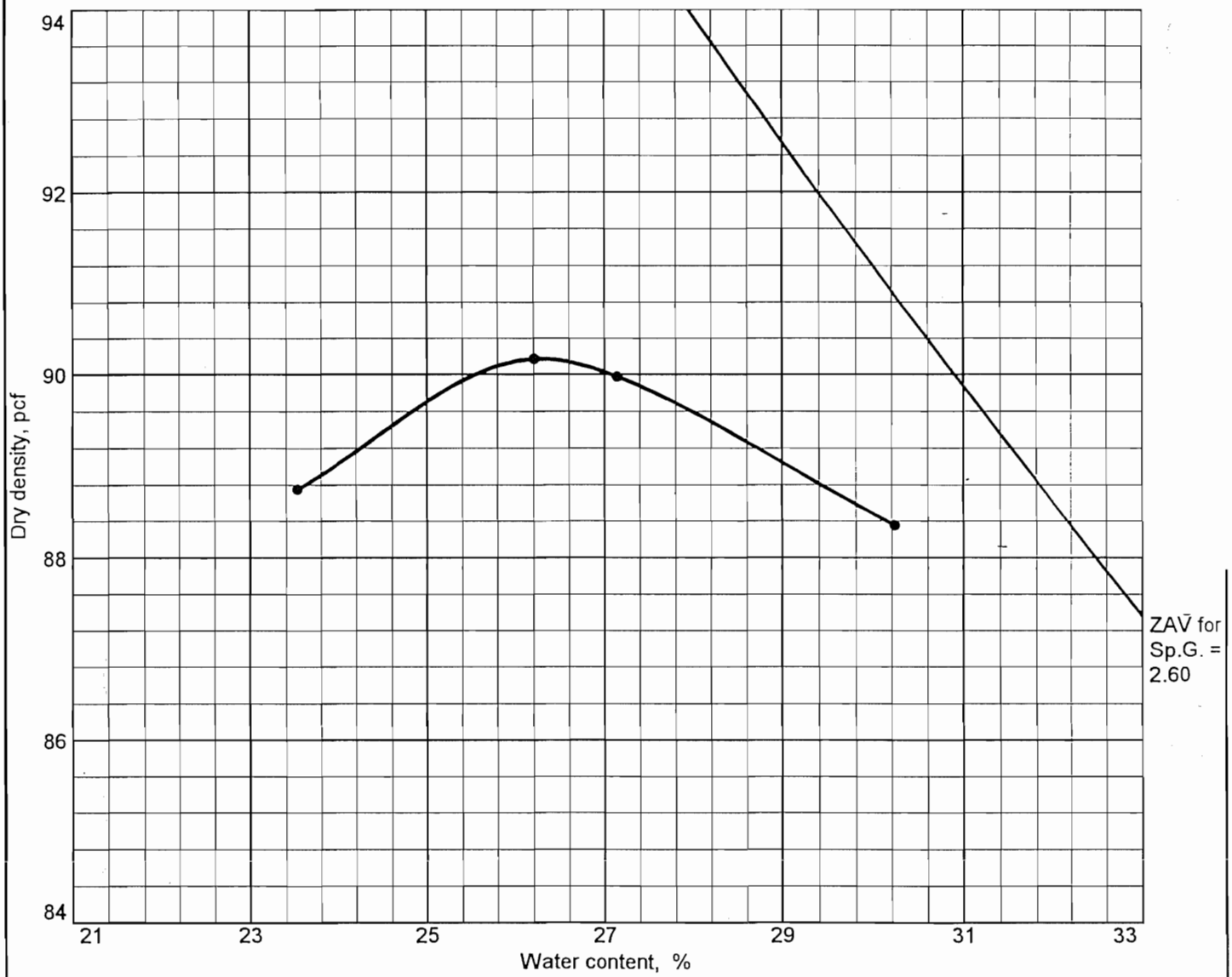
MOISTURE-DENSITY RELATIONSHIP TEST

MSE-HKM, INC.

Remarks:
SAMP BY D. Clark/Pioneer
TEST BY TE MSE/HKM 9/15
Field ID = RP-Proctor-G

Lab No: S011542

MOISTURE - DENSITY RELATIONSHIP TEST



Test specification: ASTM D 698-91 Procedure A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	N/T	N/T	N/T	N/T	N/T	N/T	0.0	N/T

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 90.2 pcf Optimum moisture = 26.3 %	

Project No. 18A149.103 **Client:**

Project: Riley Pass

● **Location:** RP-Proctor-I

Remarks:

Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

MOISTURE - DENSITY RELATIONSHIP TEST

MSE-HKM, INC.

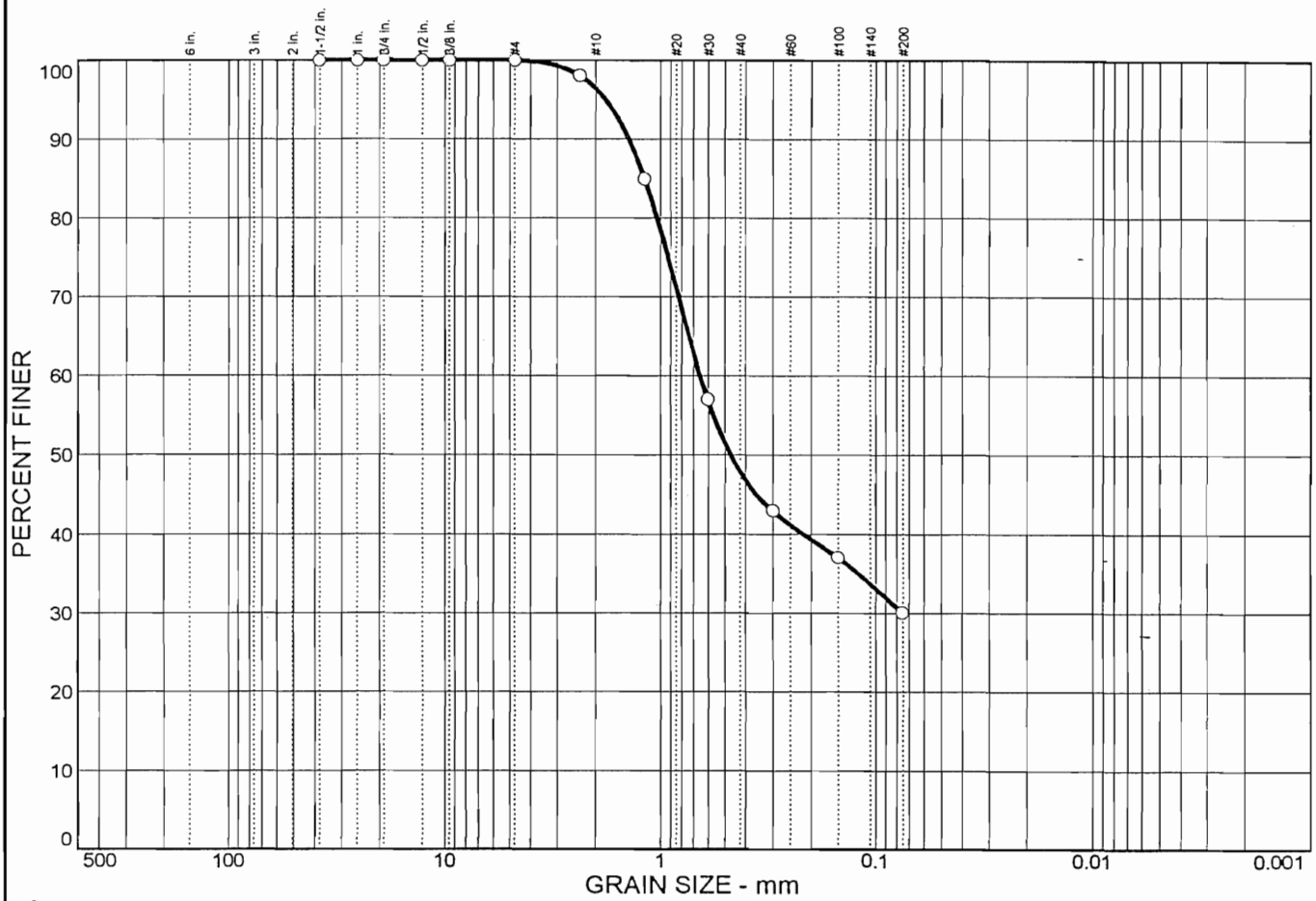
Figure 05

1999

SEDIMENT SAMPLES

GRAIN SIZE DISTRIBUTION

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	0	70	30	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	100		
#4	100		
#8	98		
#16	85		
#30	57		
#50	43		
#100	37		
#200	30		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 1.18 D_{60}= 0.650 D_{50}= 0.469
D_{30}= 0.0750 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=1.80

Sample No.: RP-SE-X1 **Source of Sample:** **Date:** 9/14/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011449

GRAIN SIZE DISTRIBUTION TEST REPORT

% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	1	63	36	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	100		
#4	99		
#8	99		
#16	94		
#30	89		
#50	78		
#100	58		
#200	36		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 0.434 D_{60}= 0.160 D_{50}= 0.117
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

F.M.=0.83

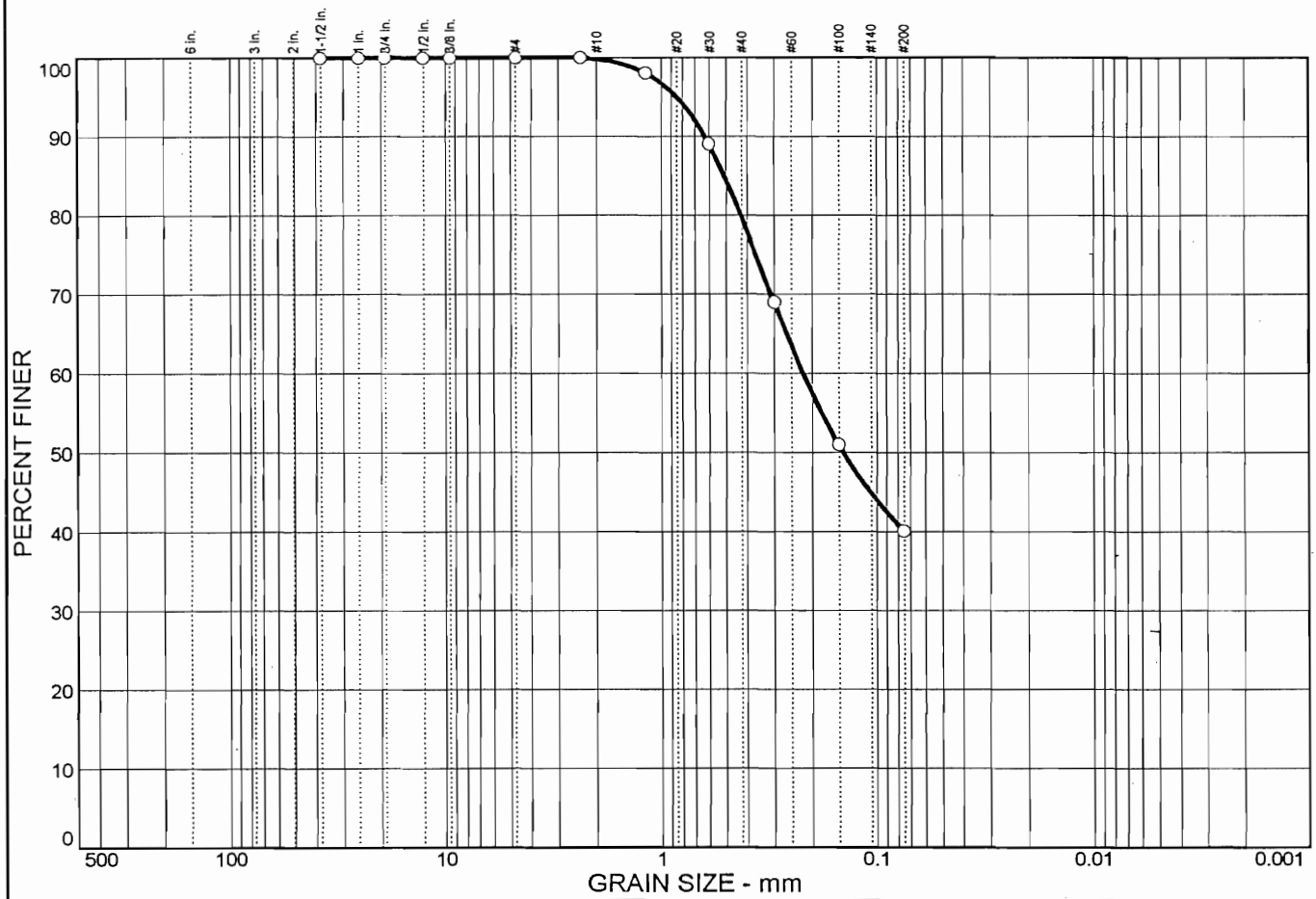
Sample No.: RP-SE-A1 **Source of Sample:** **Date:** 9/13/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011437

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	0	60	40	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	100		
#4	100		
#8	100		
#16	98		
#30	89		
#50	69		
#100	51		
#200	40		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 0.510 D_{60}= 0.219 D_{50}= 0.143
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

F.M.=0.93

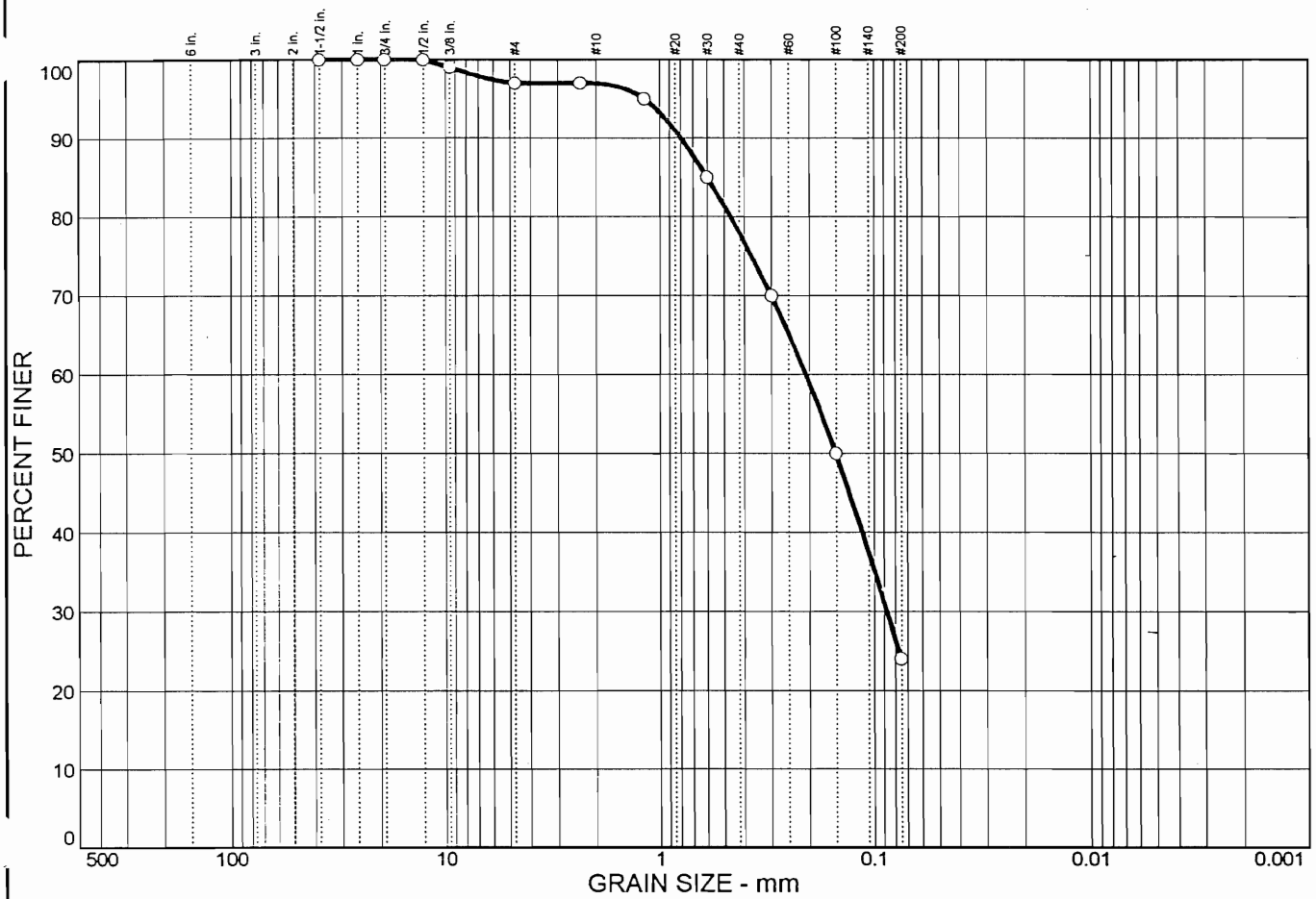
Sample No.: RP-SE-A2 **Source of Sample:** **Date:** 9/8/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011438

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	3	73	24	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	99		
#4	97		
#8	97		
#16	95		
#30	85		
#50	70		
#100	50		
#200	24		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 0.600 D_{60}= 0.206 D_{50}= 0.150
D_{30}= 0.0874 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=1.07

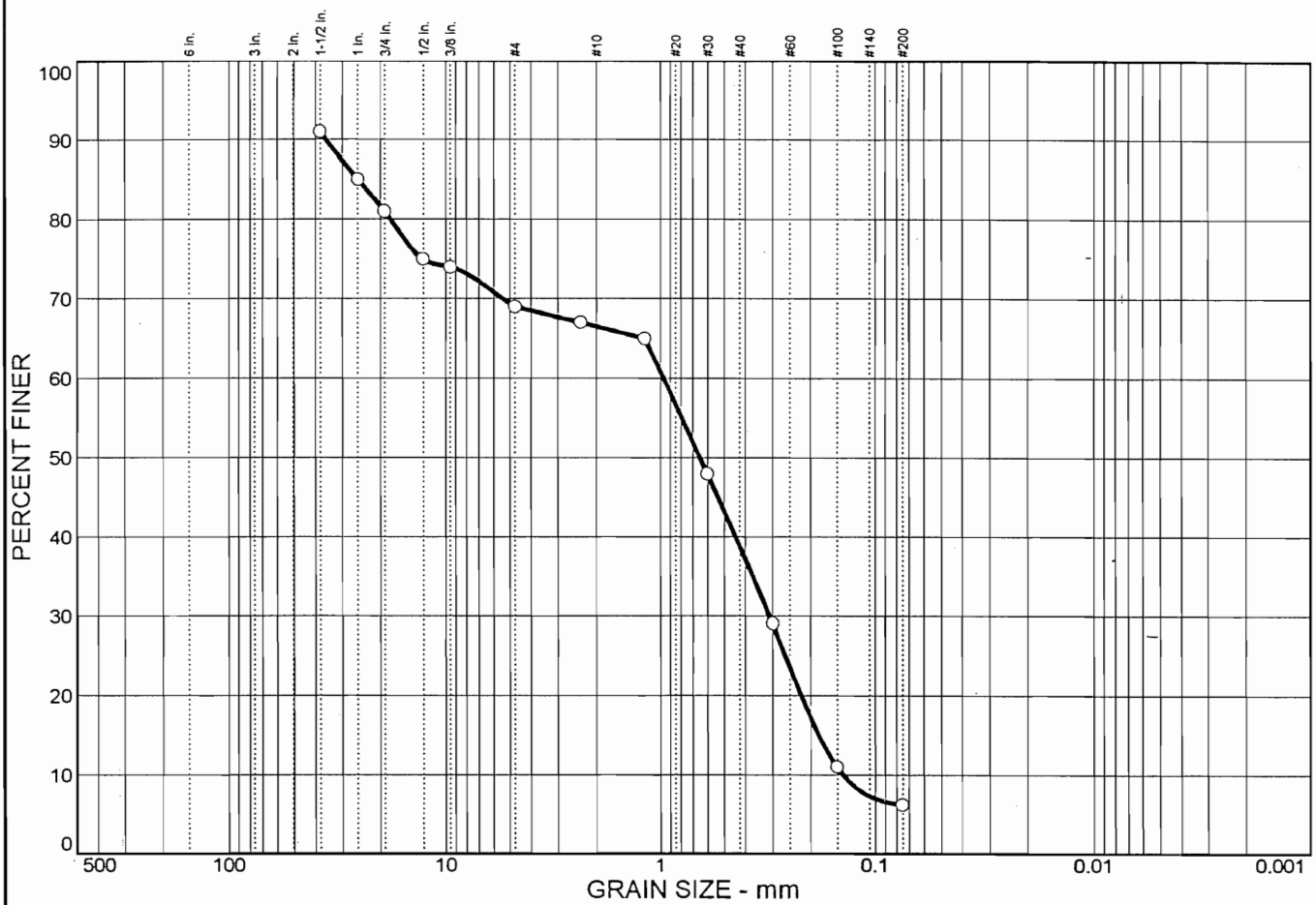
Sample No.: RP-SE-B1 **Source of Sample:** **Date:** 9/8/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011439

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
		63	6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	91		
1 in.	85		
.75 in.	81		
.5 in.	75		
.375 in.	74		
#4	69		
#8	67		
#16	65		
#30	48		
#50	29		
#100	11		
#200	6.2		

* (no specification provided)

Soil Description

Poorly graded sand with silt and gravel

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 25.4 D_{60}= 0.965 D_{50}= 0.648
D_{30}= 0.310 D_{15}= 0.182 D_{10}= 0.141
C_u= 6.86 C_c= 0.71

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

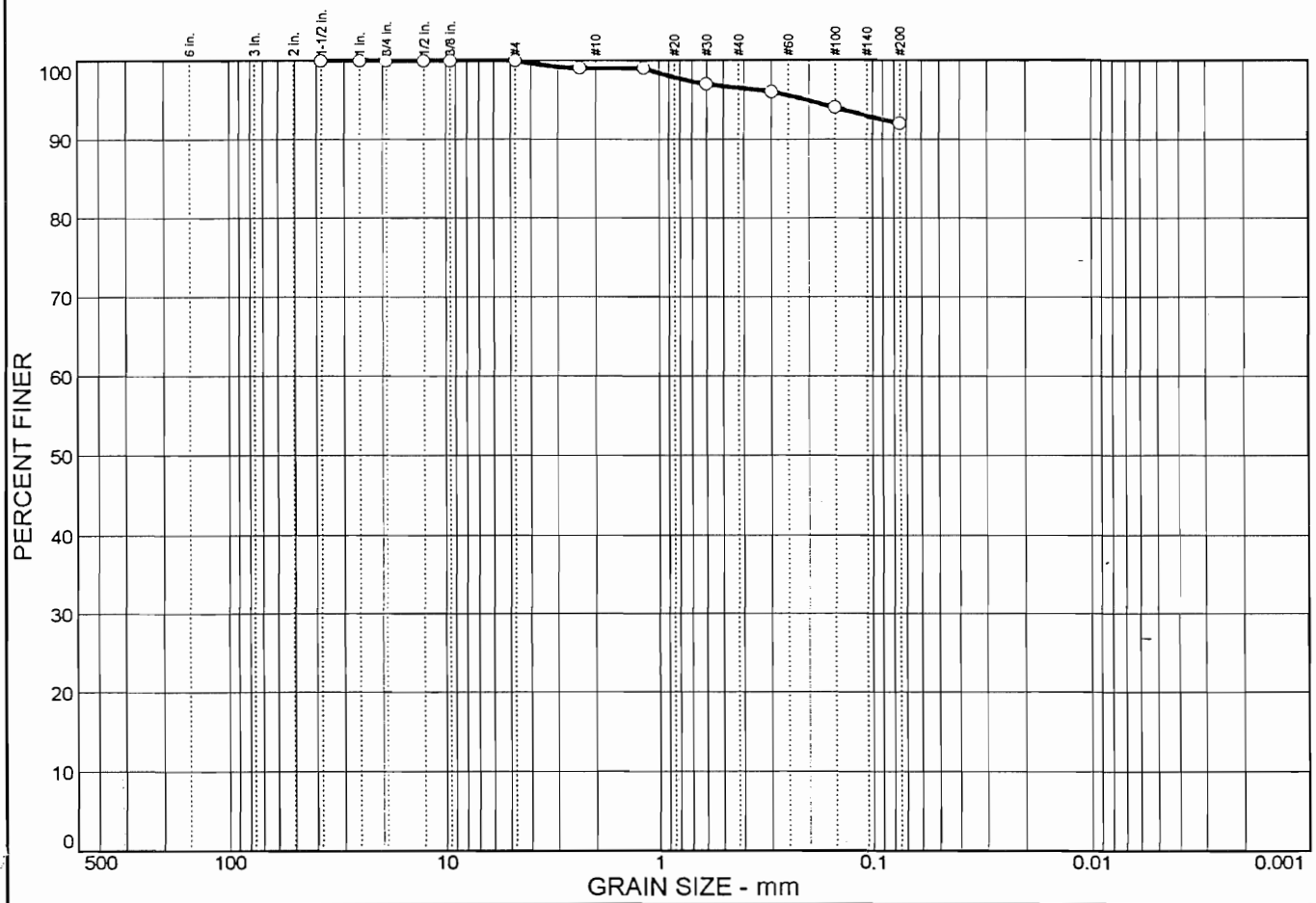
F.M.=3.65

Sample No.: RP-SE-B2 **Source of Sample:** **Date:** 9/8/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802
Project No: 18A149.103 **Lab No:** S011440

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	0	8	92	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	100		
#4	100		
#8	99		
#16	99		
#30	97		
#50	96		
#100	94		
#200	92		

* (no specification provided)

Soil Description

Silt

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

F.M.=0.15

Sample No.: RP-SE-B4 **Source of Sample:** **Date:** 9/14/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011442

GRAIN SIZE DISTRIBUTION TEST REPORT

% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	3	66	31	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	100		
#4	97		
#8	94		
#16	92		
#30	85		
#50	74		
#100	49		
#200	31		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 0.600 D_{60}= 0.201 D_{50}= 0.154
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=1.09

Sample No.: RP-SE-C1 **Source of Sample:** **Date:** 9/1/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011443

GRAIN SIZE DISTRIBUTION TEST REPORT

% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	1	74	25	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	100		
#4	99		
#8	98		
#16	93		
#30	80		
#50	67		
#100	44		
#200	25		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 0.771 D_{60}= 0.238 D_{50}= 0.179
D_{30}= 0.0916 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=1.19

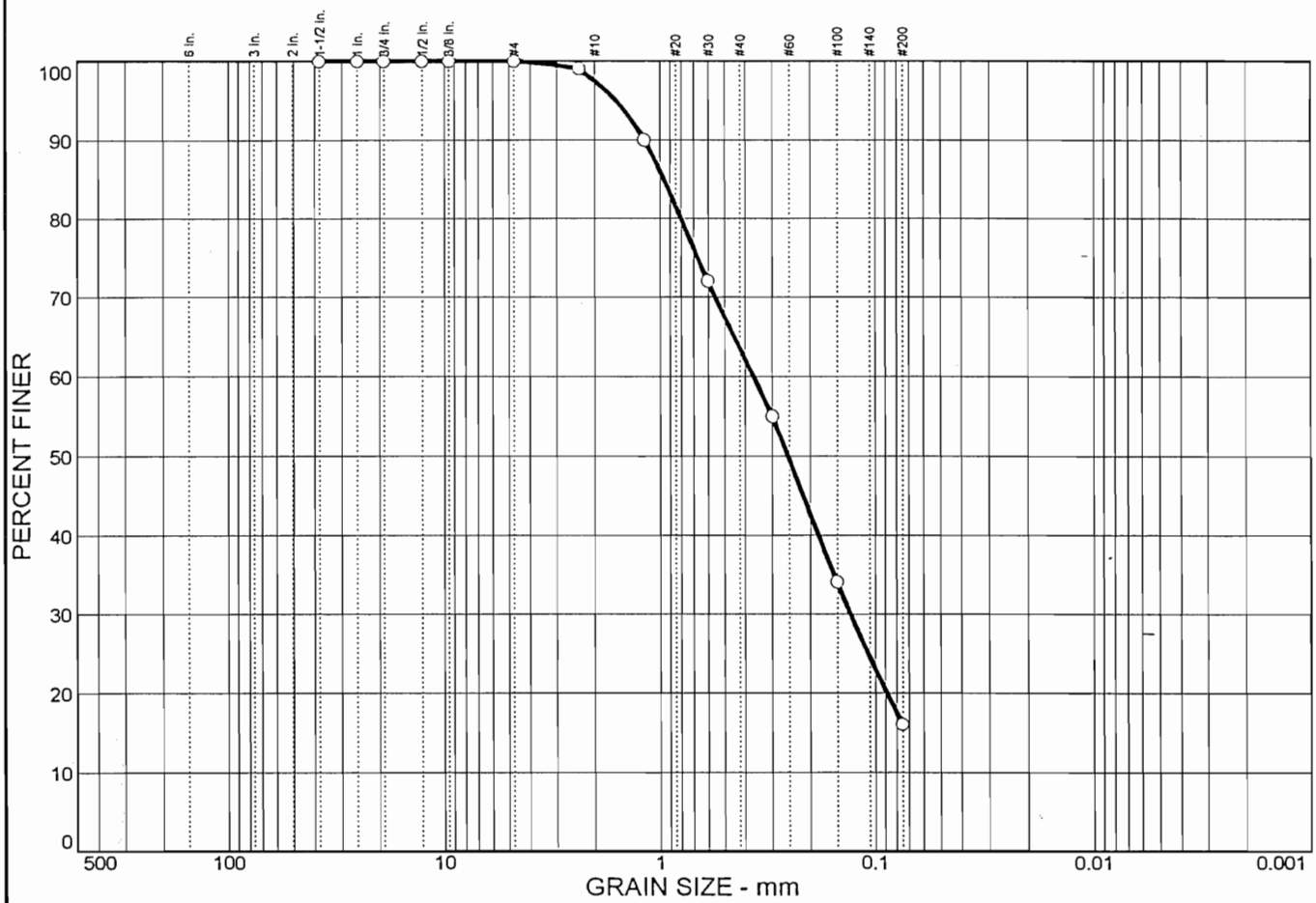
Sample No.: RP-SE-C2 **Source of Sample:** **Date:** 8/30/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011444

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	0	84	16	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.3750 in.	100		
#4	100		
#8	99		
#16	90		
#30	72		
#50	55		
#100	34		
#200	16		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T N PI=

Coefficients

D_{85}= 0.958 D_{60}= 0.365 D_{50}= 0.252
D_{30}= 0.130 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=1.50

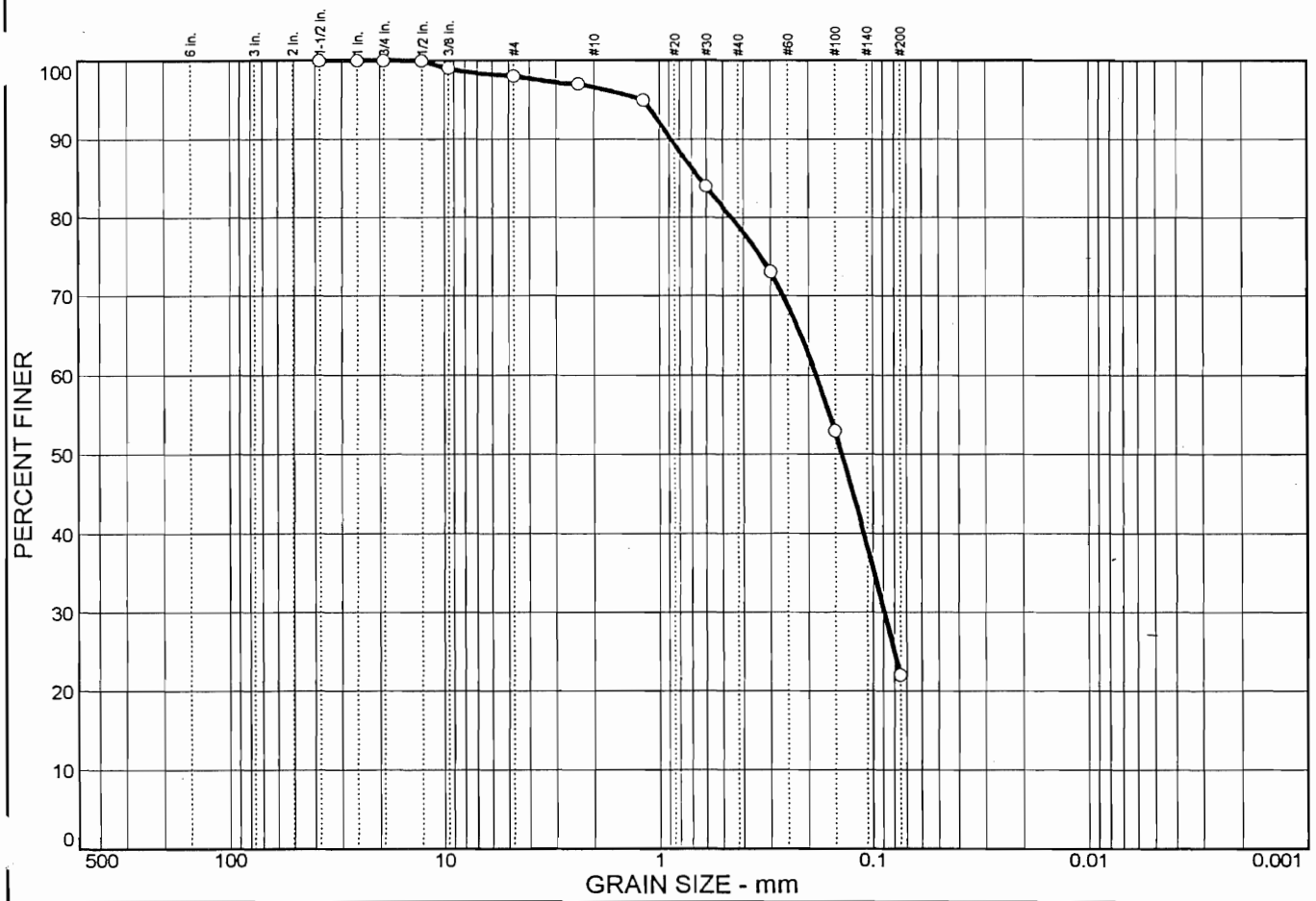
Sample No.: RP-SE-D1 **Source of Sample:** **Date:** 8/31/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011445

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	2	76	22	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	99		
#4	98		
#8	97		
#16	95		
#30	84		
#50	73		
#100	53		
#200	22		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 0.641 D_{60}= 0.183 D_{50}= 0.139
D_{30}= 0.0887 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=1.01

Sample No.: RP-SE-D2 **Source of Sample:** **Date:** 9/3/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011446

GRAIN SIZE DISTRIBUTION TEST REPORT

% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	2	71	27	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	100		
#4	98		
#8	97		
#16	94		
#30	88		
#50	80		
#100	48		
#200	27		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T N PI=

Coefficients

D_{85}= 0.379 D_{60}= 0.192 D_{50}= 0.157
D_{30}= 0.0851 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

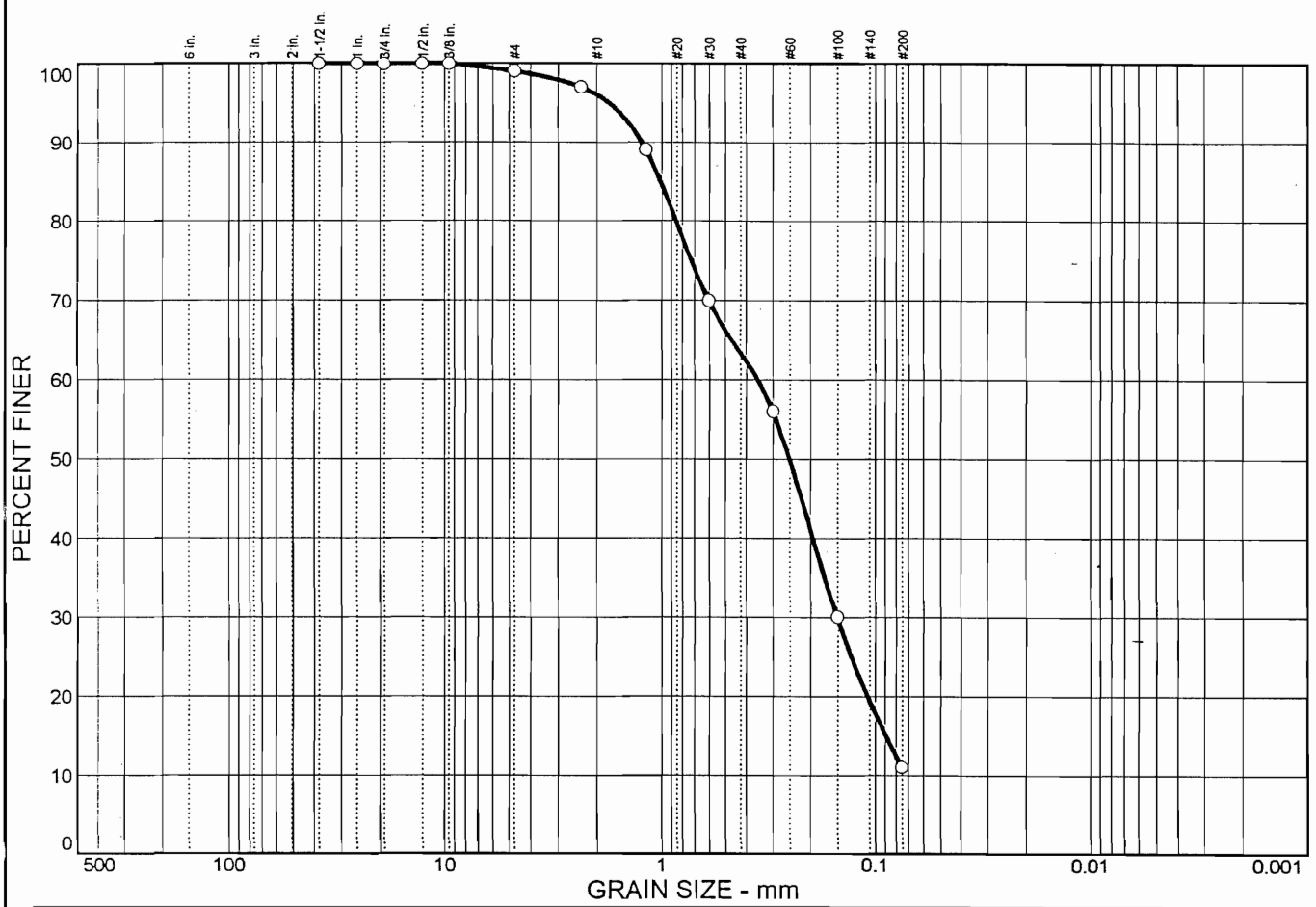
F.M.=0.95

Sample No.: RP-SE-E1 **Source of Sample:** **Date:** 9/7/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802
Project No: 18A149.103 **Lab No:** S011447

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	1	88	11	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	100		
#4	99		
#8	97		
#16	89		
#30	70		
#50	56		
#100	30		
#200	11		

* (no specification provided)

Soil Description

Poorly graded sand with silt

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 1.01 D_{60}= 0.353 D_{50}= 0.250
D_{30}= 0.150 D_{15}= 0.0889 D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO= A-2-4(0)

Remarks

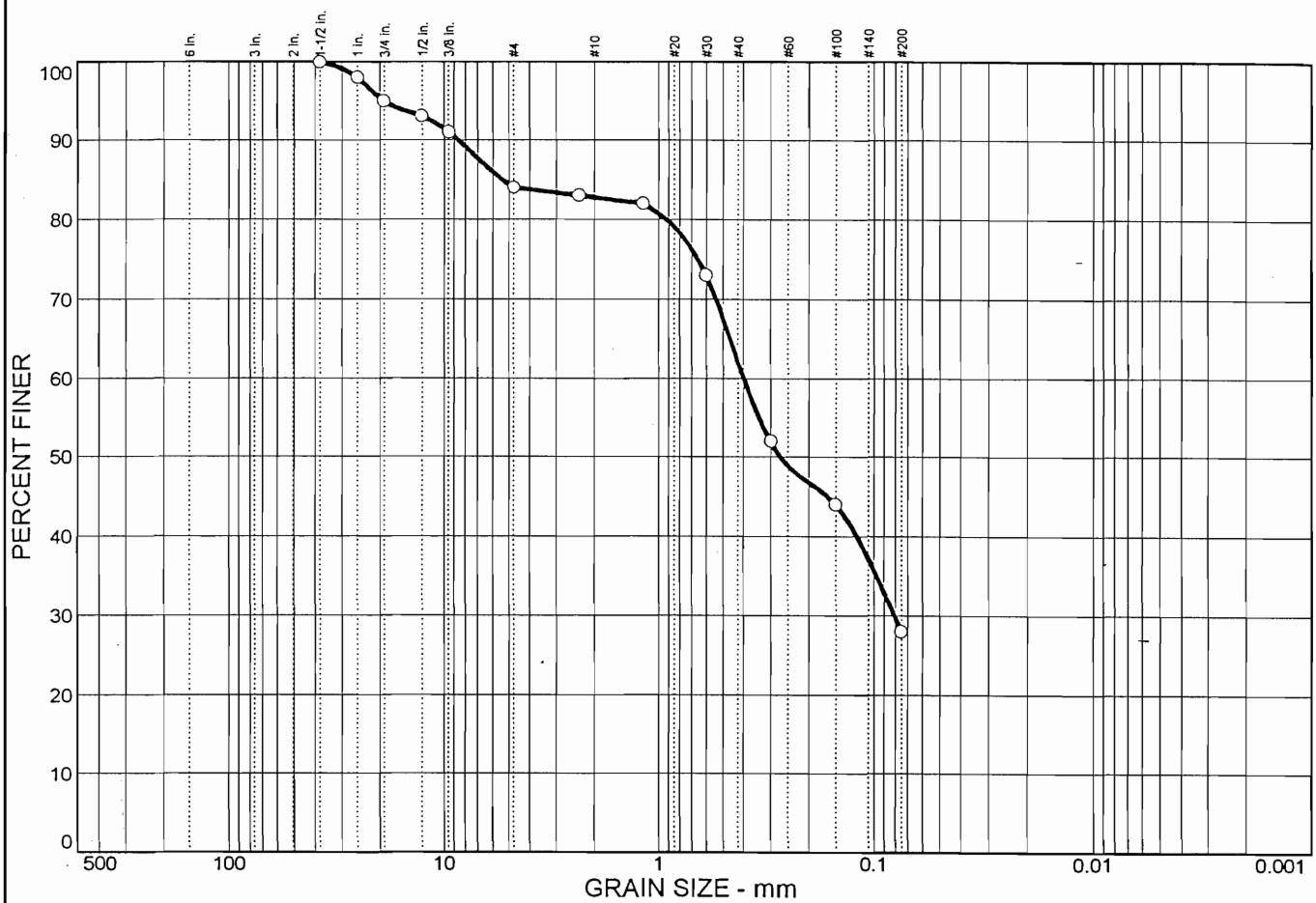
F.M.=1.59

Sample No.: RP-SE-E2 **Source of Sample:** **Date:** 9/13/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802
Project No: 18A149.103 **Lab No:** S011447

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	16	56	28	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	98		
.75 in.	95		
.5 in.	93		
.375 in.	91		
#4	84		
#8	83		
#16	82		
#30	73		
#50	52		
#100	44		
#200	28		

* (no specification provided)

Soil Description

Silty sand with gravel

Atterberg Limits

PL= N/T LL= N/T N PI=

Coefficients

D_{85}= 5.40 D_{60}= 0.397 D_{50}= 0.269
D_{30}= 0.0806 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=1.96

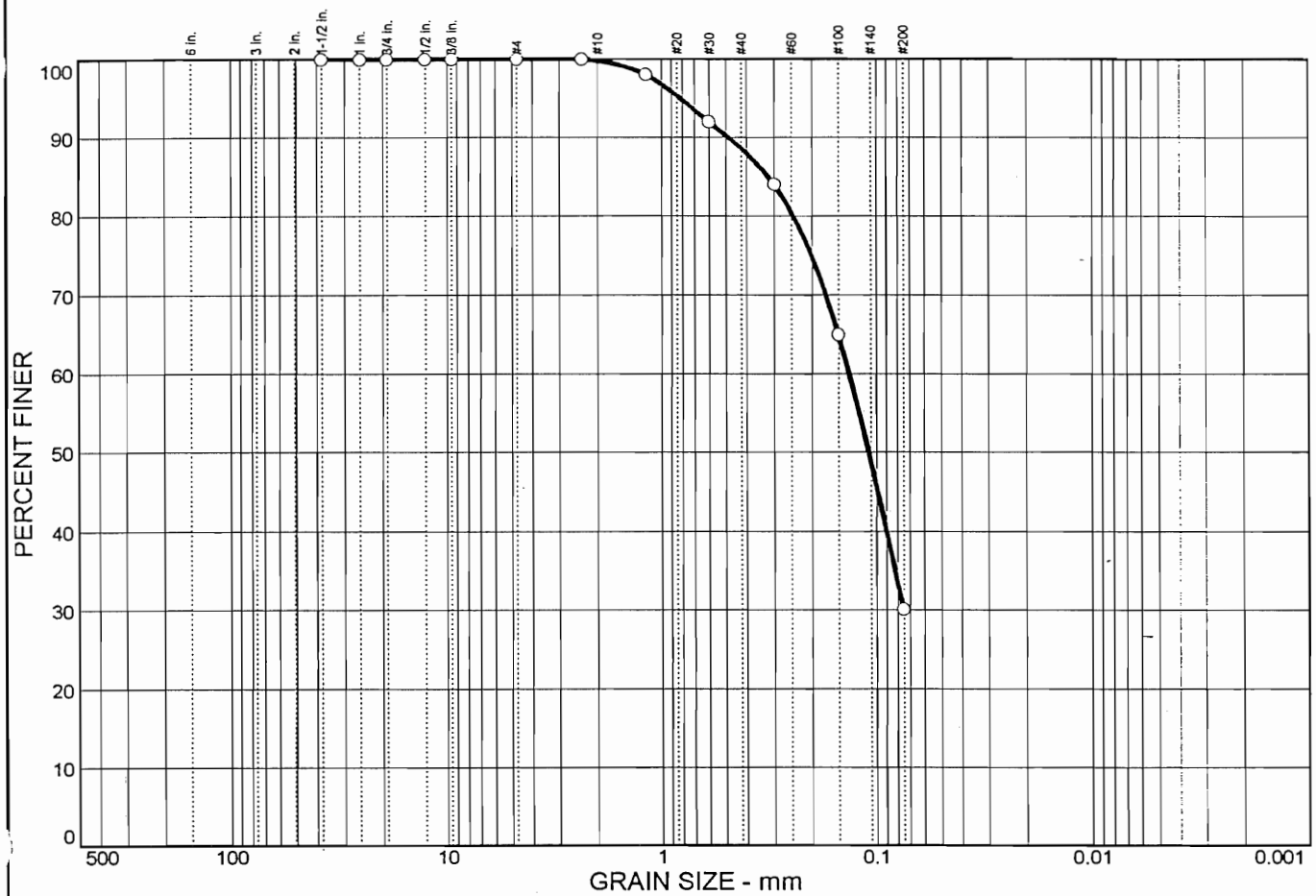
Sample No.: RP-SE-F1 **Source of Sample:** **Date:** 8/31/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011506

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	0	70	30	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	100		
#4	100		
#8	100		
#16	98		
#30	92		
#50	84		
#100	65		
#200	30		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 0.319 D_{60}= 0.133 D_{50}= 0.109
D_{30}= 0.0750 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=0.61

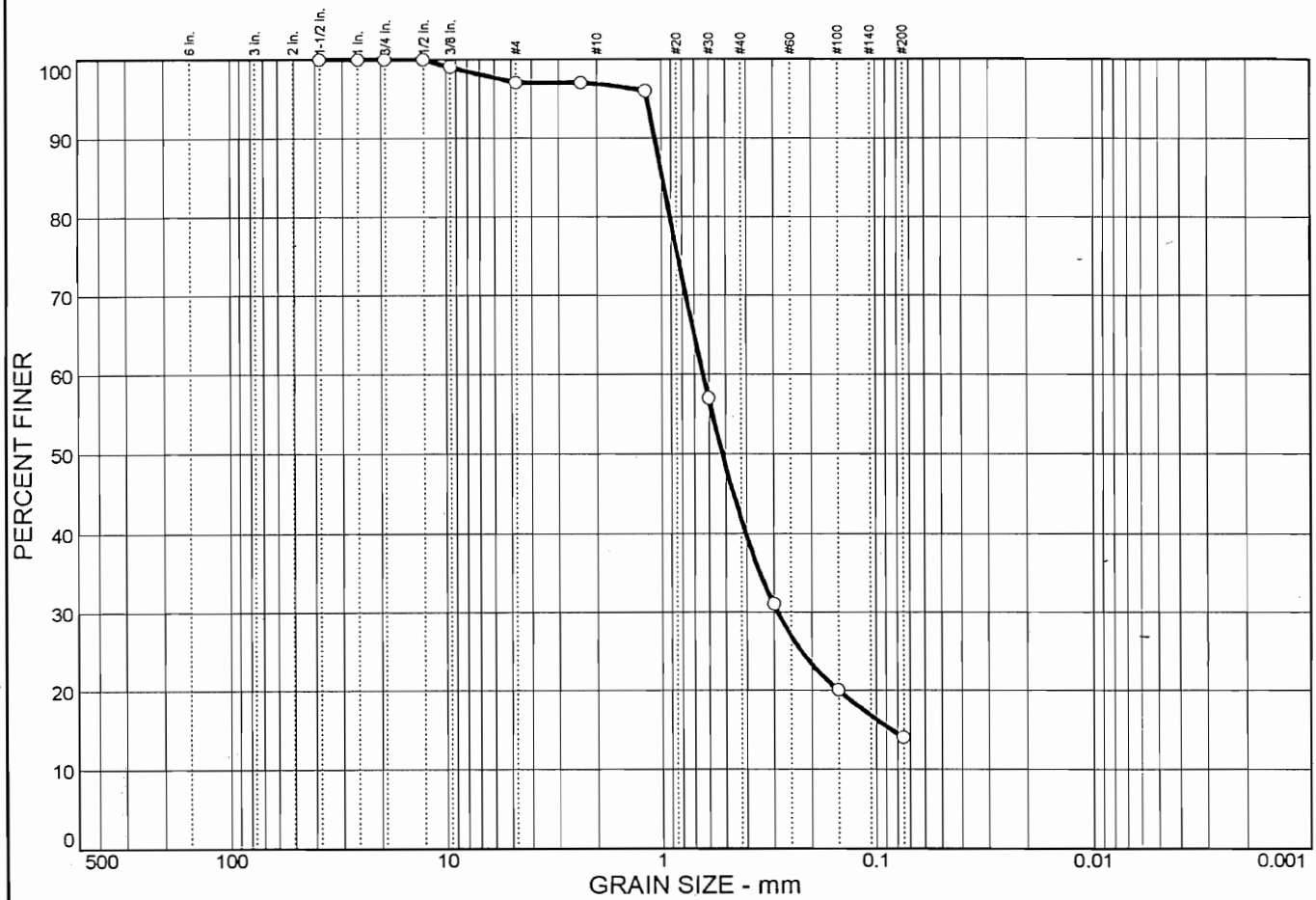
Sample No.: RP-SE-F2 **Source of Sample:** **Date:** 9/10/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011507

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	3	83	14	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	99		
#4	97		
#8	97		
#16	96		
#30	57		
#50	31		
#100	20		
#200	14		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 0.986 D_{60}= 0.636 D_{50}= 0.517
D_{30}= 0.288 D_{15}= 0.0851 D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

F.M.=2.03

Sample No.: RP-SE-G1 **Source of Sample:** **Date:** 9/17/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011509

GRAIN SIZE DISTRIBUTION TEST REPORT

% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	1	73	26	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	100		
#4	99		
#8	99		
#16	97		
#30	76		
#50	64		
#100	44		
#200	26		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 0.830 D_{60}= 0.255 D_{50}= 0.182
D_{30}= 0.0885 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=1.21

Sample No.: RP-SE-G2 **Source of Sample:** **Date:** 9/13/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011508

GRAIN SIZE DISTRIBUTION TEST REPORT

% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	5	67	28	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	99		
.5 in.	99		
.375 in.	99		
#4	95		
#8	91		
#16	78		
#30	59		
#50	49		
#100	38		
#200	28		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 1.59 D_{60}= 0.627 D_{50}= 0.324
D_{30}= 0.0868 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=1.92

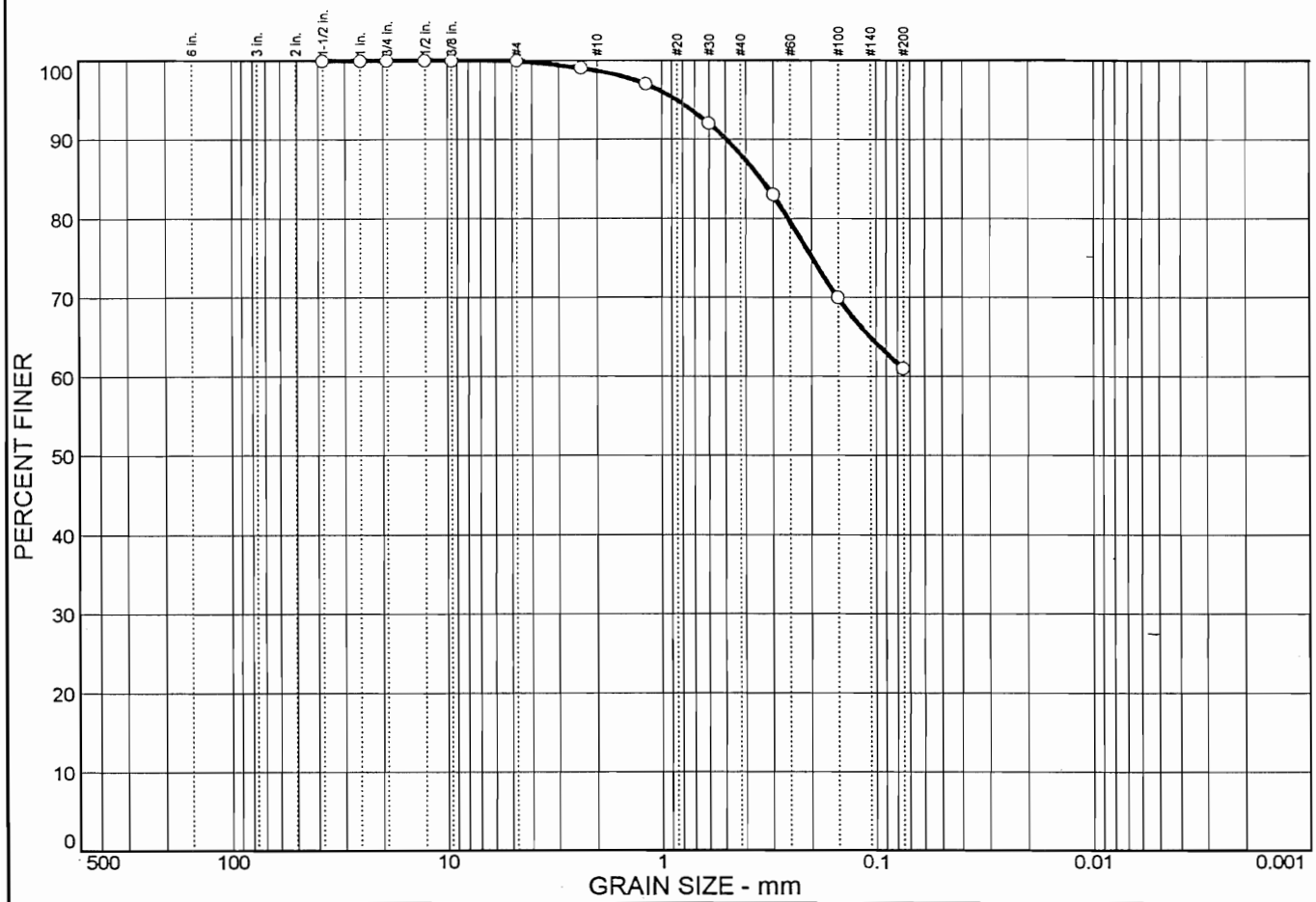
Sample No.: RP-SE-H1 **Source of Sample:** **Date:** 9/10/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011510

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	0	39	61	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	100		
#4	100		
#8	99		
#16	97		
#30	92		
#50	83		
#100	70		
#200	61		

* (no specification provided)

Soil Description

Sandy silt

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 0.339 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

F.M.=0.59

Sample No.: RP-SE-H3 **Source of Sample:** **Date:** 9/10/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

Project No: 18A149.103 **Lab No:** S011512

GRAIN SIZE DISTRIBUTION TEST REPORT

% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0	0	39	61	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100		
1 in.	100		
.75 in.	100		
.5 in.	100		
.375 in.	100		
#4	100		
#8	100		
#16	99		
#30	89		
#50	79		
#100	69		
#200	61		

* (no specification provided)

Soil Description

Sandy silt

Atterberg Limits

PL= N/T LL= N/T PI=

Coefficients

D_{85}= 0.455 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

F.M.=0.64

Sample No.: RP-SE-I3 **Source of Sample:** **Date:** 9/13/99
Location: Riley Pass **Elev./Depth:**

MSE-HKM, INC.

Client: PIONEER TECHNICAL SERVICES
Project: Riley Pass, USFS #3802

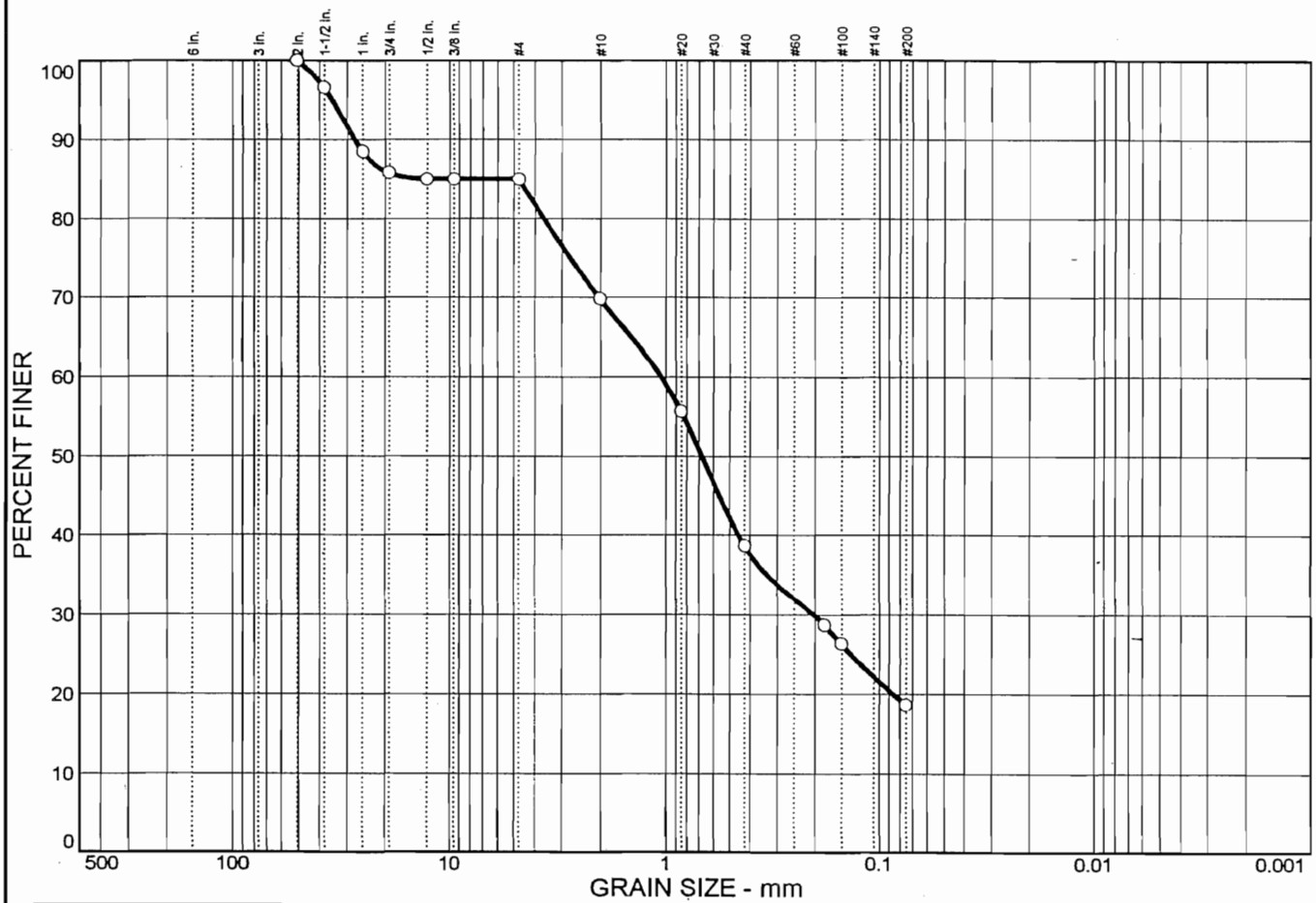
Project No: 18A149.103 **Lab No:** S011516

1999

SEDIMENT SAMPLES

PARTICLE SIZE DISTRIBUTION

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	15	66	19	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2 in.	100		
1.5 in.	97		
1 in.	88		
.75 in.	86		
.5 in.	85		
.375 in.	85		
#4	85		
#10	70		
#20	56		
#40	39		
#80	29		
#100	26		
#200	19		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= 4.75 D_{60}= 1.05 D_{50}= 0.676
D_{30}= 0.202 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

Sample No.: 15667 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-H2 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass
Project No: 18A149.103 **Figure** 01

PARTICLE SIZE DISTRIBUTION TEST REPORT

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	15	66	19	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2 in.	100		
1.5 in.	97		
1 in.	88		
.75 in.	86		
.5 in.	85		
.375 in.	85		
#4	85		
#10	70		
#20	56		
#40	39		
#80	29		
#100	26		
#200	19		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= 4.75 D_{60}= 1.05 D_{50}= 0.676
D_{30}= 0.202 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

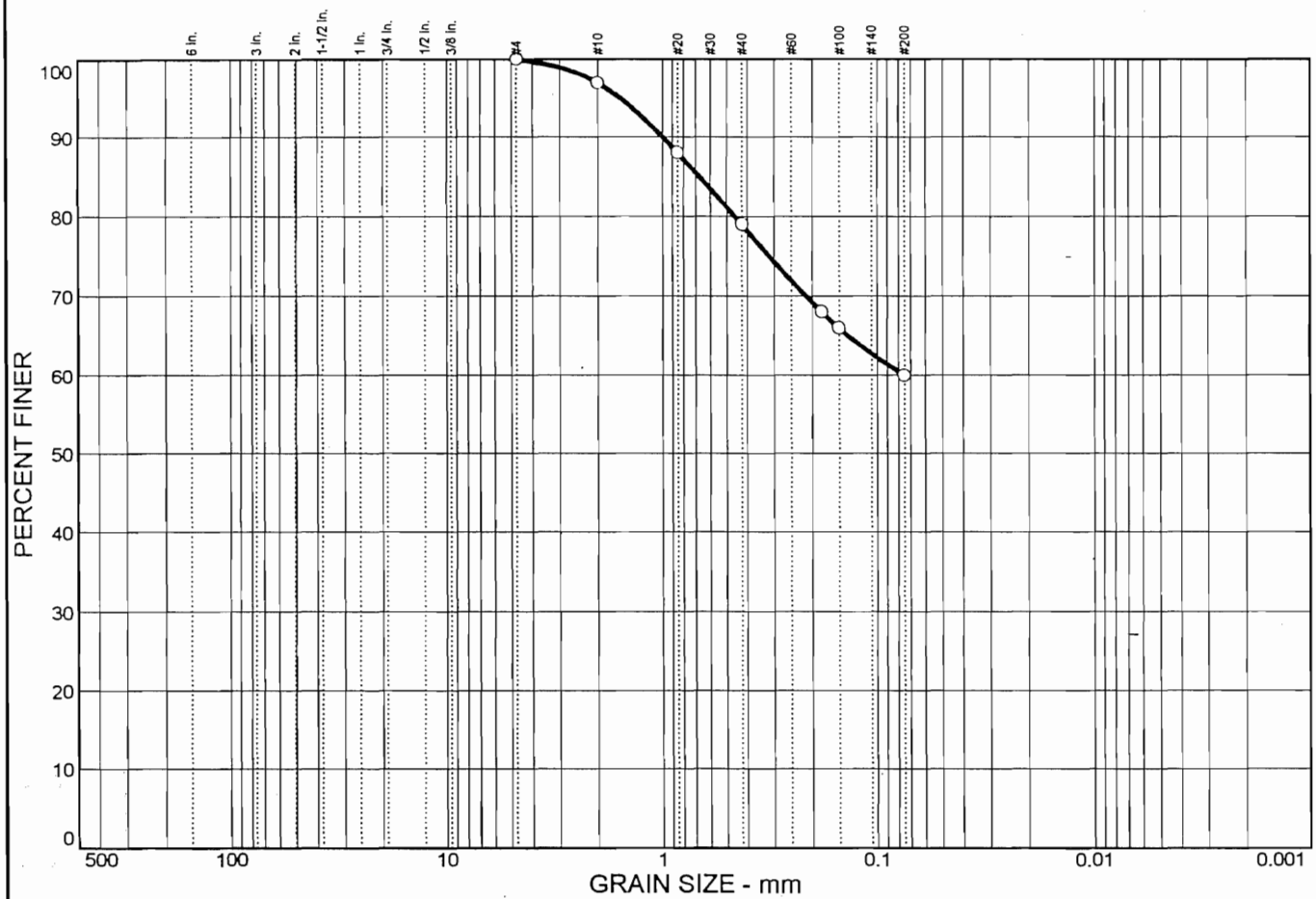
Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

Sample No.: 15667 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-H2 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass
Project No: 18A149.103 **Figure** 01

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	0	40	60	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	97		
#20	88		
#40	79		
#80	68		
#100	66		
#200	60		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= 0.672 D_{60}= 0.0750 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

Sample No.: 15668 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-H4 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass
Project No: 18A149.103 **Figure** 02

PARTICLE SIZE DISTRIBUTION TEST REPORT

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	0	85	15	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	97		
#20	93		
#40	73		
#80	53		
#100	44		
#200	15		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= 0.665 D_{60}= 0.218 D_{50}= 0.169
D_{30}= 0.110 D_{15}= 0.0750 D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

Sample No.: 15669 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-I1 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass

Project No: 18A149.103 **Figure** 03

PARTICLE SIZE DISTRIBUTION TEST REPORT

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	0	33	67	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	97		
#40	86		
#80	77		
#100	74		
#200	67		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= 0.388 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

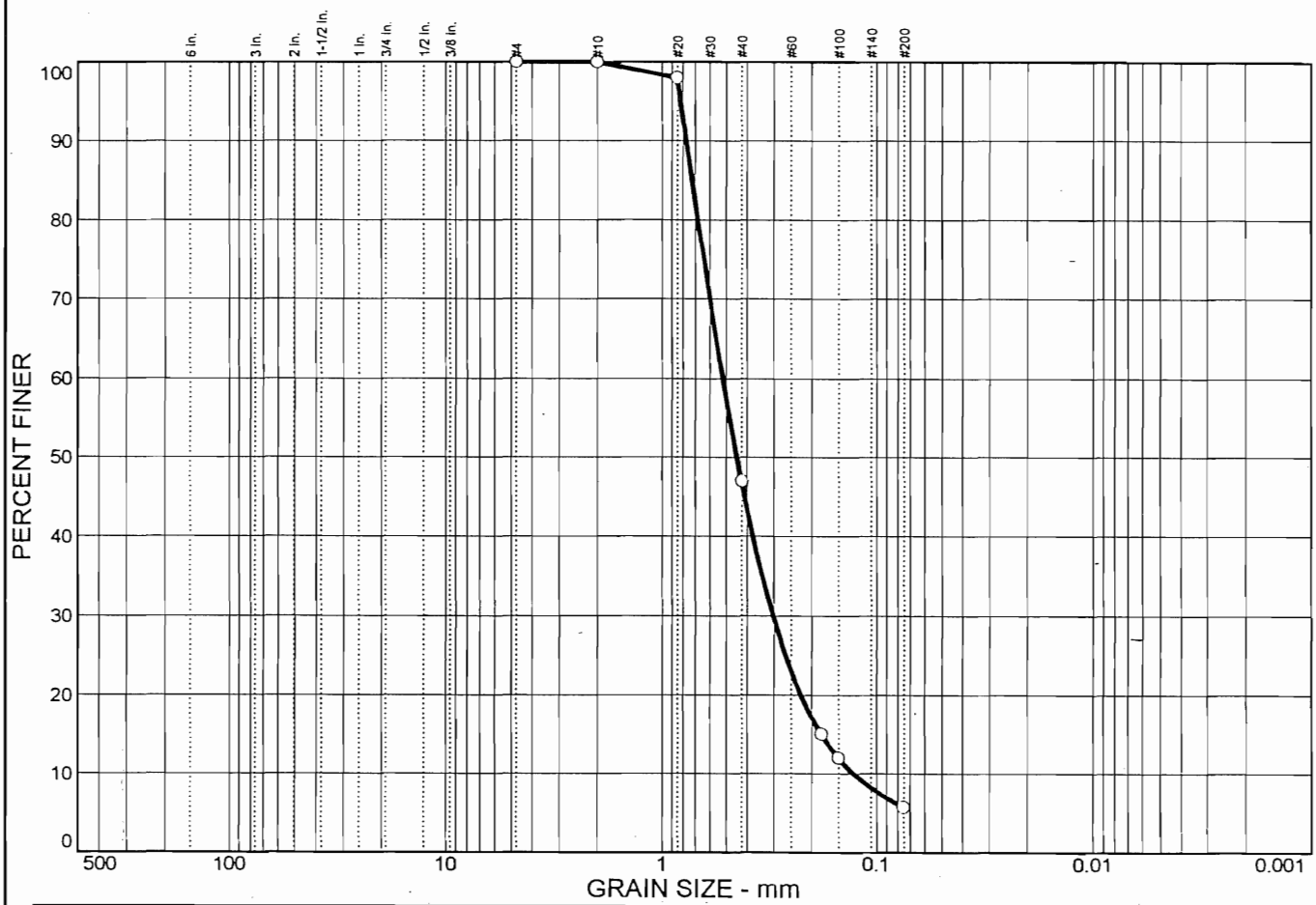
Sample No.: 15670 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-I2 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass

Project No: 18A149.103 **Figure** 04

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	0	94	6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	98		
#40	47		
#80	15		
#100	12		
#200	5.7		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= 0.723 D_{60}= 0.519 D_{50}= 0.446
D_{30}= 0.302 D_{15}= 0.180 D_{10}= 0.128
C_u= 4.06 C_c= 1.37

Classification

USCS= N/T AASHTO= N/T

Remarks

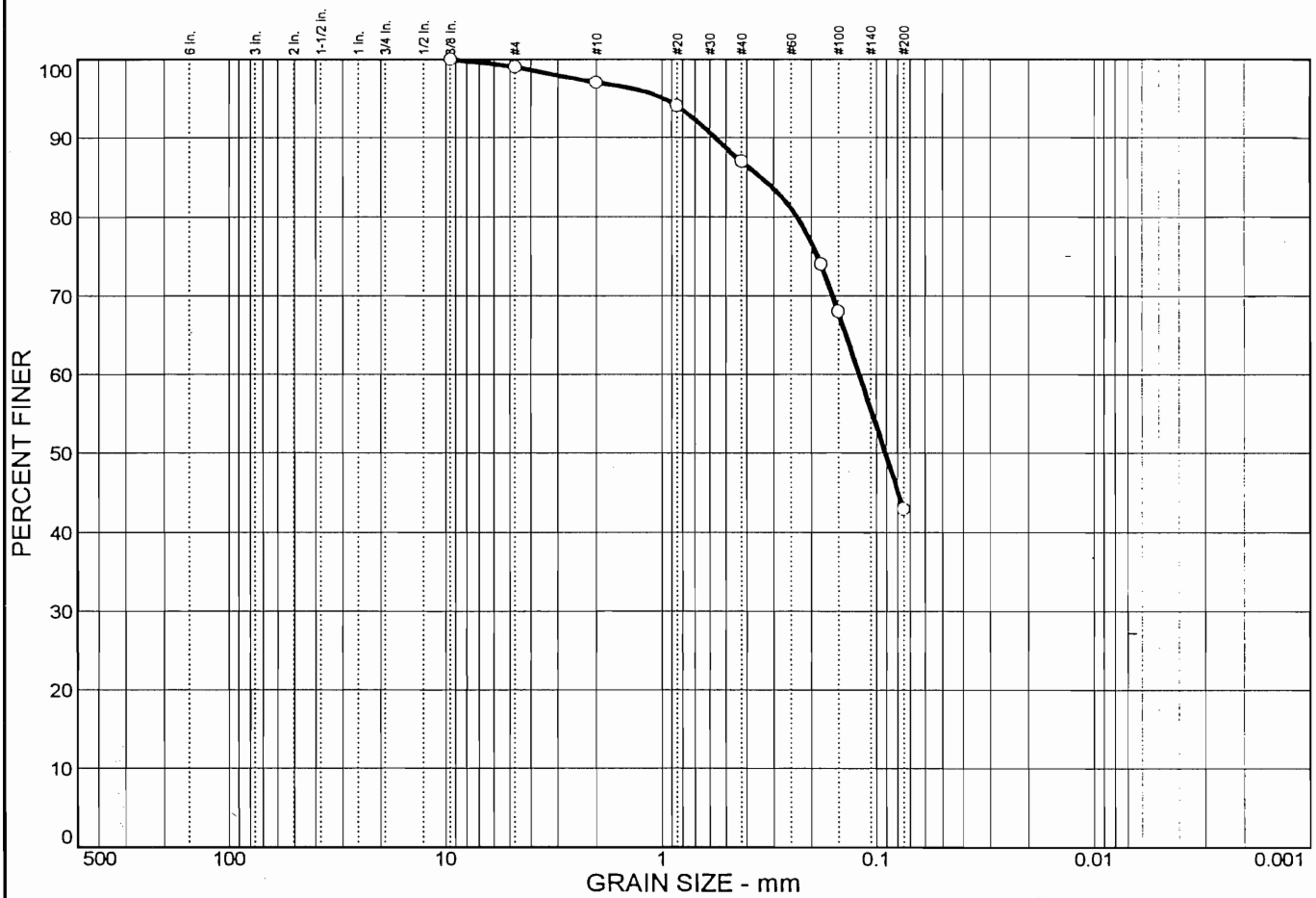
Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

Sample No.: 15671 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-I4 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass
Project No: 18A149.103 **Figure** 05

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	1	56	43	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100		
#4	99		
#10	97		
#20	94		
#40	87		
#80	74		
#100	68		
#200	43		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= 0.344 D_{60}= 0.120 D_{50}= 0.0908
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

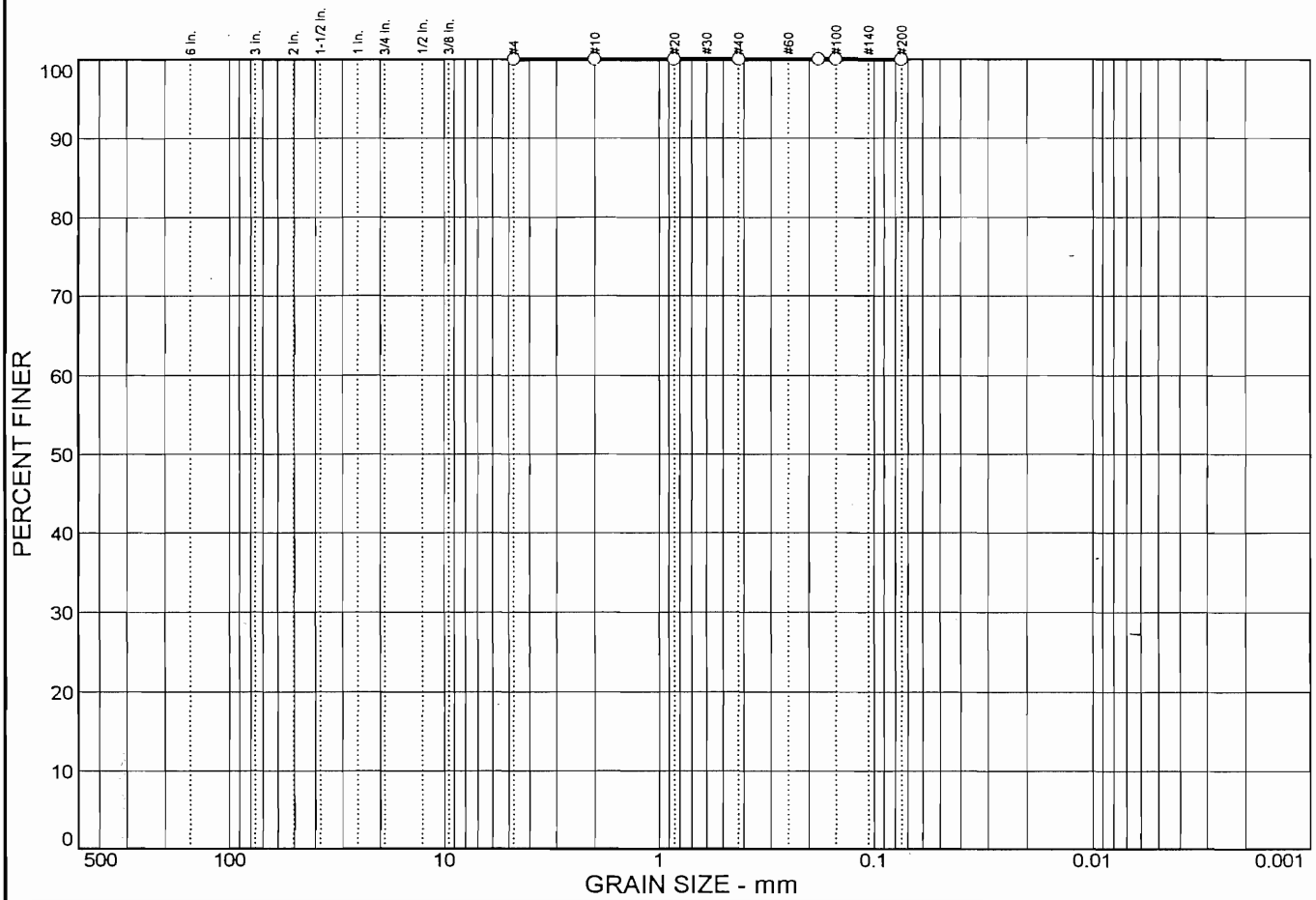
Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

Sample No.: 15672 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-SP1 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass
Project No: 18A149.103 **Figure** 06

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	0	0	100	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	100		
#80	100		
#100	100		
#200	100		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

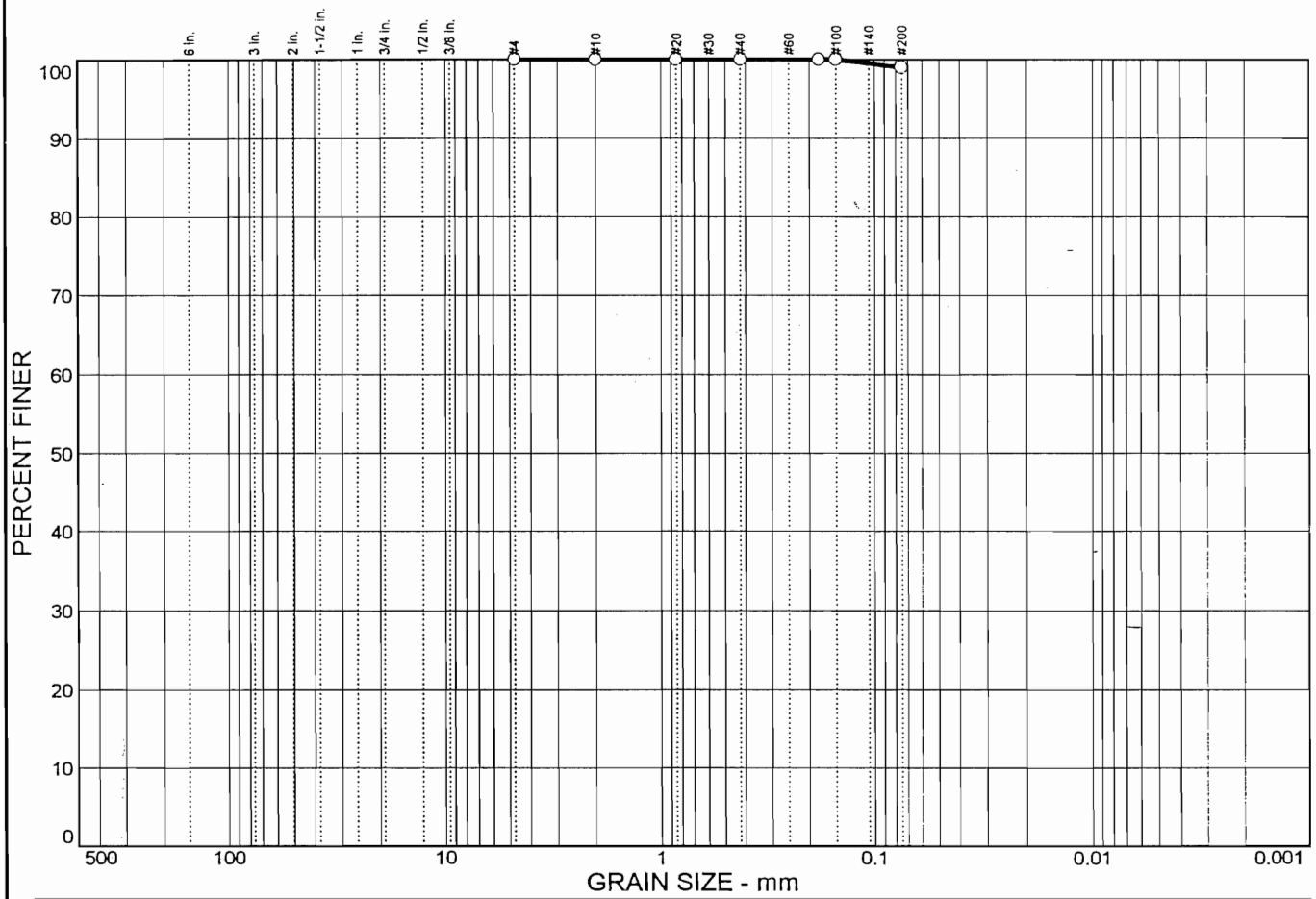
Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

Sample No.: 15673 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-SP2 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass
Project No: 18A149.103 **Figure** 07

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	0	1	99	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	100		
#80	100		
#100	100		
#200	99		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

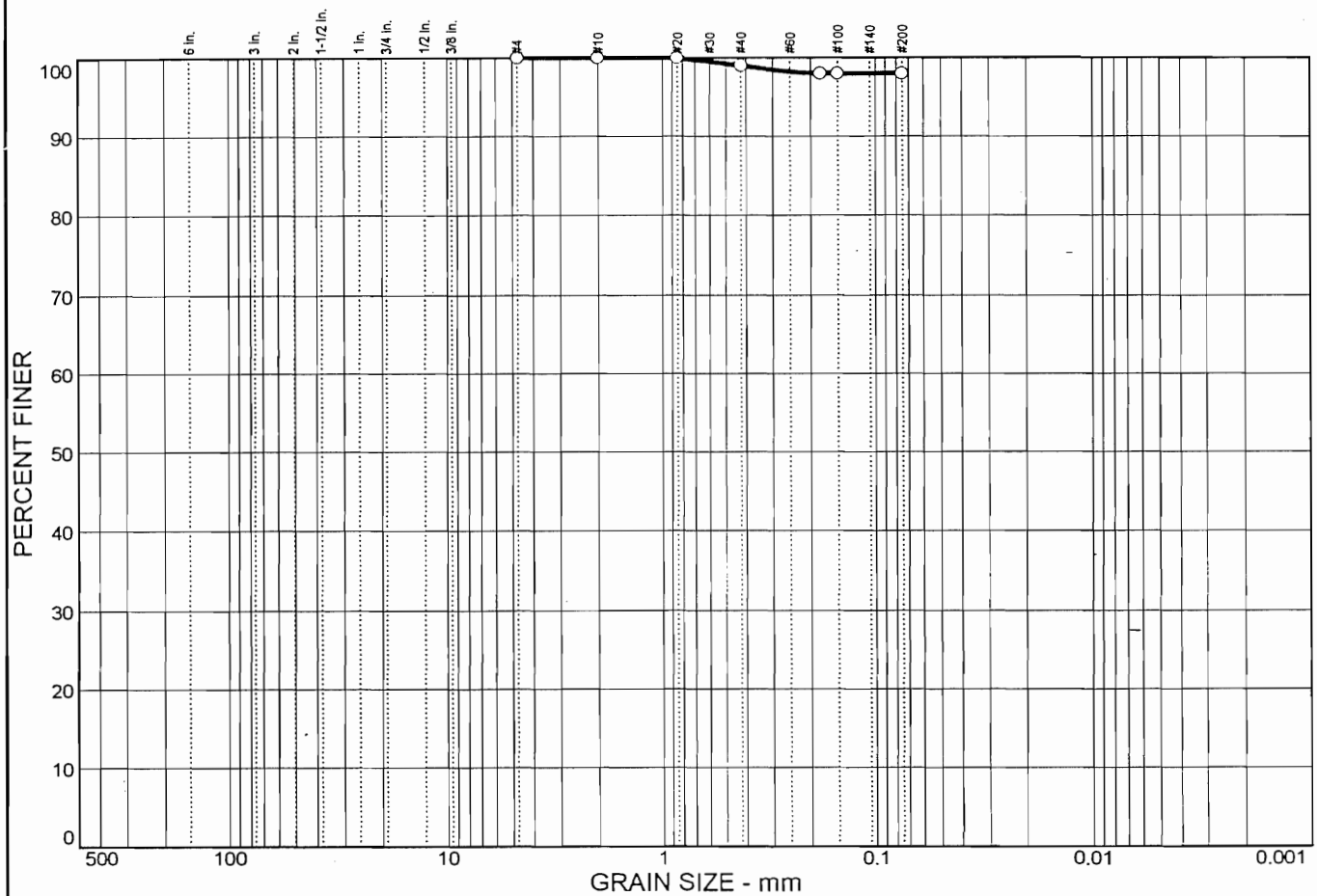
Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

Sample No.: 15674 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-SP3 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass
Project No: 18A149.103 **Figure** 08

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	0	2	98	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	99		
#80	98		
#100	98		
#200	98		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

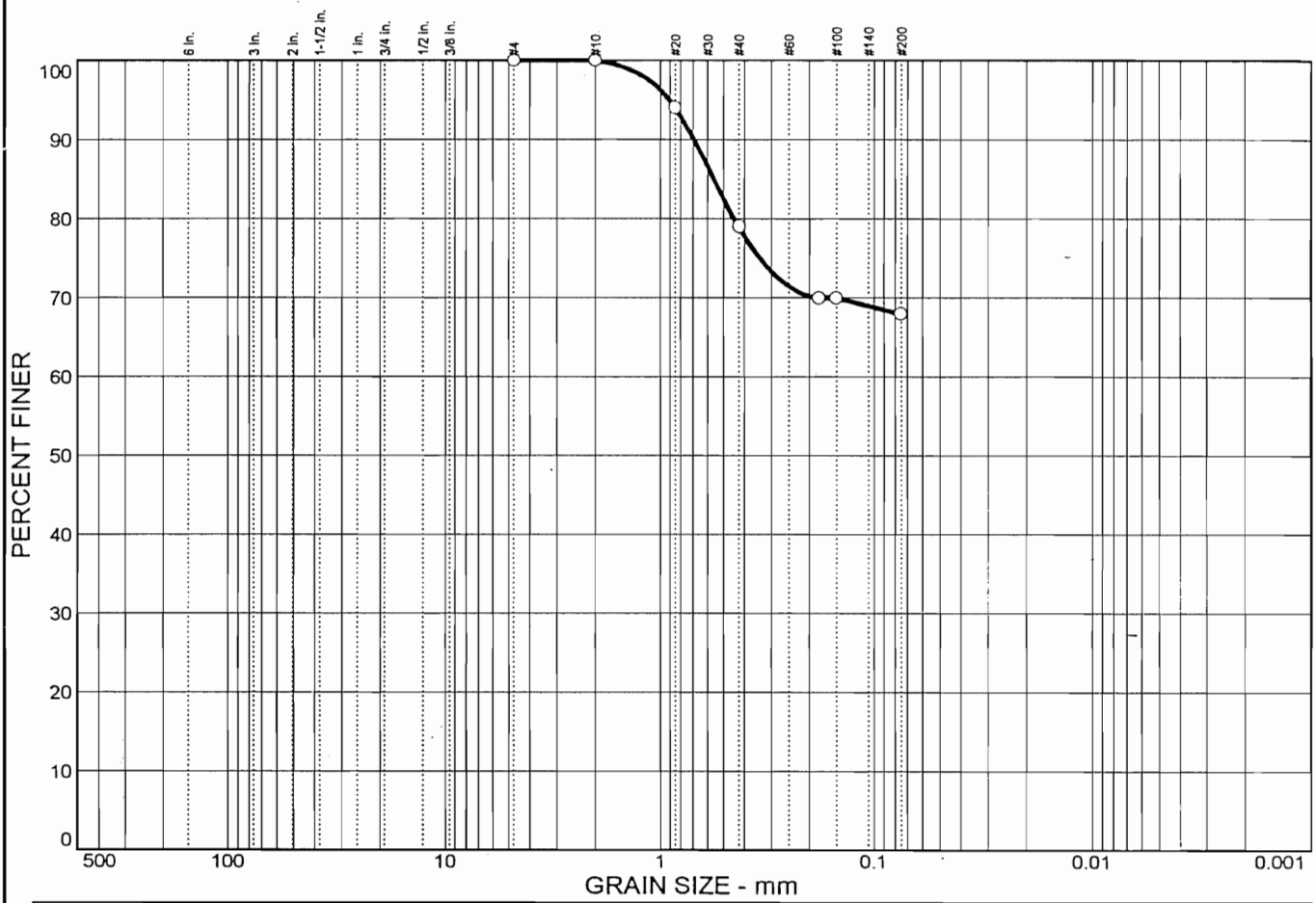
Sample No.: 15675 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-SP4 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass

Project No: 18A149.103 **Figure** 09

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	0	32	68	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	94		
#40	79		
#80	70		
#100	70		
#200	68		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= 0.556 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

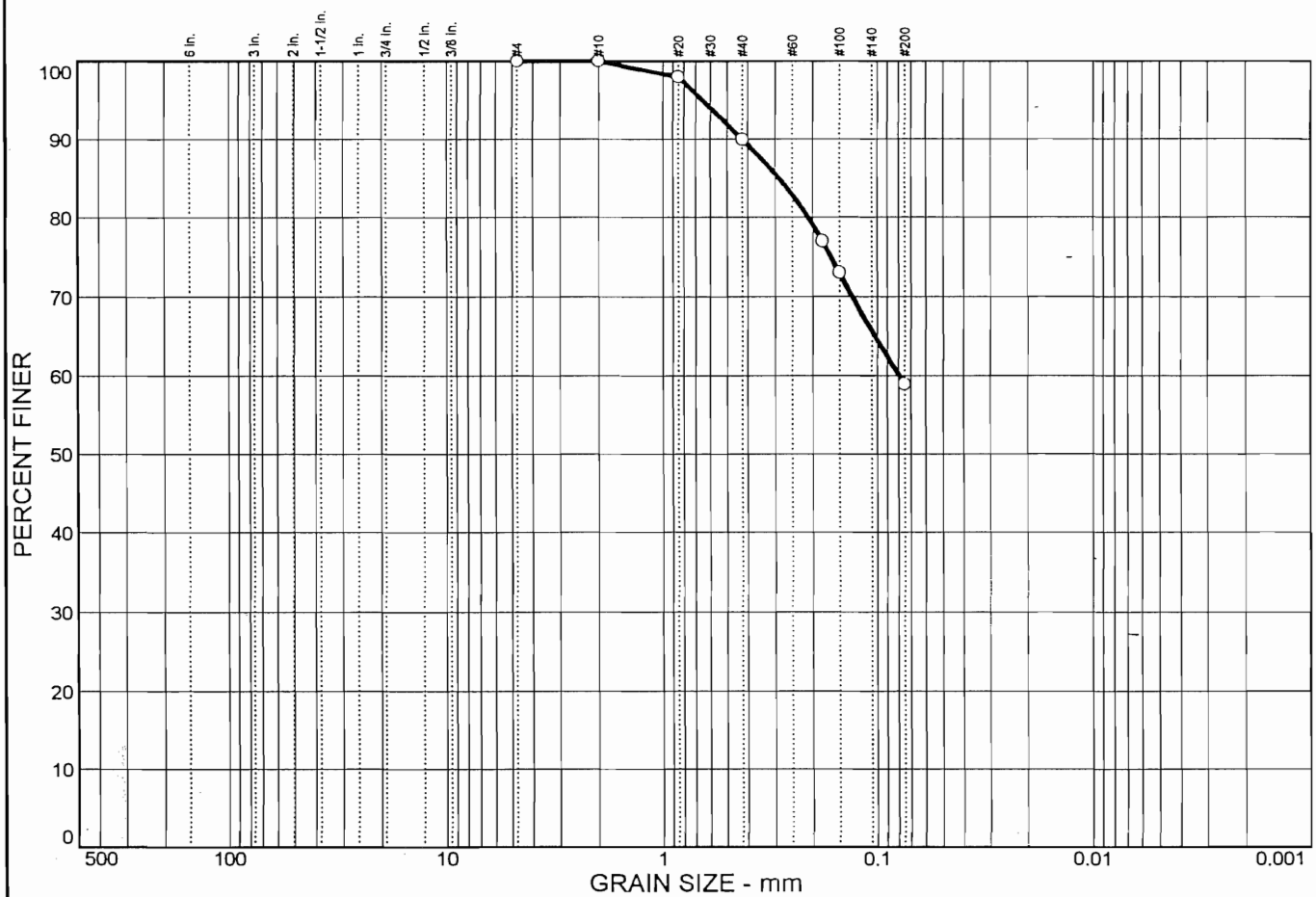
Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

Sample No.: 15676 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-SP5 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass
Project No: 18A149.103 **Figure** 10

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	0	41	59	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	98		
#40	90		
#80	77		
#100	73		
#200	59		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= 0.287 D_{60}= 0.0790 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

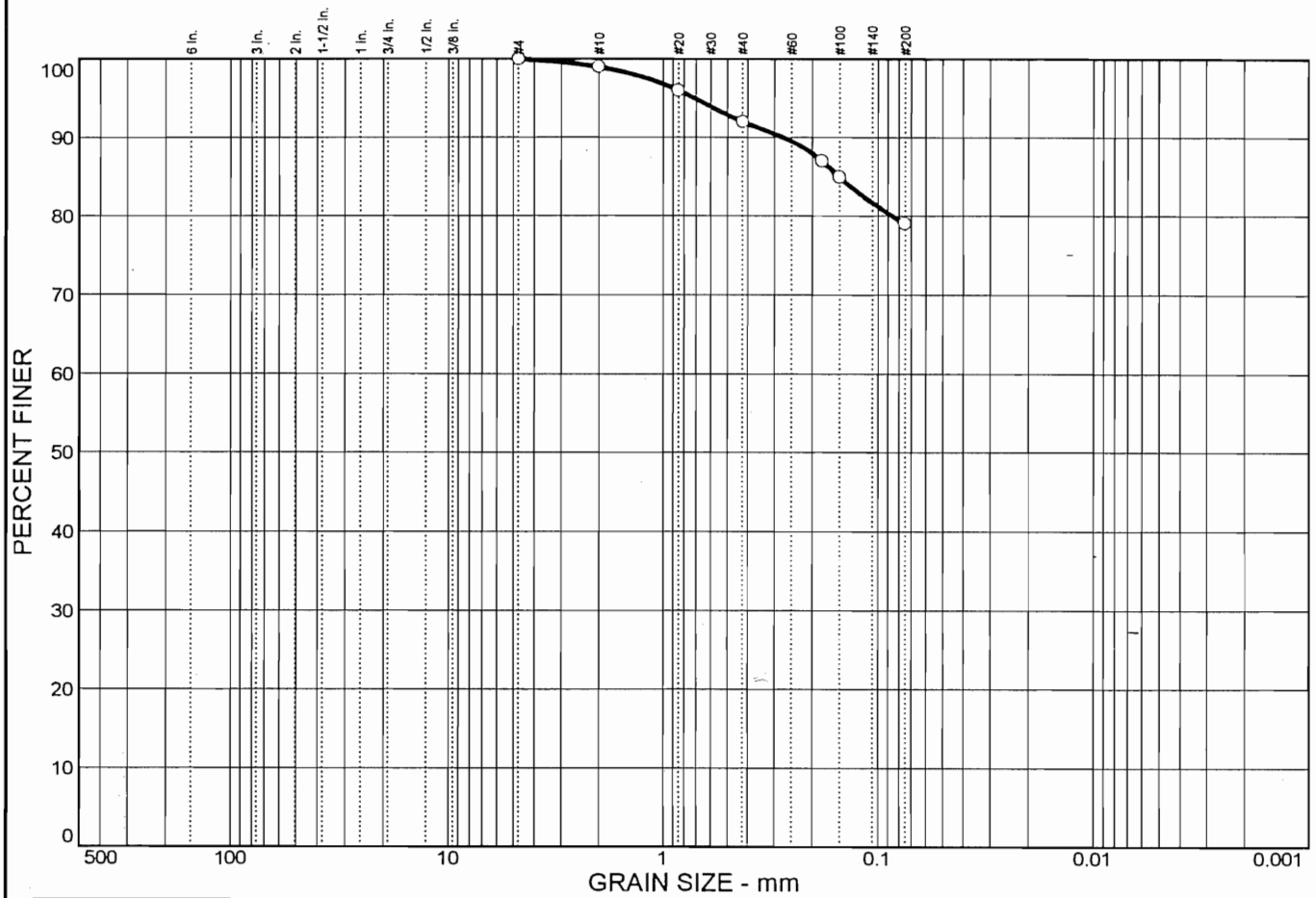
Sample No.: 15677 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-SP6 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass

Project No: 18A149.103 **Figure** 11

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	0	21	79	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	99		
#20	96		
#40	92		
#80	87		
#100	85		
#200	79		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= 0.150 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

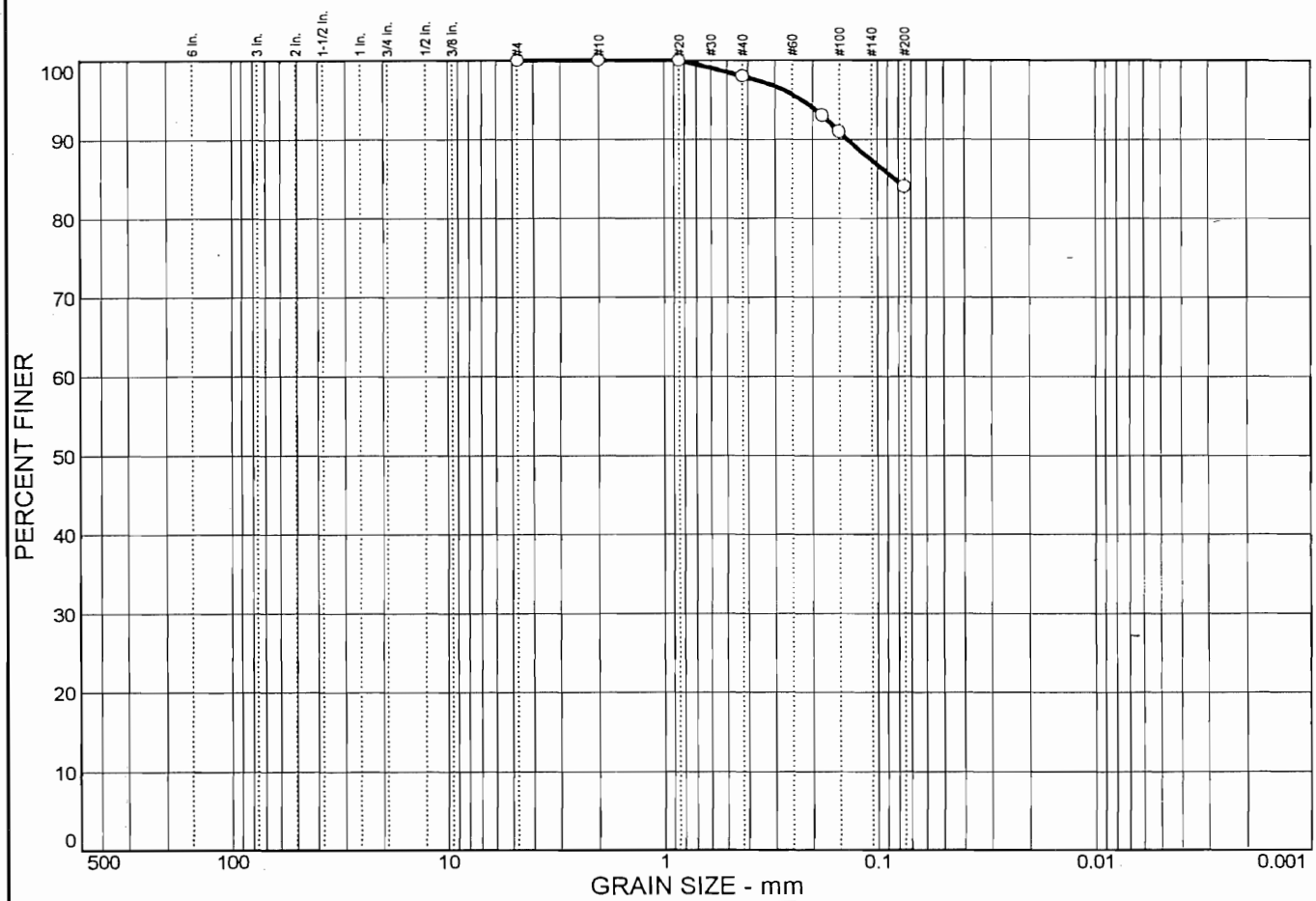
Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

Sample No.: 15678 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-SP7 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass
Project No: 18A149.103 **Figure** 12

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0	0	16	84	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	98		
#80	93		
#100	91		
#200	84		

* (no specification provided)

Soil Description

Atterberg Limits

PL= N/T LL= N/T PI= N/T

Coefficients

D_{85}= 0.0832 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= N/T AASHTO= N/T

Remarks

Sampled by: Client
Date Received: 9-13-99
Date Tested: 9-16-99

Sample No.: 15679 **Source of Sample:** Site Samples **Date:** 9-20-99
Location: RP-SE-SP8 **Elev./Depth:**

MSE-HKM, INC.

Client:
Project: Riley Pass
Project No: 18A149.103 **Figure** 13

2000

SOIL AND SEDIMENT SAMPLES

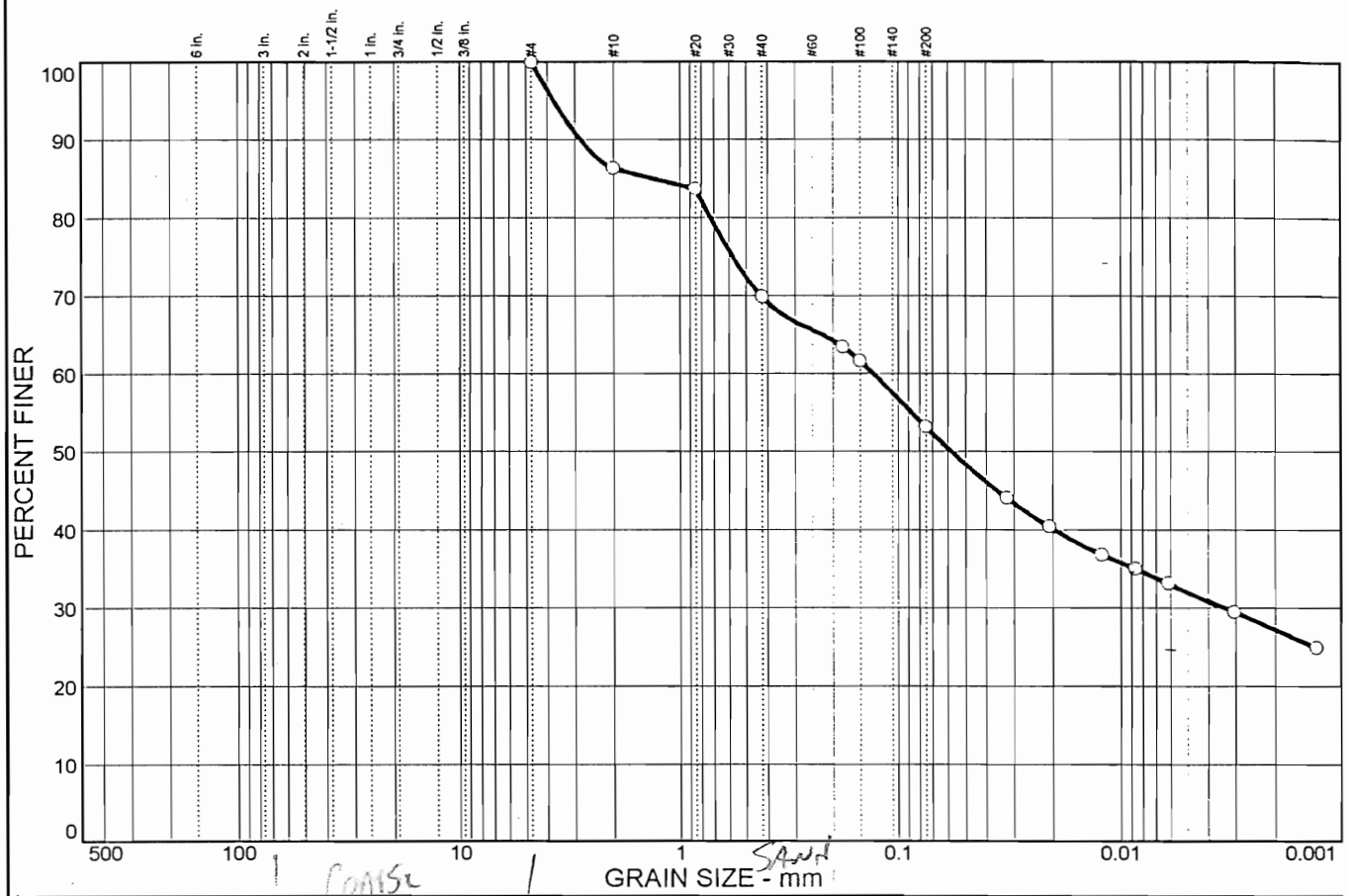
PARTICLE SIZE DISTRIBUTION

CLIENT: PIONEER TECHNICAL SERVICES
PROJECT: RILEY PASS
DATE RECEIVED: 08/07/00
BIF: 007503

MSE/HKM LAB No	FIELD ID	DATE SAMPLED	Sand (%)	Silt (%)	Clay (%)	Texture
000807Q006	RP-SS-K1	08/02/2000	45.0	21.9	33.1	Sandy Clay Loam/Clay Loam
000807Q007	RP-SS-K2	08/02/2000	48.8	21.3	30.0	Sandy Clay Loam
000807Q008	RP-SE-K3	08/02/2000	90.0	5.0	5.0	Sand
000807Q009	RP-SE-J1	08/02/2000	41.3	32.5	26.3	Loam
000807Q010	RP-SE-J2	08/02/2000	85.0	8.8	6.3	Loamy Sand
000807Q011	RP-SS-J2	08/02/2000	82.5	8.8	8.8	Loamy Sand
000807Q012	RP-SS-J1	08/02/2000	76.3	16.3	7.5	Sandy Loam
000807Q013	RP-SE-J3	08/02/2000	76.9	14.4	8.8	Sandy Loam
000807Q014	RP-SE-X3	08/02/2000	81.9	13.8	4.4	Loamy Sand
000807Q015	RP-SE-L2	08/02/2000	55.0	15.0	30.0	Sandy Clay Loam
000807Q016	RP-SS-X3	08/02/2000	65.0	28.8	6.3	Sandy Loam
000807Q017	RP-SS-L1	08/02/2000	48.8	21.3	30.0	Sandy Clay Loam
000807Q018	RP-SE-L1	08/02/2000	61.3	21.3	17.5	Sandy Loam
000807Q019	RP-SS-X2	08/03/2000	77.5	17.5	5.0	Sandy Loam
000807Q020	RP-SE-X2	08/03/2000	76.3	16.3	7.5	Sandy Loam
000807Q021	RP-SS-XD	08/03/2000	67.5	25.0	7.5	Sandy Loam
000807Q022	RP-SE-XD	08/03/2000	85.0	8.8	6.3	Loamy Sand
000807Q023	RP-SE-K1	08/02/2000	76.3	12.5	11.3	Sandy Loam
000807Q024	RP-SE-K2	08/02/2000	81.3	11.3	7.5	Loamy Sand

Review

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	13.7	16.4	16.7	21.2	32.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	86.3		
#20	83.7		
#40	69.9		
#80	63.5		
#100	61.7		
#200	53.2		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= * Sandy silt (ML)

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 1.30 D_{60}= 0.129 D_{50}= 0.0573
D_{30}= 0.0034 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.38

Sample No.: LAB ID:000807Q006 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SS-K1 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT

% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	10.6	20.3	9.3	24.0	35.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	89.4		
#20	84.2		
#40	69.1		
#80	64.4		
#100	63.6		
#200	59.8		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= * Sandy silt (ML)

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 0.896 D_{60}= 0.0771 D_{50}= 0.0255
D_{30}= 0.0024 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

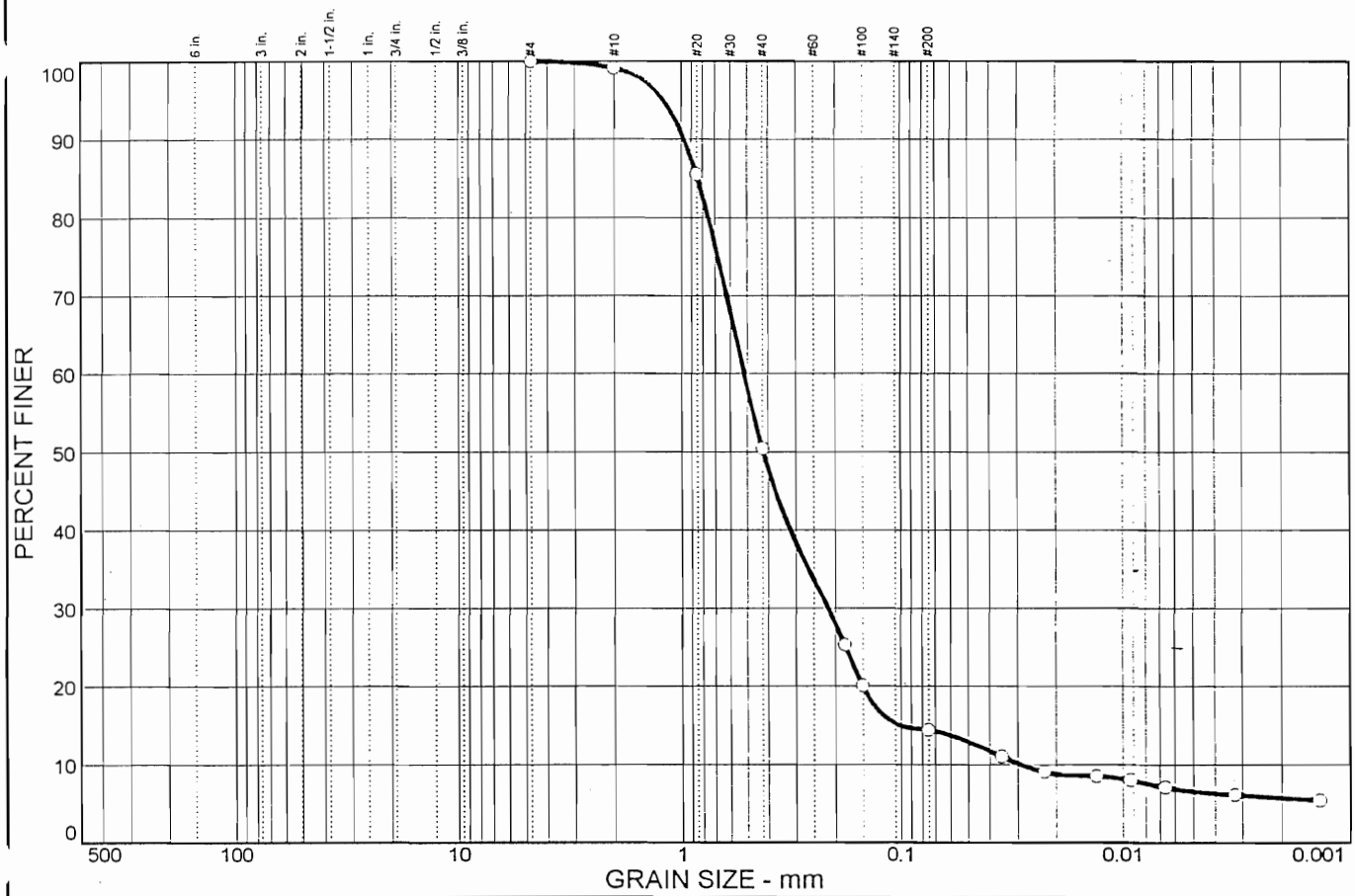
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.36

Sample No.: LAB ID:000807Q007 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SS-K2 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.9	48.6	36.1	7.8	6.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.1		
#20	85.5		
#40	50.5		
#80	25.3		
#100	20.1		
#200	14.4		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= * Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 0.839 D_{60}= 0.515 D_{50}= 0.420
D_{30}= 0.215 D_{15}= 0.100 D_{10}= 0.0292
C_u= 17.67 C_c= 3.07

Classification

USCS= SM AASHTO= A-1-b

Remarks

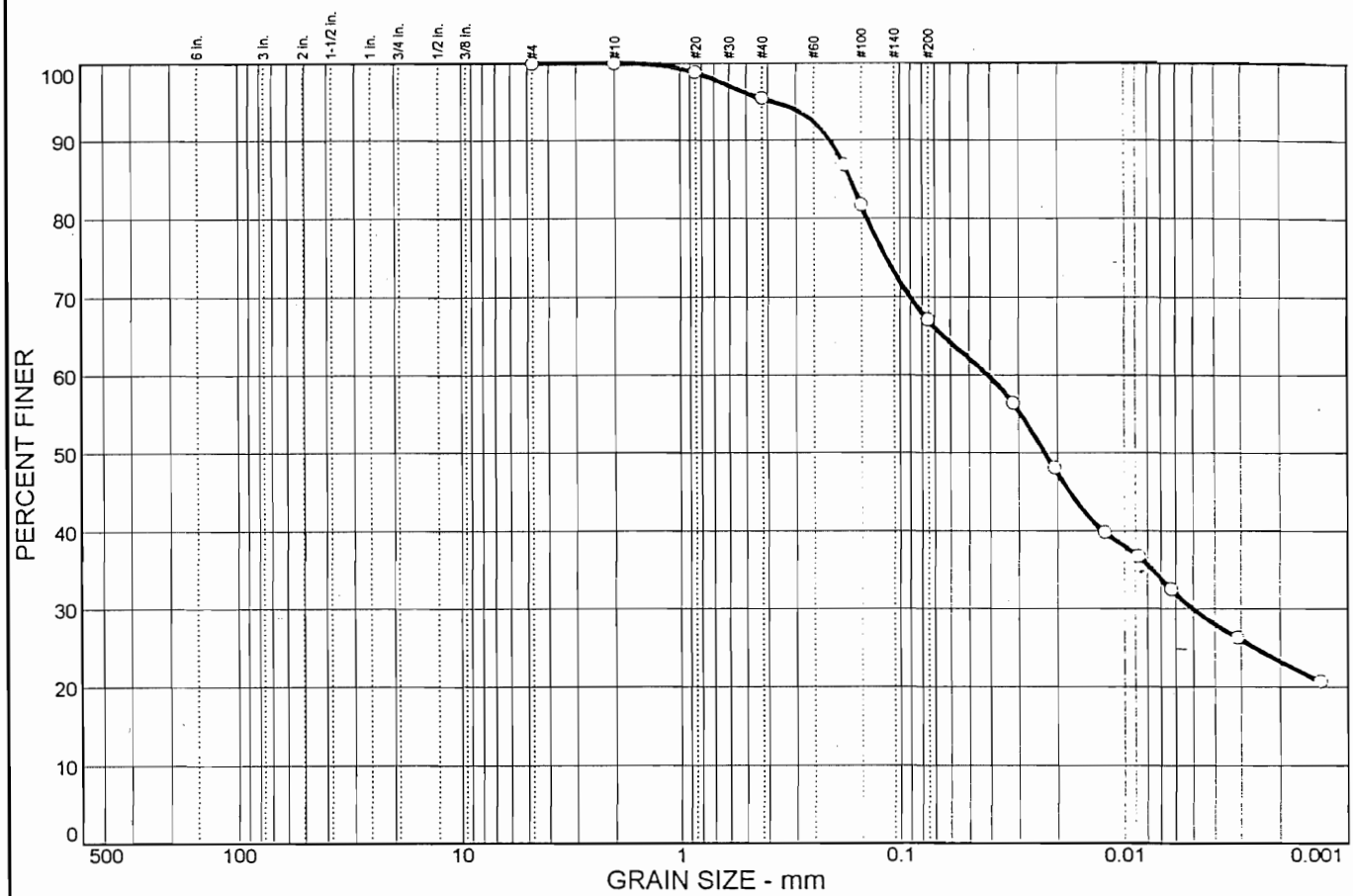
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.80

Sample No.: LAB ID:000807Q008 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SE-K3 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	4.6	28.3	37.1	30.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	98.8		
#40	95.4		
#80	86.8		
#100	81.7		
#200	67.1		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= * Sandy silt (ML)

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 0.168 D_{60}= 0.0409 D_{50}= 0.0227
D_{30}= 0.0050 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

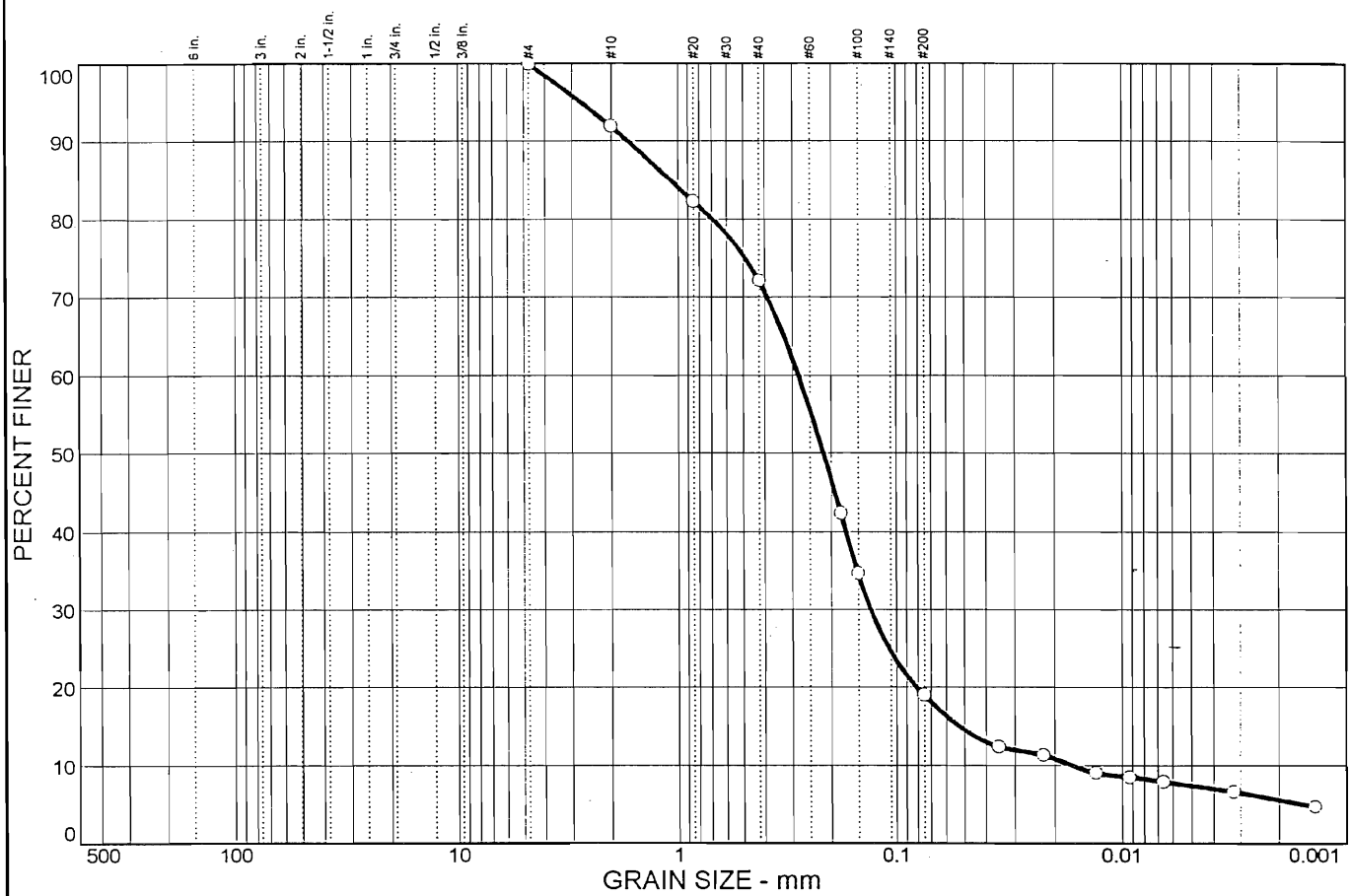
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.18

Sample No.: LAB ID:000807Q009 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SE-J1 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	8.1	19.8	53.1	11.6	7.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	91.9		
#20	82.3		
#40	72.1		
#80	42.4		
#100	34.7		
#200	19.0		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= * Silty sand (SM)

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 1.08 D_{60}= 0.281 D_{50}= 0.216
D_{30}= 0.131 D_{15}= 0.0524 D_{10}= 0.0167
C_u= 16.79 C_c= 3.65

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

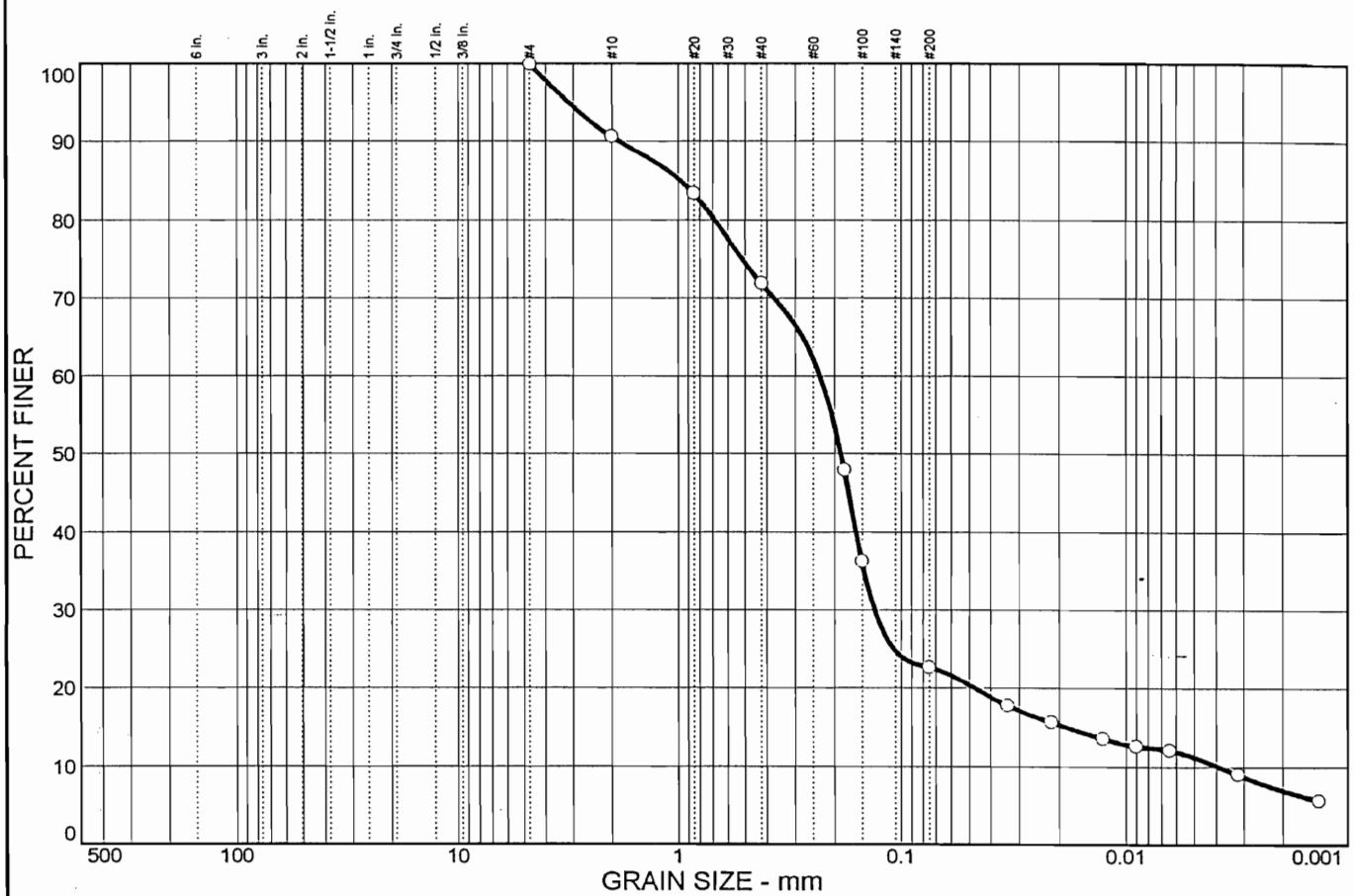
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.65

Sample No.: LAB ID:000807Q010 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SE-J2 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	9.4	18.7	49.2	11.5	11.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	90.6		
#20	83.4		
#40	71.9		
#80	48.0		
#100	36.3		
#200	22.7		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= * Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 0.970 D_{60}= 0.232 D_{50}= 0.186
D_{30}= 0.131 D_{15}= 0.0183 D_{10}= 0.0039
C_u= 59.72 C_c= 19.08

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

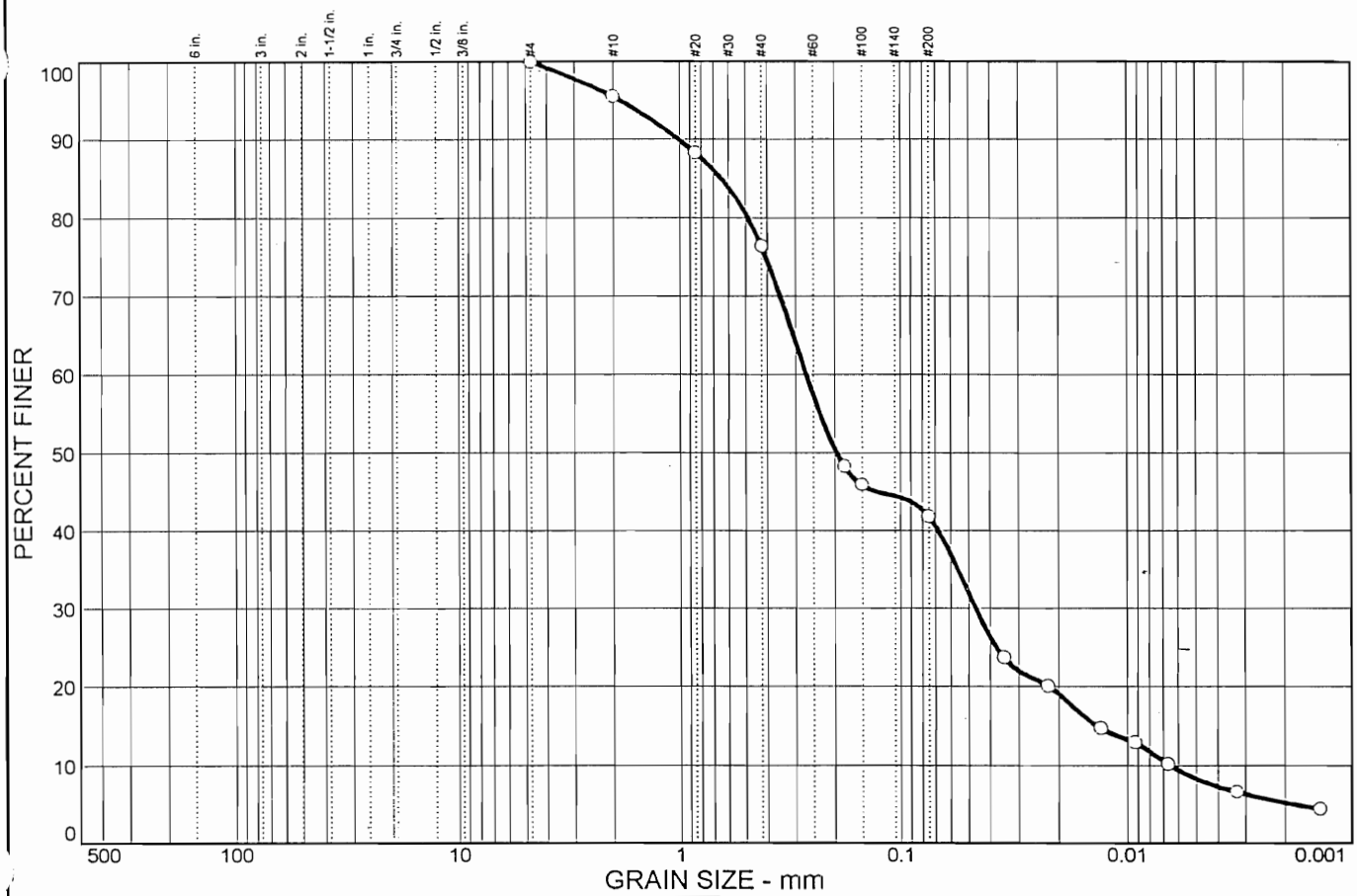
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.64

Sample No.: LAB ID:000807Q011 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SS-J2 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	4.5	19.1	34.6	33.5	8.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	95.5		
#20	88.3		
#40	76.4		
#80	48.3		
#100	45.9		
#200	41.8		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= * Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 0.644 D_{60}= 0.267 D_{50}= 0.195
D_{30}= 0.0462 D_{15}= 0.0136 D_{10}= 0.0065
C_u= 41.28 C_c= 1.24

Classification

USCS= SM AASHTO= A-4(0)

Remarks

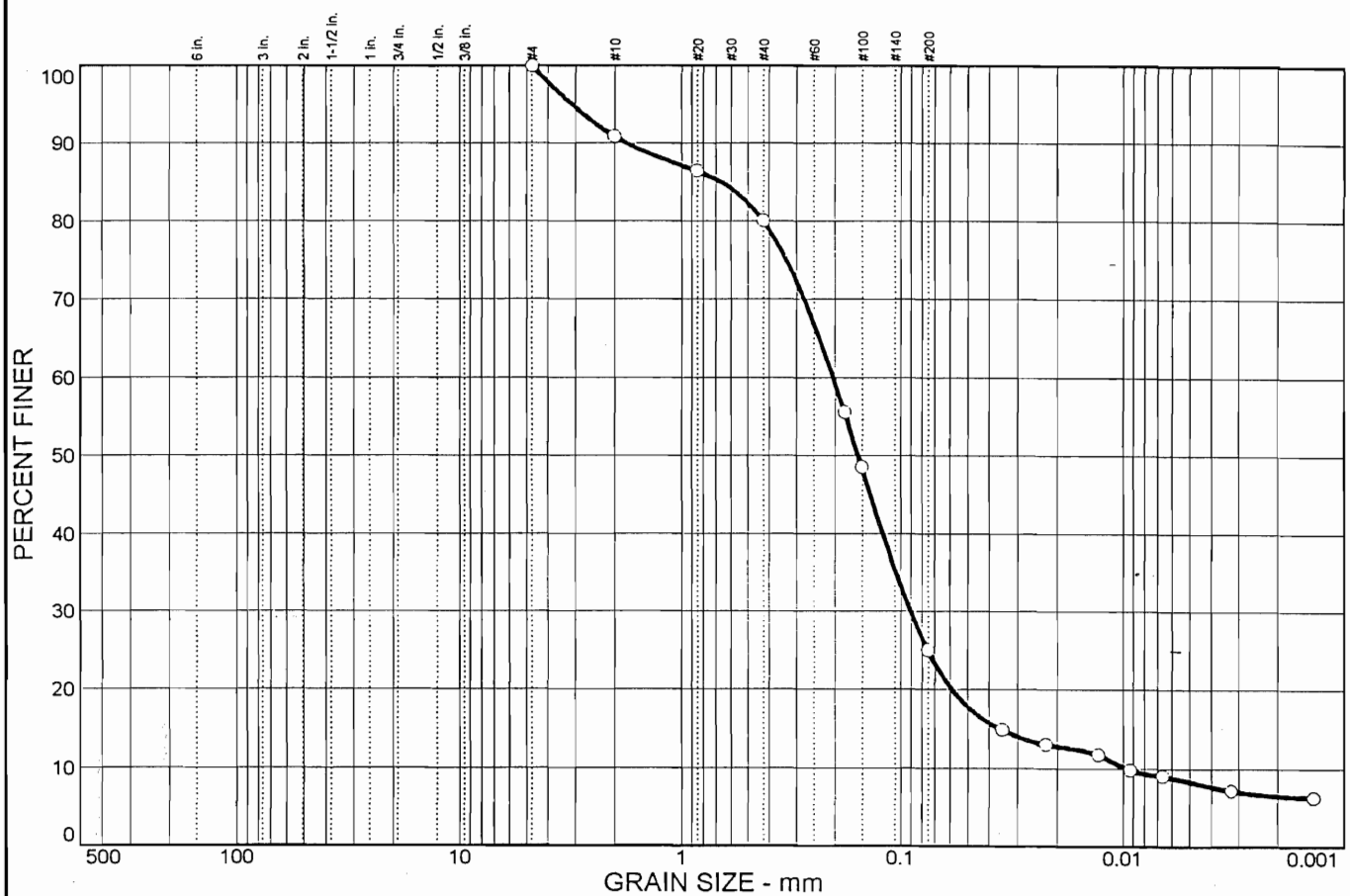
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.54

Sample No.: LAB ID:000807Q012 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SS-J1 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	9.1	10.9	55.0	16.7	8.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	90.9		
#20	86.4		
#40	80.0		
#80	55.6		
#100	48.5		
#200	25.0		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= * Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 0.663 D_{60}= 0.203 D_{50}= 0.156
D_{30}= 0.0899 D_{15}= 0.0357 D_{10}= 0.0097
C_u= 20.93 C_c= 4.11

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.51

Sample No.: LAB ID:000807Q013 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SE-J3 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT

% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	4.3	23.4	27.4	30.9	14.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	95.7		
#20	81.8		
#40	72.3		
#80	58.7		
#100	55.7		
#200	44.9		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= * Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 1.03 D_{60}= 0.195 D_{50}= 0.105
D_{30}= 0.0286 D_{15}= 0.0082 D_{10}= 0.0017
C_u= 112.18 C_c= 2.42

Classification

USCS= SM AASHTO= A-4(0)

Remarks

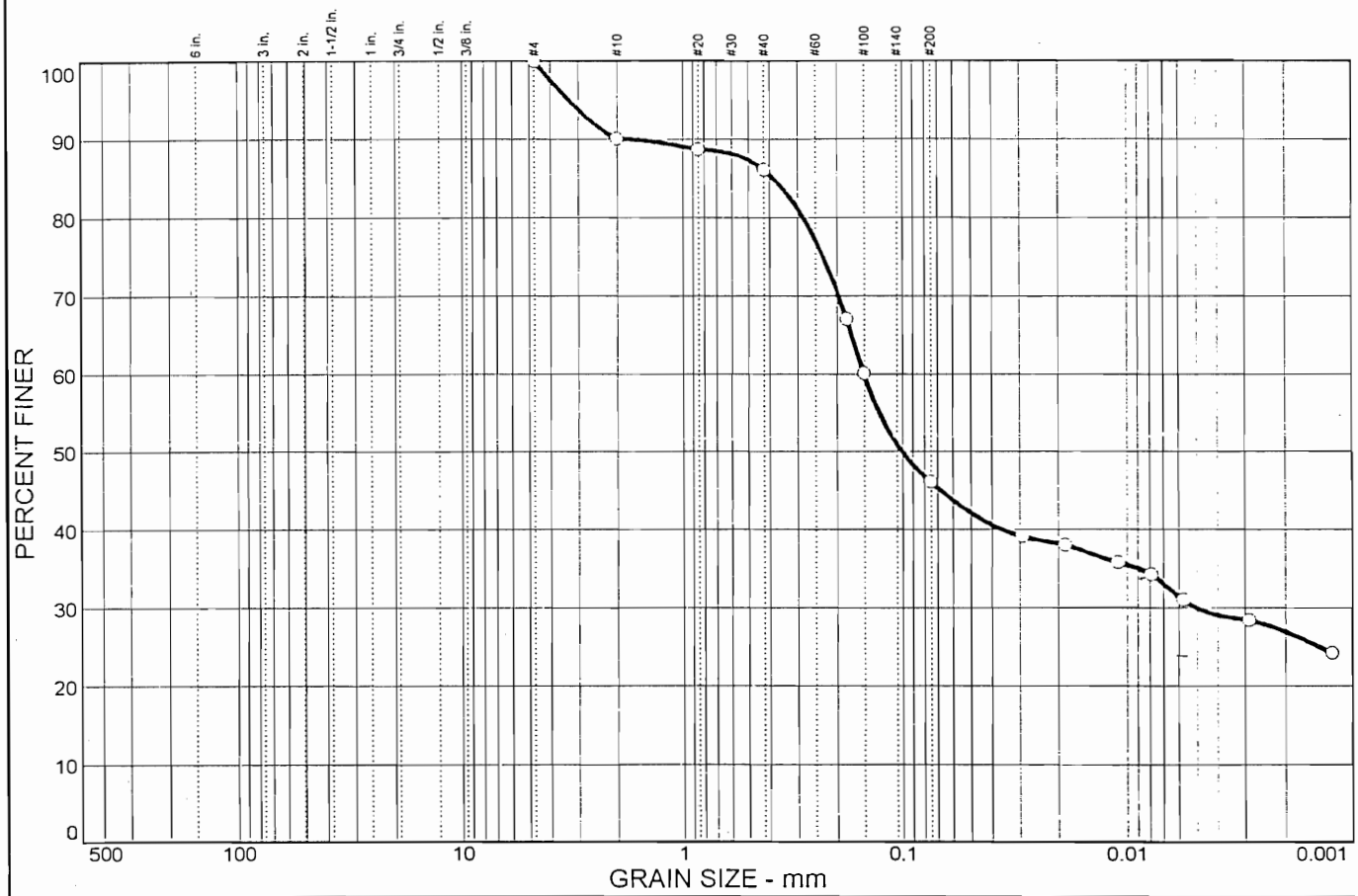
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.44

Sample No.: LAB ID:000807Q014 **Source of Sample:** **Date:** 08-03-00
Location: FIELD ID: RP-SE-X3 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	9.9	4.0	40.0	16.1	30.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	90.1		
#20	88.7		
#40	86.1		
#80	67.0		
#100	60.1		
#200	46.1		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= * Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 0.384 D_{60}= 0.150 D_{50}= 0.100
D_{30}= 0.0050 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

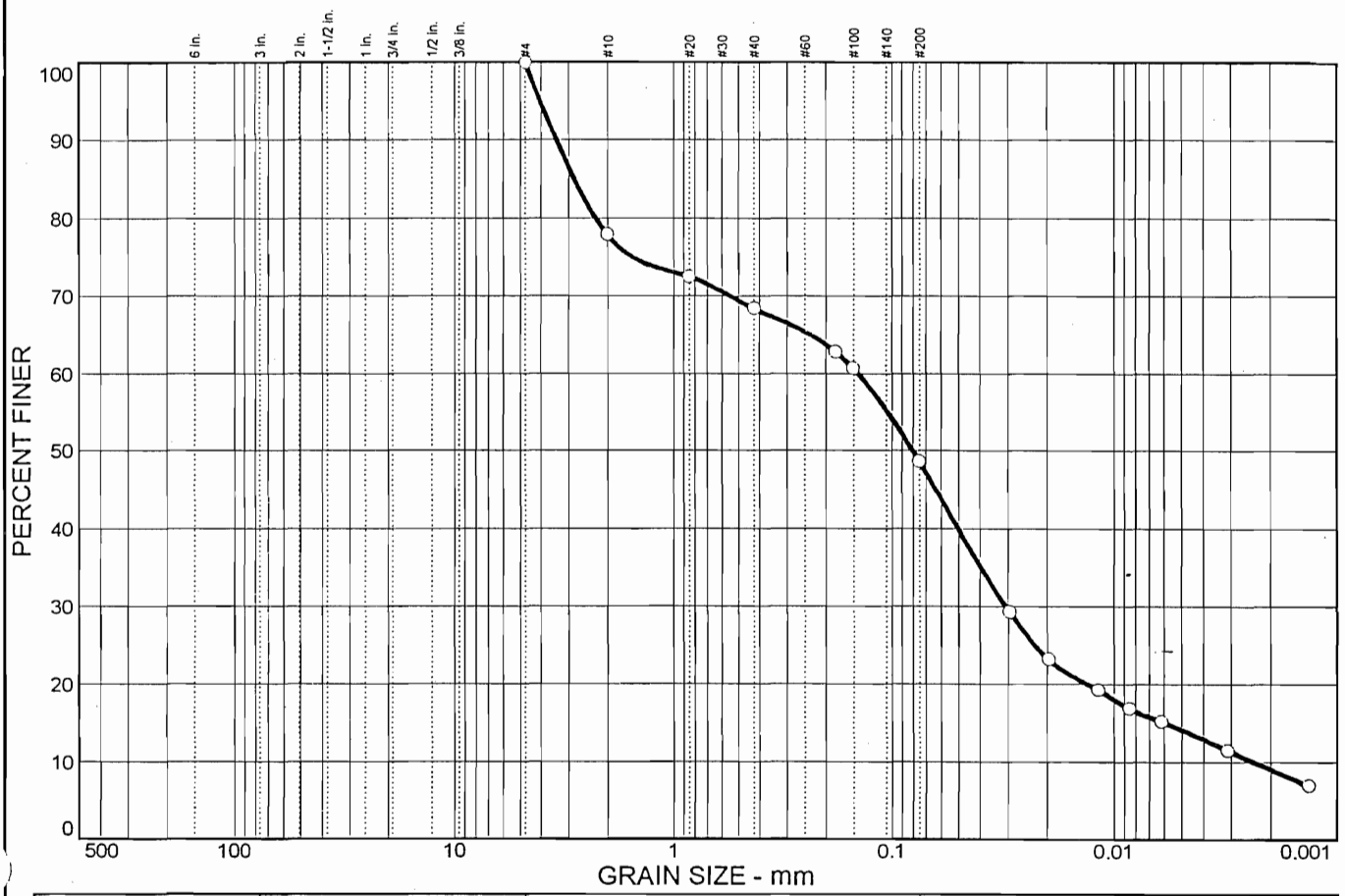
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.40

Sample No.: LAB ID:000807Q015 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SE-L2 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	22.1	9.5	19.8	34.4	14.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	77.9		
#20	72.5		
#40	68.4		
#80	62.8		
#100	60.7		
#200	48.6		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= * Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 2.83 D_{60}= 0.142 D_{50}= 0.0803
D_{30}= 0.0306 D_{15}= 0.0059 D_{10}= 0.0024
C_u= 59.65 C_c= 2.76

Classification

USCS= SM AASHTO= A-4(0)

Remarks

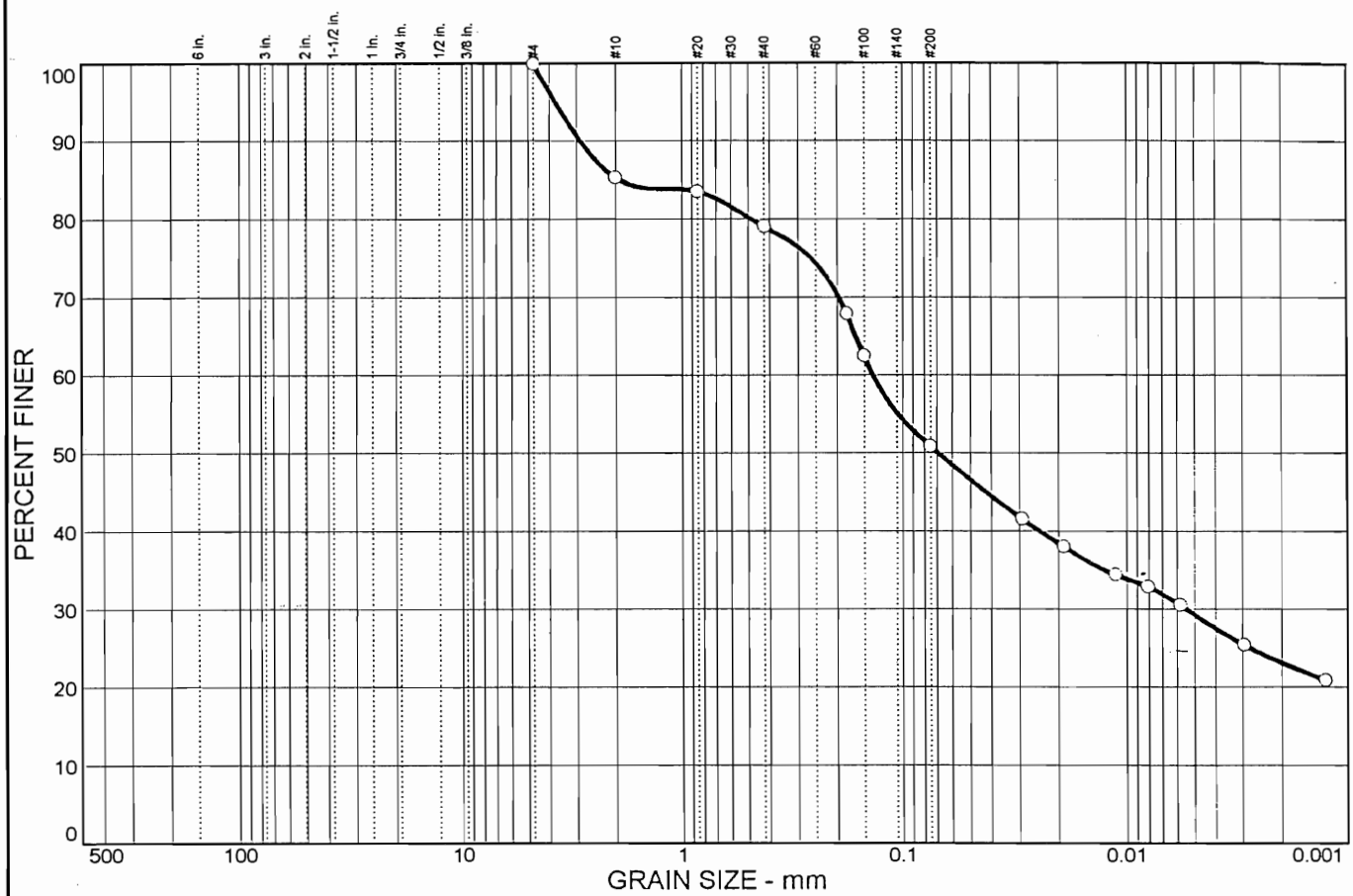
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.39

Sample No.: LAB ID:000807Q016 **Source of Sample:** **Date:** 08-03-00
Location: FIELD ID: RP-SS-X3 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	14.7	6.3	28.1	21.6	29.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	85.3		
#20	83.5		
#40	79.0		
#80	67.9		
#100	62.5		
#200	50.9		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= * Sandy silt

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 1.92 D_{60}= 0.136 D_{50}= 0.0689
D_{30}= 0.0054 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

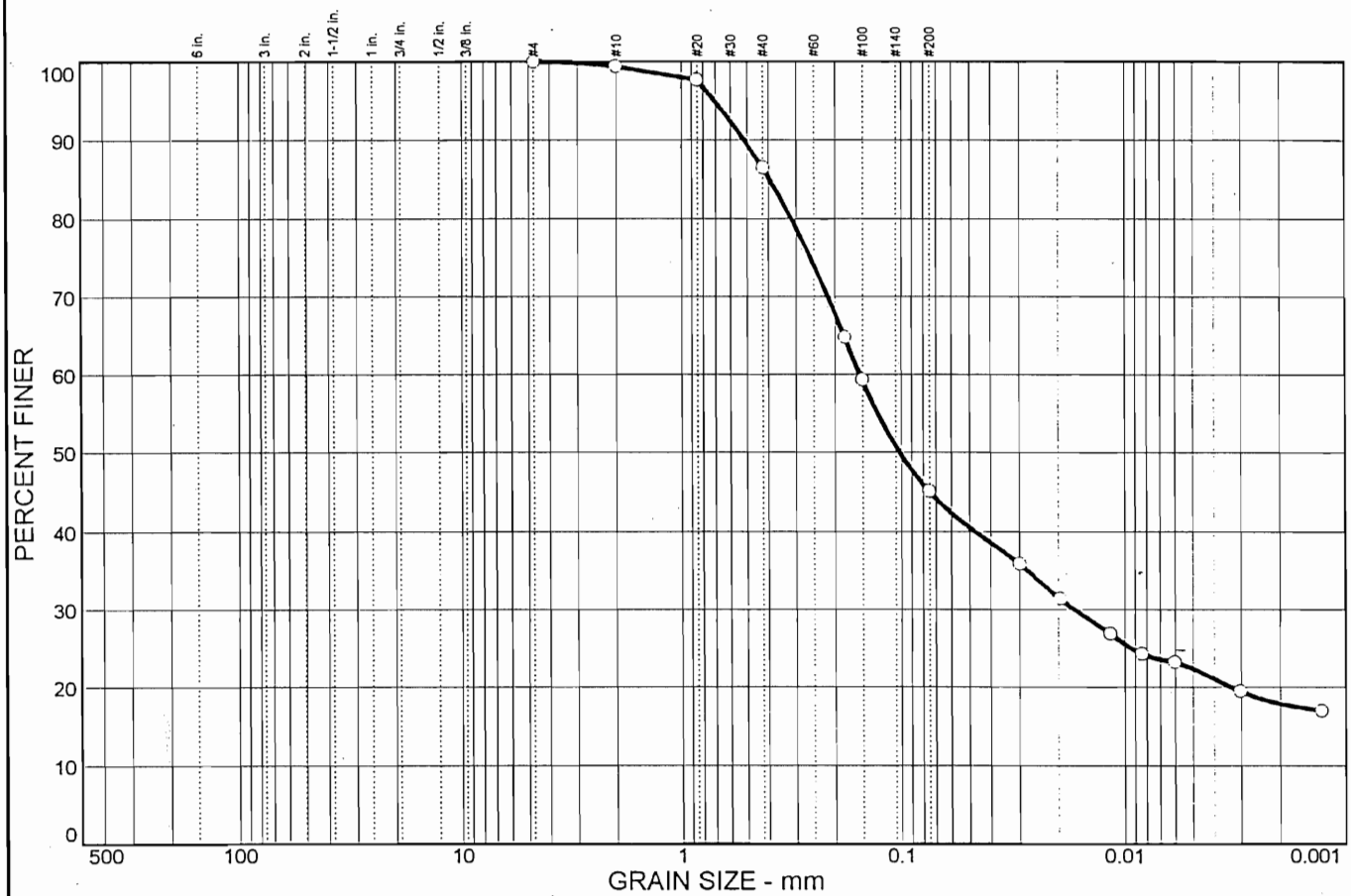
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.38

Sample No.: LAB ID:000807Q017 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SS-L1 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.6	12.9	41.4	22.7	22.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.4		
#20	97.7		
#40	86.5		
#80	64.8		
#100	59.3		
#200	45.1		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= *Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 0.394 D_{60}= 0.154 D_{50}= 0.101
D_{30}= 0.0168 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

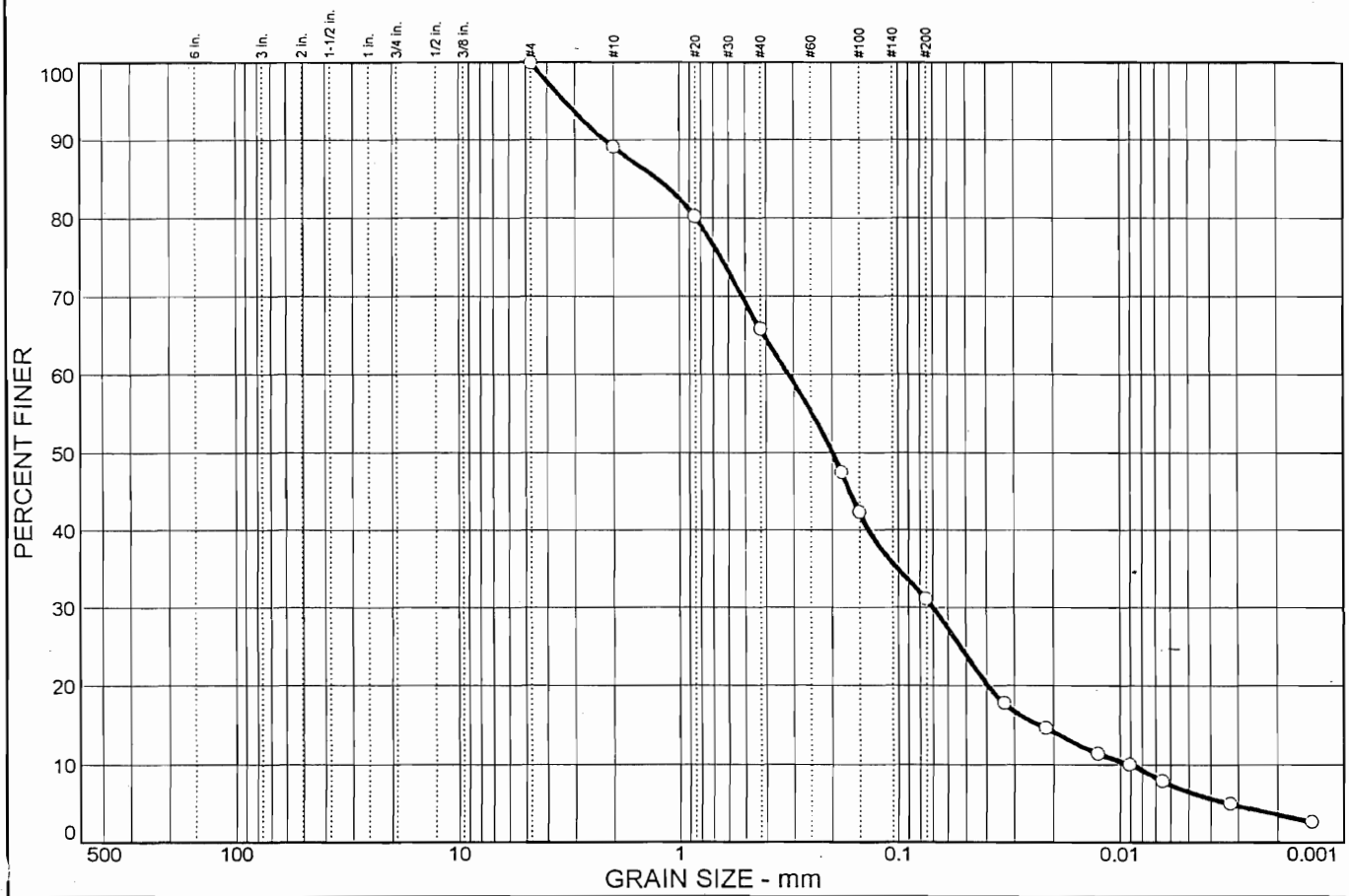
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.41

Sample No.: LAB ID:000807Q018 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SE-L1 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	10.9	23.3	34.7	24.6	6.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	89.1		
#20	80.2		
#40	65.8		
#80	47.5		
#100	42.3		
#200	31.1		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= *Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 1.25 D_{60}= 0.315 D_{50}= 0.198
D_{30}= 0.0698 D_{15}= 0.0230 D_{10}= 0.0091
C_u= 34.69 C_c= 1.70

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

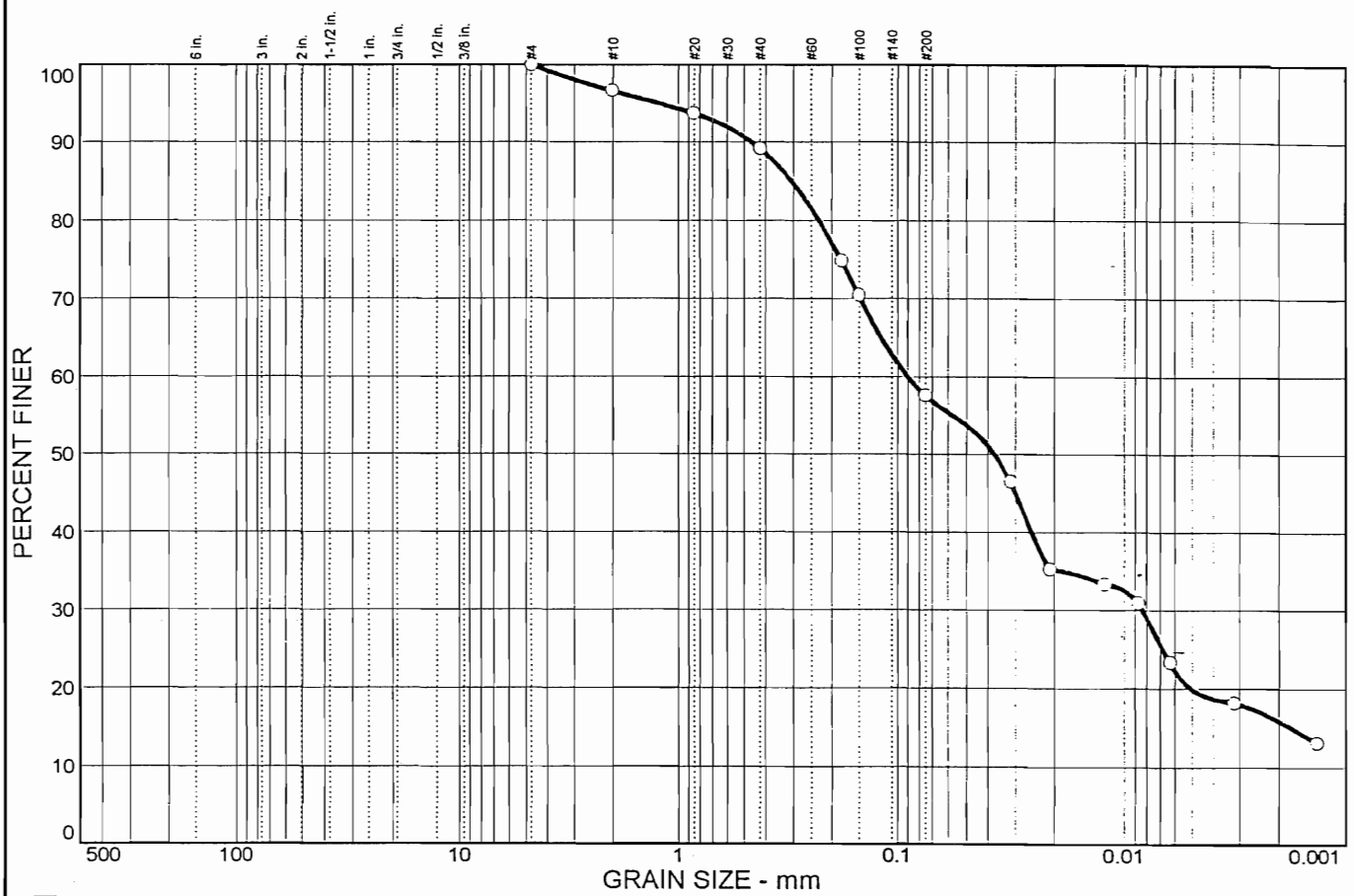
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.58

Sample No.: LAB ID:000807Q019 **Source of Sample:** **Date:** 08-03-00
Location: FIELD ID: RP-SS-X2 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	3.4	7.4	31.6	37.6	20.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	96.6		
#20	93.7		
#40	89.2		
#80	74.8		
#100	70.4		
#200	57.6		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= *Sandy silt

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 0.305 D_{60}= 0.0895 D_{50}= 0.0372
D_{30}= 0.0083 D_{15}= 0.0018 D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

TEST METHOD= ASTM D 422 SAMP.BY/PTS 08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.30

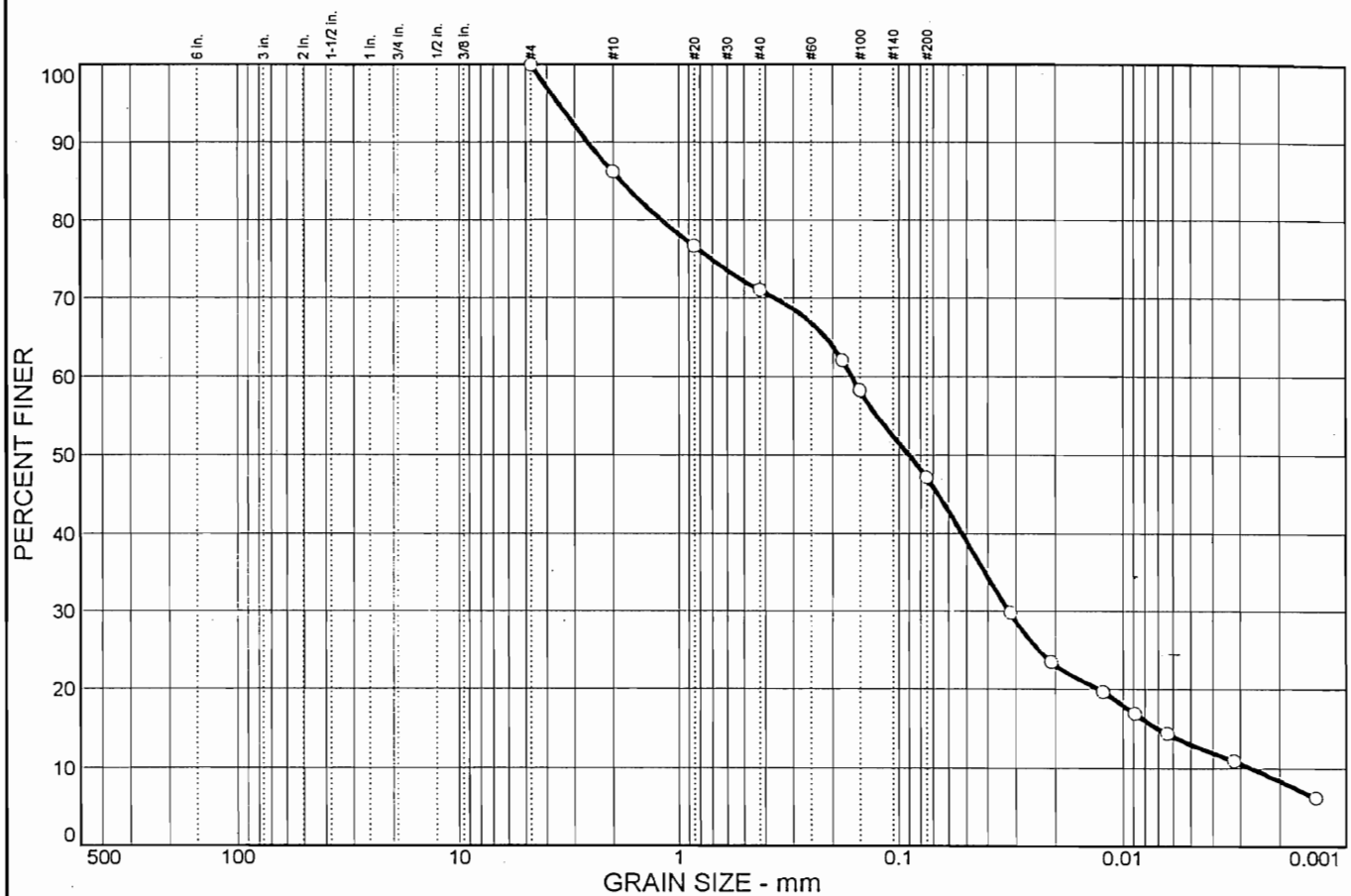
Sample No.: LAB ID:000807Q020 **Source of Sample:** **Date:** 08-03-00
Location: FIELD ID: RP-SE-X2 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS

Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	13.8	15.2	23.8	34.2	13.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	86.2		
#20	76.6		
#40	71.0		
#80	62.1		
#100	58.3		
#200	47.2		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= *Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 1.83 D_{60}= 0.163 D_{50}= 0.0895
D_{30}= 0.0322 D_{15}= 0.0070 D_{10}= 0.0027
C_u= 60.68 C_c= 2.37

Classification

USCS= SM AASHTO= A-4(0)

Remarks

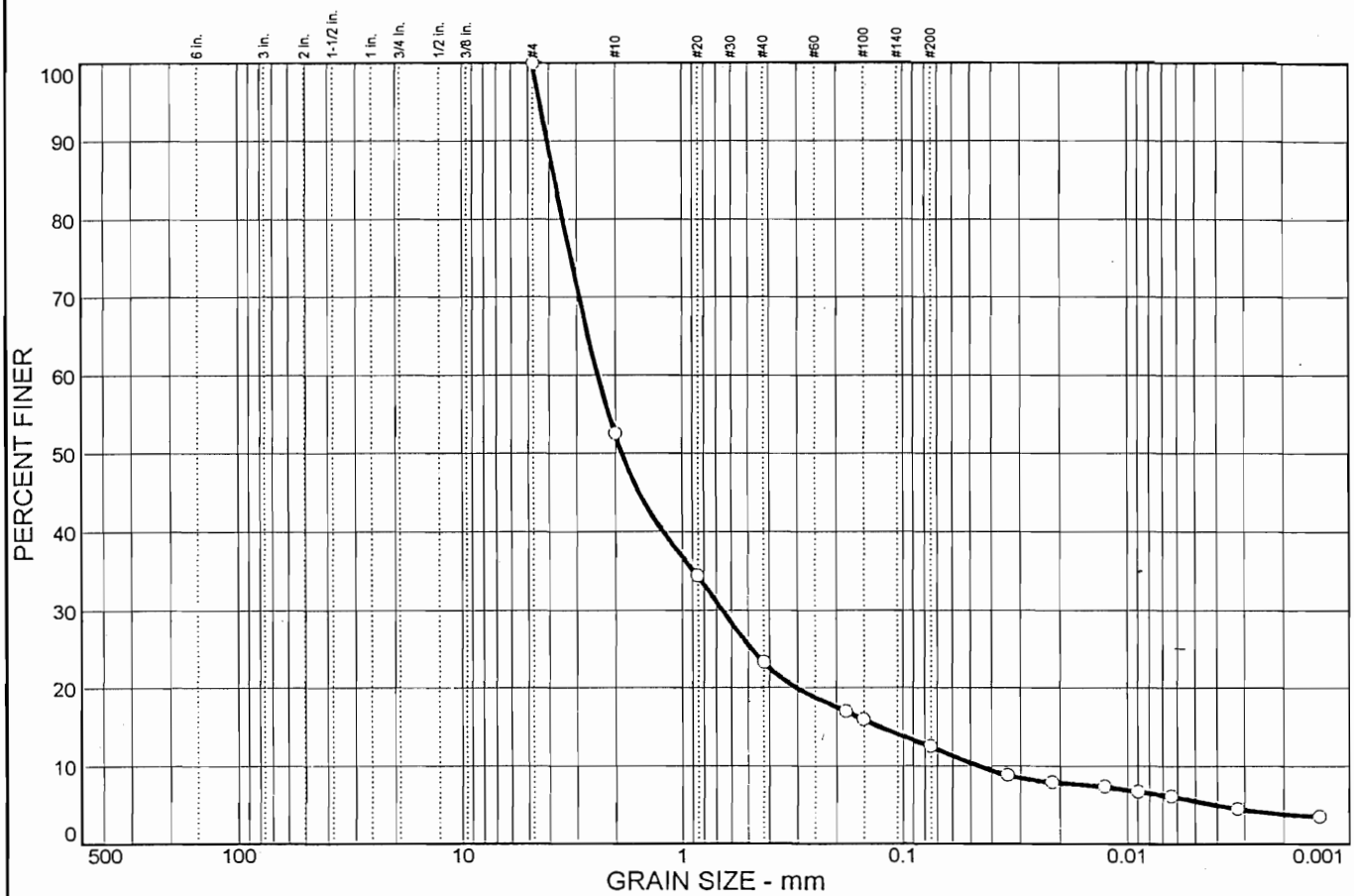
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.42

Sample No.: LAB ID:000807Q021 **Source of Sample:** **Date:** 08-03-00
Location: FIELD ID: RP-SS-X4 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	47.4	29.3	10.8	7.0	5.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	52.6		
#20	34.4		
#40	23.3		
#80	17.0		
#100	15.9		
#200	12.5		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= *Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 3.74 D_{60}= 2.38 D_{50}= 1.86
D_{30}= 0.654 D_{15}= 0.127 D_{10}= 0.0458
C_u= 52.06 C_c= 3.91

Classification

USCS= SM AASHTO= A-1-b

Remarks

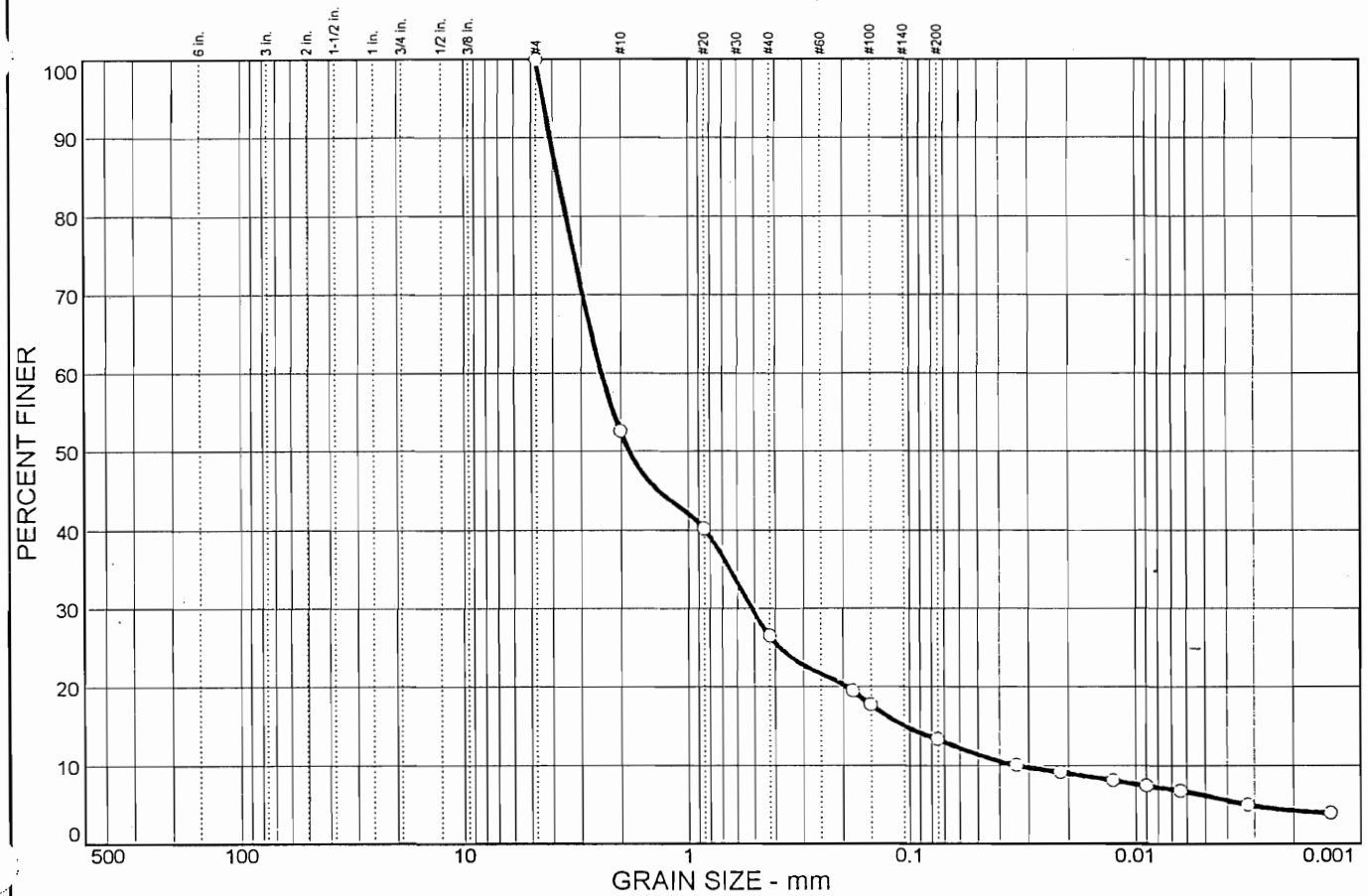
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.84

Sample No.: LAB ID:000807Q022 **Source of Sample:** **Date:** 08-03-00
Location: FIELD ID: RP-SE-X4 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	47.4	26.1	13.2	7.1	6.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	52.6		
#20	40.2		
#40	26.5		
#80	19.5		
#100	17.7		
#200	13.3		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= *Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 3.78 D_{60}= 2.42 D_{50}= 1.82
D_{30}= 0.513 D_{15}= 0.105 D_{10}= 0.0340
C_u= 71.29 C_c= 3.20

Classification

USCS= SM AASHTO= A-1-b

Remarks

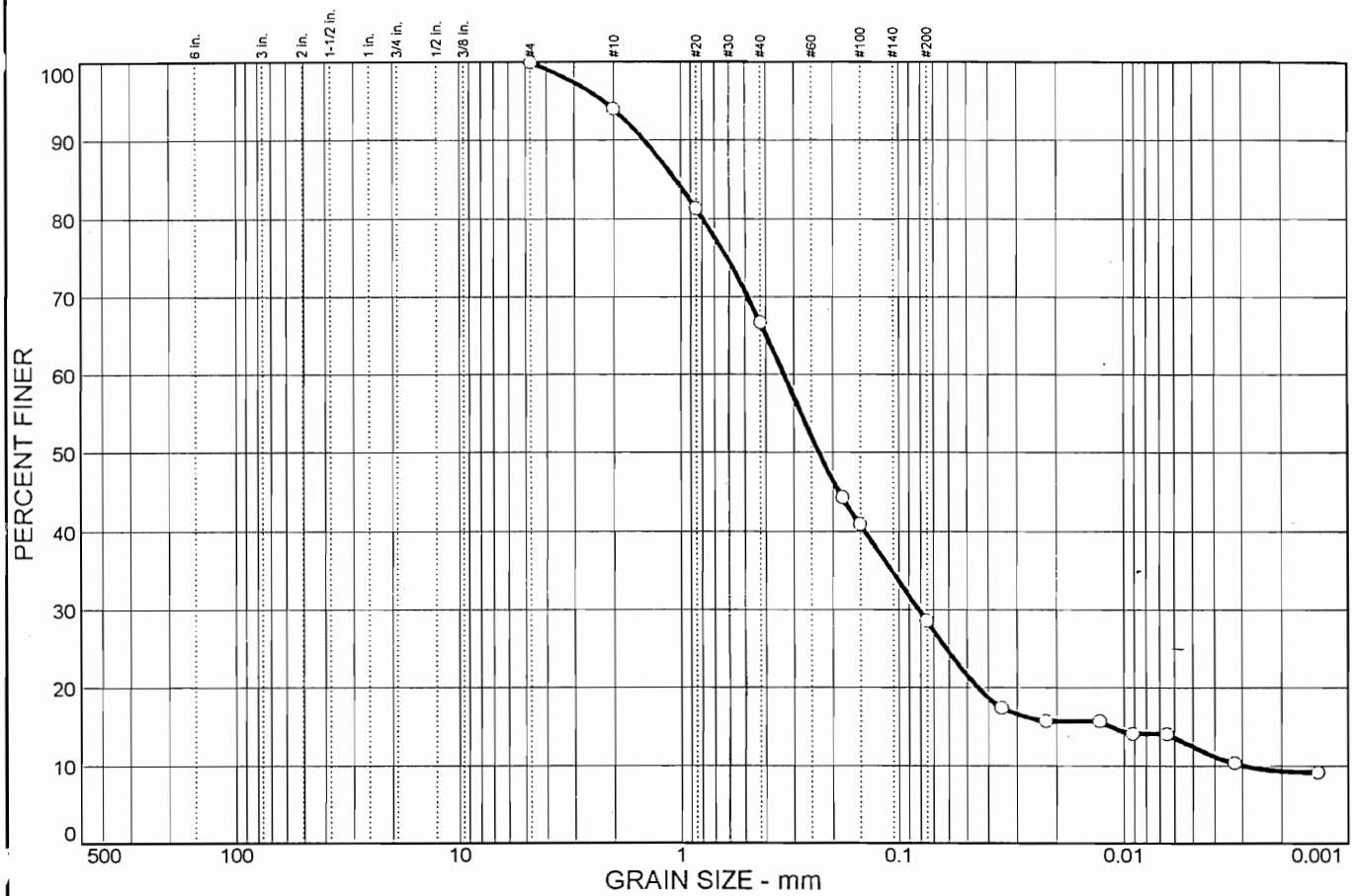
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.82

Sample No.: LAB #:000807Q022D **Source of Sample:** **Date:** 08-03-00
Location: FIELD ID: RP-SE-X4D **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	6.0	27.3	38.1	16.1	12.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	94.0		
#20	81.3		
#40	66.7		
#80	44.3		
#100	40.9		
#200	28.6		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= *Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 1.05 D_{60}= 0.331 D_{50}= 0.230
D_{30}= 0.0811 D_{15}= 0.0115 D_{10}= 0.0030
C_u= 111.74 C_c= 6.70

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

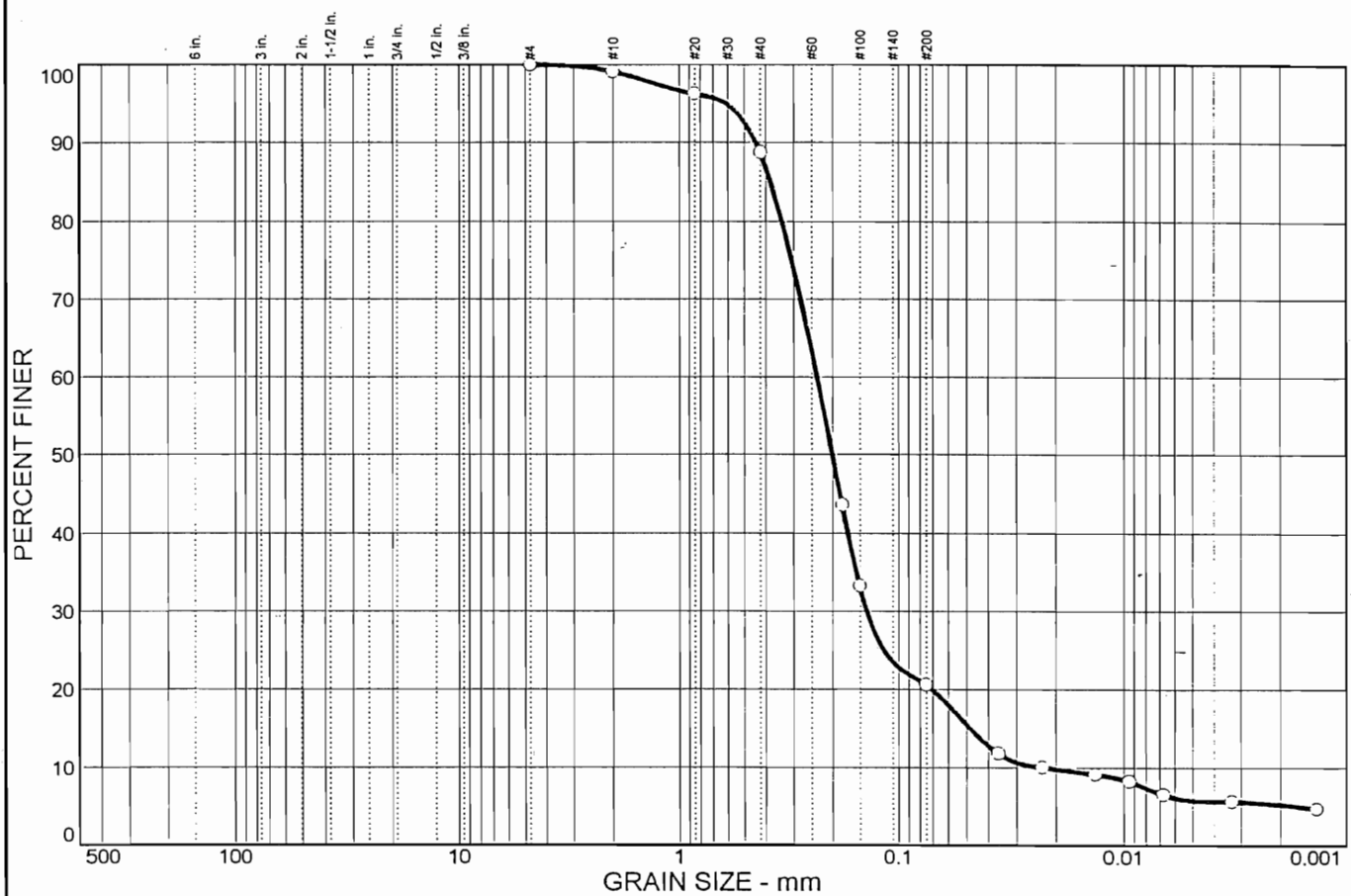
TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.59

Sample No.: LAB ID:000807Q023 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SE-K1 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.9	10.3	68.2	14.8	5.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.1		
#20	96.2		
#40	88.8		
#80	43.6		
#100	33.3		
#200	20.6		

* (no specification provided)

Soil Description

USCS CLASSIFICATION= *Silty sand

* Atterberg Limits not tested (NT)

Atterberg Limits

PL= NT LL= NT PI= NT

Coefficients

D_{85}= 0.380 D_{60}= 0.235 D_{50}= 0.200
D_{30}= 0.139 D_{15}= 0.0478 D_{10}= 0.0230
C_u= 10.20 C_c= 3.56

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

TEST METHOD= ASTM D 422 SAMP.BY/PTS/08-02-00
TESTED BY: JMJ/HKM/11-08-00 THRU 11-13-00
F.M.=0.67

Sample No.: LAB ID:000807Q024 **Source of Sample:** **Date:** 08-02-00
Location: FIELD ID: RP-SE-K2 **Elev./Depth:**

HKM ENGINEERING, INC.

Client: PIONEER TECHNICAL SERVICES
Project: RILEY PASS
Project No: 18A149.103

1999

SOIL AND SEDIMENT SAMPLES

GAMMA SPECS – REPORT 1

CORE LABORATORIES

Sample Receipt Checklist

Client	Pioneer Tech. Svcs	Job Number	995484

Samples Shipped	UPS	Federal Express	Other: Airborne
Samples Hand Delivered	Client	Core Lab Courier	Other

air bill # 6708243161

	Yes	No	Comments
1. Chain-of-Custody present?	✓		
2. Custody seal on shipping container?		✓	
If yes, intact on shipping container?			
3. Custody seals on sample container?		✓	
If yes, intact on sample containers?			
4. Samples chilled?		✓	Radiochemistry
Temperature of cooler: 4°C±2°C			
5. Samples received intact (good condition)?	✓		
If volatiles required , no headspace?			
6. Correct containers used?	✓		
7, Adequate sample volume provided?	✓		
8. Samples preserved correctly?	✓		
Circle bottle/preservative types checked.			(Plain) HNO_3 HCl H_2SO_4 NaOH Other
9. Samples received within holding time?	✓		
10. Agreement between COC and sample lablels?	✓		
11. Gamma Screen mR/Hr @ surface within Bkg?	✓		CBKG

Additional Comments: _____

Sample Container (Size/Material) 48-6402

Received and inspected by JMP Date/Time 8/18/99, 1110

CORE LABORATORIES, INC.

Page 1

Anaheim, CA
1250 E. Gene Autry Way
Anaheim, CA 92805
(714) 937-1094 Fax (714) 937-1170

Aurora, CO
10703 E. Bethany Drive
Aurora, CO 80014
(303) 751-1780 Fax (303) 751-1784

Carson, CA
21730 S. Wilmington Ave. - Suite 201
Carson, CA 90810-1640
(310) 513-2031 Fax (310) 513-2035

Casper, WY
420 W. First Street
Casper, WY 82601
(307) 235-5741 Fax (307) 266-1676

Corpus Christi, TX
1733 N. Padre Island Drive
Corpus Christi, TX 78408
(512) 289-2673 Fax (512) 289-2471

Edison, NJ
284 Raritan Center Parkway
Edison, NJ 08837
(732) 225-6700 Fax 677

Houston, TX (Env)
6310 Rothway Drive
Houston, TX 77040
(713) 690-4444 Fax (713) 690-5646

Houston, TX (Pet)
8210 Mosley Road
Houston, TX 77075
(713) 943-9776 Fax (713) 943-3846

Indianapolis, IN
7726 Moller Road
Indianapolis, IN 46268
(317) 875-5894 Fax (317) 872-6189

Lake Charles, LA
3645 Beglis Parkway
Sulphur, LA 70663
(318) 583-4926 Fax (318) 583-4929

Valparaiso, IN
2400 Cumberland Drive
Valparaiso, IN 46383
(219) 464-2389 Fax (219) 462-2953

Sample Receipt Acknowledgment

Date 08/18/99

Report To

Pioneer Technical Services
63 1/2 West Broadway
PO BOX 3445

BUTTE, MT 59701
Jodi Belanger-Woods

Invoice To

Pioneer Technical Services
63 1/2 West Broadway
PO BOX 3445

BUTTE, MT 59701
Jodi Belanger-Woods

Core Laboratories Job Number	Customer Project ID	
995484	RILEY PASS - 3806	09/15/99
Sample No.	**Customer ID**	**Remarks**
1	RP-SE-I3	
2	RP-SE-F2	
3	RP-SE-H2	
4	RP-SS-F	
5	RP-SS-G	
6	RP-SE-SP2	
7	RP-SE-SP8	
8	RP-SE-SP6	
9	RP-SE-H1	
10	RP-SE-F1	

CORE LABORATORIES

ANALYTICAL REPORT

JOB NUMBER: 995484

Prepared For:

Pioneer Technical Services
63 1/2 West Broadway
PO BOX 3445
BUTTE, MT 59701

Attention: Jodi Belanger-Woods

Date: 09/15/99

Don Ukele
Signature

9/15/99
Date

Name: Don W. Ukele

Title: Project Manager

420 West First Street
Casper, WY 82601

PHONE: 307-235-5741
FAX..: 307-266-1676

CORE LABORATORIES

SAMPLE INFORMATION
Date: 09/15/99

Job Number.: 995484
Customer...: Pioneer Technical Services
Attn.....: Jodi Belanger-Woods

Project Number.....: 98000013
Customer Project ID....: RILEY PASS - 3806
Project Description....: general radiochemistry

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
995484-1	RP-SE-I3	SEDIMENT	08/11/1999	18:00	08/18/1999	11:10
995484-2	RP-SE-F2	SEDIMENT	08/11/1999	16:50	08/18/1999	11:10
995484-3	RP-SE-H2	SEDIMENT	08/11/1999	14:45	08/18/1999	11:10
995484-4	RP-SS-F	Soil	08/11/1999	08:35	08/18/1999	11:10
995484-5	RP-SS-G	Soil	08/11/1999	10:45	08/18/1999	11:10
995484-6	RP-SE-SP2	SEDIMENT	08/12/1999	11:00	08/18/1999	11:10
995484-7	RP-SE-SP8	SEDIMENT	08/12/1999	12:25	08/18/1999	11:10
995484-8	RP-SE-SP6	SEDIMENT	08/12/1999	14:00	08/18/1999	11:10
995484-9	RP-SE-H1	SEDIMENT	08/11/1999	14:25	08/18/1999	11:10
995484-10	RP-SE-F1	SEDIMENT	08/11/1999	16:25	08/18/1999	11:10

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995484 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-I3
Date Sampled.....: 08/11/1999
Time Sampled.....: 18:00
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995484-1
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	2.8		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.6		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	<0.3		pCi/g	09/10/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995484 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-F2
Date Sampled.....: 08/11/1999
Time Sampled.....: 16:50
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995484-2
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	13.4		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	1.5		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	<1.3		pCi/g	09/10/99	mdg

CORE LABORATORIES

L A B O R A T O R Y T E S T R E S U L T S

Job Number: 995484 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-H2
Date Sampled.....: 08/11/1999
Time Sampled.....: 14:45
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995484-3
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	5.9		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.6		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	1.6		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	0.7		pCi/g	09/10/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995484 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SS-F
Date Sampled.....: 08/11/1999
Time Sampled.....: 08:35
Sample Matrix.....: Soil

Laboratory Sample ID: 995484-4
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	26.6		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	1.7		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	3.8		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	1.8		pCi/g	09/10/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995484

Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SS-G
Date Sampled.....: 08/11/1999
Time Sampled.....: 10:45
Sample Matrix.....: Soil

Laboratory Sample ID: 995484-5
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	53.2		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	3.1		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	9.6		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	3.4		pCi/g	09/10/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995484 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-SP2
Date Sampled.....: 08/12/1999
Time Sampled.....: 11:00
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995484-6
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	6.7		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.7		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	<0.8		pCi/g	09/10/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995484 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-SP8
Date Sampled.....: 08/12/1999
Time Sampled.....: 12:25
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995484-7
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	2.8		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.7		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	<1.3		pCi/g	09/10/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995484 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-SP6
Date Sampled.....: 08/12/1999
Time Sampled.....: 14:00
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995484-8
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	4.3		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.8		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	<1.4		pCi/g	09/10/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995484 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-H1
Date Sampled.....: 08/11/1999
Time Sampled.....: 14:25
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995484-9
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	3.5		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.6		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	1.6		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	0.9		pCi/g	09/10/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995484 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-F1
Date Sampled.....: 08/11/1999
Time Sampled.....: 16:25
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995484-10
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	47.4		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	3.2		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	9.3		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	3.8		pCi/g	09/10/99	mdg

CORE LABORATORIES

QUALITY CONTROL RESULTS

Job Number.: 995484 Report Date.: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: general radiochemistry ATTN: Jodi Belanger-Woods

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: EPA 901.1 Batch.....: 14446 Analyst...: mdg
Method Description.: Gamma Scan (HPGe gamma) Units.....: pCi/g

LCS	Laboratory Control Sample	D2091099CC			09/10/1999	0719

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Cesium-137, Activity	42300		40000		105.8	%	70-125
Cobalt-60, Activity	67500		67300		100.3	%	70-125
Americium-241, Activity	91500		101000		90.6	%	70-125

LCS	Laboratory Control Sample	D3091099CC			09/10/1999	0730

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Cesium-137, Activity	41900		40000		104.8	%	70-125
Cobalt-60, Activity	67000		67300		99.6	%	70-125
Americium-241, Activity	102000		101000		101.0	%	70-125

LCS	Laboratory Control Sample	D1091099CC			09/10/1999	0.

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Cesium-137, Activity	41100		40000		102.8	%	70-125
Cobalt-60, Activity	67500		67300		100.3	%	70-125
Americium-241, Activity	102000		101000		101.0	%	70-125

MD	Method Duplicate		995484-7		09/10/1999	1035

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Radium-226, Activity	3.8			2.8	30.3	R	20
Uranium-235, Activity	<0.8			<1.3	0.0	R	20

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

CORE LABORATORIES

QUALITY CONTROL FOOTER

METHOD REFERENCES

(1) EPA 600/4-79-020, Methods for Chemical Analysis of Water and Wastes, March 1983
(2) EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, (9/86), Update I (7/92), Update II (9/94), Update IIA (8/93), Update IIB (1/95), Update III (6/97)
(3) Standard Methods for the Examination of Water and Wastewater, 18th, 1992
(4) EPA 600/4-80-032, Prescribed Procedures for Measurement of Radioactivity in Drinking Water, August 1980
(5) Federal Register, Friday, October 26, 1984 (40 CFR Part 136)
(6) EPA 600/8-78-017, Microbiological Methods for Monitoring the Environment, December 1978

COMMENTS

(1) The data in the Laboratory Test Results Report may differ from the data in the QC Report due to calculations for sample preparation and/or dilutions.
(2) The "Time Analyzed" in the QC Report may not reflect the actual time of each analysis. The "Date Analyzed" is the actual date of analysis.
(3) Soil and sludge samples are reported on a wet basis or on an "as received" basis unless otherwise indicated.
(4) The data in this report are within the limits of uncertainty specified in the referenced method unless otherwise indicated.
(5) Analyses performed by a subcontract laboratory are indicated with an asterisk and associated code in the "Technician" data field.

Subcontract Laboratories	Code	Subcontract Laboratories	Code
Core Laboratories - Anaheim, CA	AN	Core Laboratories - Houston, TX (Pet)	HP
Core Laboratories - Aurora, CO	AU	Core Laboratories - Houston, TX (Env)	HR
Core Laboratories - Casper, WY	CA	Core Laboratories - Indianapolis, IN	IN
Core Laboratories - Corpus Christi, TX	CC	Core Laboratories - Lake Charles, LA	LC
Core Laboratories - Carson, CA	CR	Core Laboratories - Valparaiso, IN	VP
Core Laboratories - Edison, NJ	ED	Other Subcontract Laboratories	XX

DEFINITIONS

(1) NC = Not Calculable due to values lower than the reporting limit.
(2) ND = Not Detected above the reporting limit.

QC SAMPLE IDENTIFICATIONS

BLANKS

MB = Method Blank (also referred to as a preparation blank)
RB = Reagent Blank
IB = Instrument Blank
ICB = Initial Calibration Blank
CCB = Continuing Calibration Blank
HB = Holding Blank (also referred to as a storage blank)

DUPLICATES

MSD = Matrix Spike Duplicate
MD = Method Duplicate

SPIKES

MS = Matrix Spike
MSD = Matrix Spike Duplicate
PDS = Post Digestion Spike
BS = Blank Spike (also referred to as a method spike)
SS = Surrogate Spike

REFERENCE STANDARDS

CS = Calibration Standard
RS = Reference Standard (also referred to as an external reference standard)
ICV = Initial Calibration Verification
CCV = Continuing Calibration Verification
LCS = Laboratory Control Sample

420 West First Street
Casper, WY 82601
(307) 235-5741

Job Number.....: 995484 Location.: 57210 Customer Job ID.....: RILEY PASS - 3806 Job Receive Date.: 08/18/99
Project Number.: 98000013 Project Description.: general radiochemistry Project Manager..: dwu
Customer.....: Pioneer Technical Services Contact.: Jodi Belanger-Woods

Sample Number.: 1 Customer Sample ID.: RP-SE-I3

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/11/99 Sample Time.: 18:00
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48408	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 2 Customer Sample ID.: RP-SE-F2

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/11/99 Sample Time.: 16:50
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48409	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 3 Customer Sample ID.: RP-SE-H2

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/11/99 Sample Time.: 14:45
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48410	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 4 Customer Sample ID.: RP-SS-F

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/11/99 Sample Time.: 08:35
Sample Matrix.: SOIL
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48411	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 5 Customer Sample ID.: RP-SS-G

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/11/99 Sample Time.: 10:45
Sample Matrix.: SOIL
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
2	4 oz Glass Jar	NONE	N			PREP

Job Number.....: 995484 Location.: 57210 Customer Job ID.....: RILEY PASS - 3806 Job Receive Date.: 08/18/99
Project Number.: 98000013 Project Description.: general radiochemistry Project Manager..: dwu
Customer.....: Pioneer Technical Services Contact.: Jodi Belanger-Woods

Sample Number.: 6 Customer Sample ID.: RP-SE-SP2

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/12/99 Sample Time.: 11:00
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48413	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 7 Customer Sample ID.: RP-SE-SP8

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/12/99 Sample Time.: 12:25
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48414	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 8 Customer Sample ID.: RP-SE-SP6

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/12/99 Sample Time.: 14:00
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48415	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 9 Customer Sample ID.: RP-SE-H1

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/11/99 Sample Time.: 14:25
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48416	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 10 Customer Sample ID.: RP-SE-F1

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/11/99 Sample Time.: 16:25
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #

rpjsmps J o B S a m p l e I n f o 08/18/99 V1

Number.....: 995484 Location.: 57210 Customer Job ID.....: RILEY PASS - 3806 Job Receive Date.: 08/18/99
Project Number.: 98000013 Project Description.: general radiochemistry Project Manager..: dwu
Customer.....: Pioneer Technical Services Contact.: Jodi Belanger-Woods

48417	4 oz Glass Jar	NONE	N	PREP

rpjsdst

Job Test Distribution

08/18/99

V2

Job Number.....: 995484 Location.: 57210 Customer Job ID.....: RILEY PASS - 3806 Job Receive Date.: 08/18/99
Project Number.: 98000013 Project Description.: general radiochemistry Project Manager..: dwu
Customer.....: Pioneer Technical Services Contact.: Jodi Belanger-Woods

Method	Method Description / Tests	Test Description	Sample Distribution Mtx	Test Limits	Test Units	Test TAT
901.1	Gamma Scan (HPGe gamma)		1-10			
	RA226	Radium-226, Activity	S	0.1	pCi/g	28 DAYS
	RA226E	Radium-226, Error +\-	S	0.1	pCi/g	28 DAYS
	U235	Uranium-235, Activity	S	0.1	pCi/g	28 DAYS
	U235E	Uranium-235, Error +/-	S	0.1	pCi/g	28 DAYS

1999

SOIL AND SEDIMENT SAMPLES

GAMMA SPECS – REPORT 3

CORE LABORATORIES

Sample Receipt Checklist

Client	Pioneer Tech. Svcs.	Job Number	995485

Samples Shipped	UPS	Federal Express	Other: Airborne
Samples Hand Delivered	Client	Core Lab Courier	Other

air bill # 6708243161

	Yes	No	Comments
1. Chain-of-Custody present?	✓		
2. Custody seal on shipping container?		✓	
If yes, intact on shipping container?			
3. Custody seals on sample container?		✓	
If yes, intact on sample containers?			
4. Samples chilled?		✓	Radiochemistry
Temperature of cooler: 4°C±2°C			
5. Samples received intact (good condition)?	✓		
If volatiles required , no headspace?			
6. Correct containers used?	✓		
7, Adequate sample volume provided?	✓		
8. Samples preserved correctly?	✓		
Circle bottle/preservative types checked.			(Plain) HNO_3 HCl H_2SO_4 NaOH Other
9. Samples received within holding time?	✓		
10. Agreement between COC and sample lablels?	✓		
11. Gamma Screen mR/Hr @ surface within Bkg?	✓		CBKG

Additional Comments: _____

Sample Container (Size/Material) 48-6402

Received and inspected by MP Date/Time 9/18/09, 1110

CORE LABORATORIES, INC.

Page 1

Anaheim, CA
1250 E. Gene Autry Way
Anaheim, CA 92805
(714) 937-1094 Fax (714) 937-1170

Aurora, CO
10703 E. Bethany Drive
Aurora, CO 80014
(303) 751-1780 Fax (303) 751-1784

Carson, CA
21730 S. Wilmington Ave. - Suite 201
Carson, CA 90810-1640
(310) 513-2031 Fax (310) 513-2035

Casper, WY
420 W. First Street
Casper, WY 82601
(307) 235-5741 Fax (307) 266-1676

Corpus Christi, TX
1733 N. Padre Island Drive
Corpus Christi, TX 78408
(512) 289-2673 Fax (512) 289-2471

Edison, NJ
284 Raritan Center Parkway
Edison, NJ 08837
(732) 225-6700 Fax (732) 225-677

...on, TX (Env)
...0 Rothway Drive
Houston, TX 77040
(713) 690-4444 Fax (713) 690-5646

Houston, TX (Pet)
8210 Mosley Road
Houston, TX 77075
(713) 943-9776 Fax (713) 943-3646

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3645 Beglis Parkway
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Valparaiso, IN
2400 Cumberland Drive
Valparaiso, IN 46383
(219) 464-2389 Fax (219) 462-2953

Sample Receipt Acknowledgment

Date 08/18/99

Report To

Pioneer Technical Services
63 1/2 West Broadway
PO BOX 3445

BUTTE, MT 59701
Jodi Belanger-Woods

Invoice To

Pioneer Technical Services
63 1/2 West Broadway
PO BOX 3445

BUTTE, MT 59701
Jodi Belanger-Woods

Core Laboratories Job Number	Customer Project ID	
995485	RILEY PASS - 3806	09/15/99

Sample No.	Customer ID	Remarks
1	RP-SE-A1	
2	RP-SE-A2	
3	RP-SE-B1	
4	RP-SE-B2	
5	RP-SE-B3	
6	RP-SE-B4	
7	RP-SE-C1	
8	RP-SE-C2	
9	RP-SE-D1	
10	RP-SE-D2	
11	RP-SE-E1	
12	RP-SE-E2	
13	RP-SE-X1	
14	RP-SS-A	
15	RP-SS-C	
16	RP-SS-D	
17	RP-SS-E	
18	RP-SS-X	

CORE LABORATORIES

ANALYTICAL REPORT

JOB NUMBER: 995485

Prepared For:

Pioneer Technical Services
63 1/2 West Broadway
PO BOX 3445
BUTTE, MT 59701

Attention: Jodi Belanger-Woods

Date: 09/15/99

Don Ukele
Signature

9/15/99
Date

Name: Don W. Ukele

Title: Project Manager

420 West First Street
Casper, WY 82601

PHONE: 307-235-5741
FAX..: 307-266-1676

CORE LAB

CORE LABORATORIES

SAMPLE INFORMATION
Date: 09/15/99

Job Number.: 995485
Customer...: Pioneer Technical Services
Attn.....: Jodi Belanger-Woods

Project Number.....: 98000013
Customer Project ID....: RILEY PASS - 3806
Project Description....: general radiochemistry

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
995485-1	RP-SE-A1	SEDIMENT	08/10/1999	13:45	08/18/1999	11:10
995485-2	RP-SE-A2	SEDIMENT	08/10/1999	12:30	08/18/1999	11:10
995485-3	RP-SE-B1	SEDIMENT	08/10/1999	19:35	08/18/1999	11:10
995485-4	RP-SE-B2	SEDIMENT	08/10/1999	19:10	08/18/1999	11:10
995485-5	RP-SE-B3	SEDIMENT	08/10/1999	19:35	08/18/1999	11:10
995485-6	RP-SE-B4	SEDIMENT	08/10/1999	19:10	08/18/1999	11:10
995485-7	RP-SE-C1	SEDIMENT	08/10/1999	16:15	08/18/1999	11:10
995485-8	RP-SE-C2	SEDIMENT	08/10/1999	16:35	08/18/1999	11:10
995485-9	RP-SE-D1	SEDIMENT	08/10/1999	15:34	08/18/1999	11:10
995485-10	RP-SE-D2	SEDIMENT	08/10/1999	14:46	08/18/1999	11:10
995485-11	RP-SE-E1	SEDIMENT	08/10/1999	16:45	08/18/1999	11:10
995485-12	RP-SE-E2	SEDIMENT	08/10/1999	14:20	08/18/1999	11:10
995485-13	RP-SE-X1	SEDIMENT	08/10/1999	17:55	08/18/1999	11:10
995485-14	RP-SS-A	Soil	08/10/1999	13:00	08/18/1999	11:10
995485-15	RP-SS-C	Soil	08/10/1999	12:00	08/18/1999	11:10
995485-16	RP-SS-D	Soil	08/10/1999	10:45	08/18/1999	11:10
995485-17	RP-SS-E	Soil	08/10/1999	13:15	08/18/1999	11:10
995485-18	RP-SS-X	Soil	08/10/1999	18:05	08/18/1999	11:10

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-A1
Date Sampled.....: 08/10/1999
Time Sampled.....: 13:45
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-1
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	3.1		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.5		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	<0.9		pCi/g	09/10/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-A2
Date Sampled.....: 08/10/1999
Time Sampled.....: 12:30
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-2
Date Received.....: 08/18/1999
Time Received.....: 17:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TEC
EPA 901.1	Radium-226, Activity, Solid	2.8		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.5		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	<1.0		pCi/g	09/10/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-B1
Date Sampled.....: 08/10/1999
Time Sampled.....: 19:35
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-3
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	3.9		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.5		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	1.1		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	0.6		pCi/g	09/10/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-B2
Date Sampled.....: 08/10/1999
Time Sampled.....: 19:10
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-4
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	1.8		pCi/g	09/10/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.4		pCi/g	09/10/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	<0.3		pCi/g	09/10/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-B3
Date Sampled.....: 08/10/1999
Time Sampled.....: 19:35
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-5
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	6.4		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	1.7		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	2.7		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	1.6		pCi/g	09/13/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-B4
Date Sampled.....: 08/10/1999
Time Sampled.....: 19:10
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-6
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	7.2		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	1.0		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	<1.0		pCi/g	09/13/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-C1
Date Sampled.....: 08/10/1999
Time Sampled.....: 16:15
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-7
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	4.9		pCi/g	09/13/99	mcg
EPA 901.1	Radium-226, Error +\-, Solid	0.8		pCi/g	09/13/99	mcg
EPA 901.1	Uranium-235, Activity, Solid	<0.9		pCi/g	09/13/99	mcg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-C2
Date Sampled.....: 08/10/1999
Time Sampled.....: 16:35
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-8
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	31.1		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	2.3		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	4.8		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	2.5		pCi/g	09/13/99	mdg

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-D1
Date Sampled.....: 08/10/1999
Time Sampled.....: 15:34
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-9
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	6.6		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	1.1		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	2.8		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	1.2		pCi/g	09/13/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-D2
Date Sampled.....: 08/10/1999
Time Sampled.....: 14:46
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-10
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	22.8		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	1.6		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	5.3		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	2.4		pCi/g	09/13/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-E1
Date Sampled.....: 08/10/1999
Time Sampled.....: 16:45
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-11
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	5.8		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.9		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	<0.6		pCi/g	09/13/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-E2
Date Sampled.....: 08/10/1999
Time Sampled.....: 14:20
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-12
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	5.3		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.7		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	1.7		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	0.9		pCi/g	09/13/99	mdg

CORE LABORATORIES

L A B O R A T O R Y T E S T R E S U L T S

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SE-X1
Date Sampled.....: 08/10/1999
Time Sampled.....: 17:55
Sample Matrix.....: SEDIMENT

Laboratory Sample ID: 995485-13
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	2.1		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.4		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	1.5		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	0.6		pCi/g	09/13/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SS-A
Date Sampled.....: 08/10/1999
Time Sampled.....: 13:00
Sample Matrix.....: Soil

Laboratory Sample ID: 995485-14
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	85.8		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	4.2		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	8.3		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	3.6		pCi/g	09/13/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SS-C
Date Sampled.....: 08/10/1999
Time Sampled.....: 12:00
Sample Matrix.....: Soil

Laboratory Sample ID: 995485-15
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	314		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	11.2		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	28.8		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	7.5		pCi/g	09/13/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SS-D
Date Sampled.....: 08/10/1999
Time Sampled.....: 10:45
Sample Matrix.....: Soil

Laboratory Sample ID: 995485-16
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	80.3		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	3.3		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	11.3		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	3.4		pCi/g	09/13/99	mdg

CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 995485 Date: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: RILEY PASS - 3806 ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SS-E
Date Sampled.....: 08/10/1999
Time Sampled.....: 13:15
Sample Matrix.....: Soil

Laboratory Sample ID: 995485-17
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	42.6		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	2.2		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	5.8		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Error +/-, Solid	2.3		pCi/g	09/13/99	mdg

LABORATORY TEST RESULTS

Job Number: 995485

Date: 09/15/99

CUSTOMER: Pioneer Technical Services

PROJECT: RILEY PASS - 3806

ATTN: Jodi Belanger-Woods

Customer Sample ID: RP-SS-X
Date Sampled.....: 08/10/1999
Time Sampled.....: 18:05
Sample Matrix.....: Soil

Laboratory Sample ID: 995485-18
Date Received.....: 08/18/1999
Time Received.....: 11:10

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 901.1	Radium-226, Activity, Solid	2.2		pCi/g	09/13/99	mdg
EPA 901.1	Radium-226, Error +\-, Solid	0.5		pCi/g	09/13/99	mdg
EPA 901.1	Uranium-235, Activity, Solid	<0.3		pCi/g	09/13/99	mdg

CORE LABORATORIES

QUALITY CONTROL RESULTS

Job Number.: 995485 Report Date.: 09/15/99

CUSTOMER: Pioneer Technical Services PROJECT: general radiochemistry ATTN: Jodi Belanger-Woods

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: EPA 901.1 Batch.....: 14468 Analyst...: mdg
Method Description.: Gamma Scan (HPGe gamma) Units.....: pCi/g

LCS	Laboratory Control Sample	D1091099CC			09/10/1999	0703

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Cesium-137, Activity	41100		40000		102.8	%	70-125
Cobalt-60, Activity	67500		67300		100.3	%	70-125
Americium-241, Activity	102000		101000		101.0	%	70-125

LCS	Laboratory Control Sample	D2091099CC			09/10/1999	0719

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Cesium-137, Activity	42300		40000		105.8	%	70-125
Cobalt-60, Activity	67500		67300		100.3	%	70-125
Americium-241, Activity	91500		101000		90.6	%	70-125

LCS	Laboratory Control Sample	D3091099CC			09/10/1999	0730

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Cesium-137, Activity	41900		40000		104.8	%	70-125
Cobalt-60, Activity	67000		67300		99.6	%	70-125
Americium-241, Activity	102000		101000		101.0	%	70-125

LCS	Laboratory Control Sample	D1091399CC			09/13/1999	0713

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Cesium-137, Activity	42600		40000		106.5	%	70-125
Cobalt-60, Activity	67100		67300		99.7	%	70-125
Americium-241, Activity	102000		101000		101.0	%	70-125

LCS	Laboratory Control Sample	D2091399CC			09/13/1999	0725

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Cesium-137, Activity	42100		40000		105.2	%	70-125
Cobalt-60, Activity	68000		67300		101.0	%	70-125
Americium-241, Activity	95100		101000		94.2	%	70-125

LCS	Laboratory Control Sample	D3091399CC			09/13/1999	0737

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Cesium-137, Activity	43400		40000		108.5	%	70-125
Cobalt-60, Activity	66600		67300		99.0	%	70-125
Americium-241, Activity	101000		101000		100.0	%	70-125

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

CORE LAB

CORE LABORATORIES

QUALITY CONTROL RESULTS

Job Number.: 995485

Report Date.: 09/15/99

CUSTOMER: Pioneer Technical Services

PROJECT: general radiochemistry

ATTN: Jodi Belanger-Woods

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MD	Method Duplicate		995485-7		09/13/1999	0900

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Radium-226, Activity	5.3			4.9	7.8	R	20
Uranium-235, Activity	<0.7			<0.9	0.0	R	20

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

CORE LABORATORIES

QUALITY CONTROL FOOTER

METHOD REFERENCES

(1) EPA 600/4-79-020, Methods for Chemical Analysis of Water and Wastes, March 1983
(2) EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, (9/86), Update I (7/92), Update II (9/94), Update IIA (8/93), Update IIB (1/95), Update III (6/97)
(3) Standard Methods for the Examination of Water and Wastewater, 18th, 1992
(4) EPA 600/4-80-032, Prescribed Procedures for Measurement of Radioactivity in Drinking Water, August 1980
(5) Federal Register, Friday, October 26, 1984 (40 CFR Part 136)
(6) EPA 600/8-78-017, Microbiological Methods for Monitoring the Environment, December 1978

COMMENTS

(1) The data in the Laboratory Test Results Report may differ from the data in the QC Report due to calculations for sample preparation and/or dilutions.
(2) The "Time Analyzed" in the QC Report may not reflect the actual time of each analysis. The "Date Analyzed" is the actual date of analysis.
(3) Soil and sludge samples are reported on a wet basis or on an "as received" basis unless otherwise indicated.
(4) The data in this report are within the limits of uncertainty specified in the referenced method unless otherwise indicated.
(5) Analyses performed by a subcontract laboratory are indicated with an asterisk and associated code in the "Technician" data field.

Subcontract Laboratories	Code	Subcontract Laboratories	Code
Core Laboratories - Anaheim, CA	AN	Core Laboratories - Houston, TX (Pet)	HP
Core Laboratories - Aurora, CO	AU	Core Laboratories - Houston, TX (Env)	HR
Core Laboratories - Casper, WY	CA	Core Laboratories - Indianapolis, IN	IN
Core Laboratories - Corpus Christi, TX	CC	Core Laboratories - Lake Charles, LA	LC
Core Laboratories - Carson, CA	CR	Core Laboratories - Valparaiso, IN	VP
Core Laboratories - Edison, NJ	ED	Other Subcontract Laboratories	XX

DEFINITIONS

(1) NC = Not Calculable due to values lower than the reporting limit.
(2) ND = Not Detected above the reporting limit.

QC SAMPLE IDENTIFICATIONS

BLANKS

MB = Method Blank (also referred to as a preparation blank)
RB = Reagent Blank
IB = Instrument Blank
ICB = Initial Calibration Blank
CCB = Continuing Calibration Blank
HB = Holding Blank (also referred to as a storage blank)

DUPLICATES

MSD = Matrix Spike Duplicate
MD = Method Duplicate

SPIKES

MS = Matrix Spike
MSD = Matrix Spike Duplicate
PDS = Post Digestion Spike
BS = Blank Spike (also referred to as a method spike)
SS = Surrogate Spike

REFERENCE STANDARDS

CS = Calibration Standard
RS = Reference Standard (also referred to as an external reference standard)
ICV = Initial Calibration Verification
CCV = Continuing Calibration Verification
LCS = Laboratory Control Sample

420 West First Street
Casper, WY 82601
(307) 235-5741

Job Number.....: 995485 Location.: 57210 Customer Job ID.....: RILEY PASS - 3806 Job Receive Date.: 08/18/99
Project Number.: 98000013 Project Description.: general radiochemistry Project Manager..: dwu
Customer.....: Pioneer Technical Services Contact.: Jodi Belanger-Woods

Sample Number.: 1 Customer Sample ID.: RP-SE-A1

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 13:45
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48418	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 2 Customer Sample ID.: RP-SE-A2

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 12:30
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48419	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 3 Customer Sample ID.: RP-SE-B1

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 19:35
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48420	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 4 Customer Sample ID.: RP-SE-B2

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 19:10
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48421	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 5 Customer Sample ID.: RP-SE-B3

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 19:35
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48422	4 oz Glass Jar	NONE	N			PREP

Number.....: 995485 Location.: 57210 Customer Job ID.....: RILEY PASS - 3806 Job Receive Date.: 08/18/99
...oject Number.: 98000013 Project Description.: general radiochemistry Project Manager..: dwu
Customer.....: Pioneer Technical Services Contact.: Jodi Belanger-Woods

Sample Number.: 6 Customer Sample ID.: RP-SE-B4

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 19:10
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48423	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 7 Customer Sample ID.: RP-SE-C1

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 16:15
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48424	4 oz Glass Jar	NONE	N			PREP

...ple Number.: 8 Customer Sample ID.: RP-SE-C2

...e Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 16:35
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48425	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 9 Customer Sample ID.: RP-SE-D1

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 15:34
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48426	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 10 Customer Sample ID.: RP-SE-D2

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 14:46
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

...tle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #

Job Number.....: 995485 Location.: 57210 Customer Job ID.....: RILEY PASS - 3806 Job Receive Date.: 08/18/99
Project Number.: 98000013 Project Description.: general radiochemistry Project Manager..: dwu
Customer.....: Pioneer Technical Services Contact.: Jodi Belanger-Woods

48427	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 11 Customer Sample ID.: RP-SE-E1

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 16:45
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48428	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 12 Customer Sample ID.: RP-SE-E2

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 14:20
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48429	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 13 Customer Sample ID.: RP-SE-X1

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 17:55
Sample Matrix.: SEDIMENT
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48430	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 14 Customer Sample ID.: RP-SS-A

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 13:00
Sample Matrix.: SOIL
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48431	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 15 Customer Sample ID.: RP-SS-C

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 12:00
Sample Matrix.: SOIL
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Number.....: 995485 Location.: 57210 Customer Job ID.....: RILEY PASS - 3806 Job Receive Date.: 08/18/99
Project Number.: 98000013 Project Description.: general radiochemistry Project Manager..: dwu
Customer.....: Pioneer Technical Services Contact.: Jodi Belanger-Woods

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48432	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 16 Customer Sample ID.: RP-SS-D

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 10:45
Sample Matrix.: SOIL
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48433	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 17 Customer Sample ID.: RP-SS-E

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 13:15
Sample Matrix.: SOIL
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
74	4 oz Glass Jar	NONE	N			PREP

Sample Number.: 18 Customer Sample ID.: RP-SS-X

Date Received.: 08/18/99 Time Received.: 11:10 Sample Date.: 08/10/99 Sample Time.: 18:05
Sample Matrix.: SOIL
Containers Received.....:
Comments.....:
Radioactivity Class.....:

Bottle #	Type of Bottle	Preserv.	F	Condition	Volume	Bin #
48435	4 oz Glass Jar	NONE	N			PREP

rpjsdst

Job Test Distribution

08/18/99

V2

Job Number.....: 995485 Location.: 57210 Customer Job ID.....: RILEY PASS - 3806 Job Receive Date.: 08/18/99
Project Number.: 98000013 Project Description.: general radiochemistry Project Manager..: dwu
Customer.....: Pioneer Technical Services Contact.: Jodi Belanger-Woods

Method	Method Description / Tests	Test Description	Sample Distribution	Mtx	Test Limits	Test Units	Test TAT
901.1	Gamma Scan (HPGe gamma)		1-18				
	RA226	Radium-226, Activity		S	0.1	pCi/g	28 DAYS
	RA226E	Radium-226, Error +\-		S	0.1	pCi/g	28 DAYS
	U235	Uranium-235, Activity		S	0.1	pCi/g	28 DAYS
	U235E	Uranium-235, Error +/-		S	0.1	pCi/g	28 DAYS