As Referenced in Supplementary Condition 4.02:

Test Well Report and Well Information dated September 20, 2001, prepared by Layne Western. A 2-page log is reproduced on the following pages is for the existing "Site J1 Monitoring Well" as identified on Figure 2 of the Drawings. No sieve samples were taken at the time the test hole was drilled.

The "technical data" contained in such report upon which CONTRACTOR may rely is the field boring log.

Layne-Western

A division of Layne Christensen Company

25450 Highway 275 - Valley, Nebraska 68064

TEST WELL REPORT

City and State: Vermillion SD
Date: 09/20/2001
Contract: Lewis & Clark
Driller: Trask
Test No.: J1 - Location at Site J is undetermined.
elpers: Nelson
Static Water Level: Est 28'

Test Log

0-20	Fine Brown Silty Clay
20-50	Coarse Medium & Fine Brown Sand
50-83	Coarse Medium - Fine Gray Sand w/some Small Gravel
83-90	Cobbles & Limestone, Rough Gravel
90-103	Gravel, Sand & Boulders
103-110	Shale & Limestone

Size Mud Pit–Length 8 Width 4 Depth 18"

WATER BEARING FORMATION DATA

Depth			Wt. Mud	Inches Mud	Drilling Time
			Lbs. per Gal.	Taken from Pit	
0	to	30	30	3 1/2	
30	to	60	34	4	
60	to	85	36	6	
85	to	105	36	6 1/2	
	to				
	to				
	to				
	to				
	to				

LOCATION: Farthest West Test Hole & Well

REMARKS:

MAKE SKETCH ON BACK OF THIS SHEET SHOWING LOCATION
TIEING IT INTO PERMANENT STRUCTURES AS MUCH AT POSSIBLE

Layne-Western

A division of Layne Christensen Company

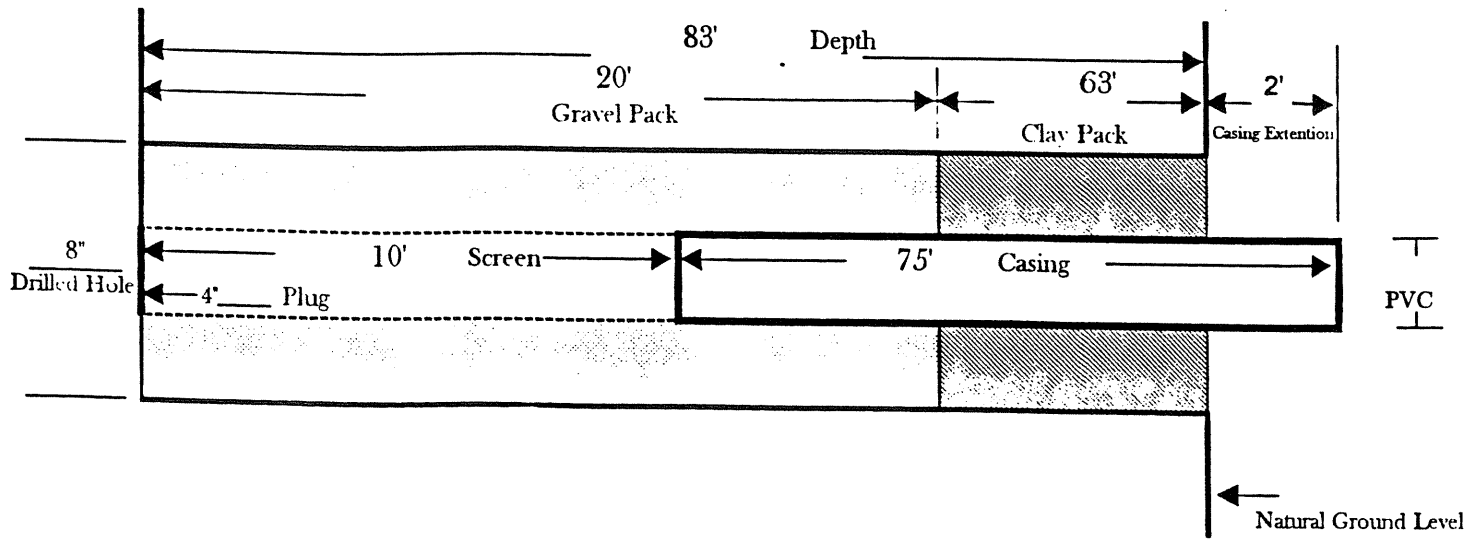
25450 Highway 275 – Valley, Nebraska 68064

WELL INFORMATION

CONTRACT Lewis & Clark WELL No. J1

Log of well from ground level:

Feet		Feet	Formation
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		



As Referenced in Supplementary Condition 4.02:

Lewis and Clark – Site J: Test Well Installation Summary dated December 3, 2004, prepared by Chatman & Associates, Inc. A 2-page narrative is reproduced in Appendix A along with boring logs, well construction details, geophysical logs and sieve sample test results.

The "technical data" contained in such report upon which CONTRACTOR may rely are the field boring logs, well construction details, geophysical logs and sieve sample test results.

Chatman & Associates
incorporated

December 3, 2004

Mr. William W. Brinker
HDR Engineering, Inc.
600 S. Cliff, Suite 106
Sioux Falls, SD 57104

RE: Lewis and Clark - Site J: Test Well Installation Summary

Dear Mr. Brinker:

Chatman and Associates, Inc. (CAI) was contracted by HDR Engineering, Inc. (HDR) to conduct on-site observations of the installation of two monitoring wells at the Site J location for the Lewis and Clark Rural Water System (Site). The objectives of the services were to provide:

- Geologic logging of drill cuttings,
- Collection of formation samples for grainsize distribution analysis,
- Witness downhole electric logging of test holes, and
- Prepare, package, and deliver formation samples to a geotechnical laboratory for grainsize analysis.

To accomplish these objectives, CAI oversaw the installation of two monitoring wells, generated a lithologic log of the Site geology, and prepared a construction diagram of each monitoring well on the Site. The following letter report summarizes the field activities and findings of the study.

FIELD ACTIVITIES

CAI coordinated with a local drilling company (Hammond-Wetmore Drilling) to install two monitoring wells on-site at the locations indicated by HDR. The drilling and installation of J-MW-1 was completed on October 20, 2004. The boring log for J-MW-1 is attached in Appendix A. The general lithology of J-MW-1 consisted of the following:

- 0 - 30 feet (ft) below ground surface (bgs) – silt topsoil and fine grained, gray sand,
- 30 – 70 ft bgs - fine grained, gray sand, with lenses of fine gravels and coal
- 87 – 97 ft bgs – coarse sand with medium gravels
- 97 – 103 ft bgs – Bedrock – greenish gray shale

The monitoring well J-MW-1 was located by Hammond-Wetmore Drilling using GPS equipment at N42° 46' 02.3''and 097° 01' 08.7''. Survey data for this well is attached in Appendix B as the East Well.

The drilling and installation of J-MW-2 was completed on October 20, 2004. The boring log for J-MW-2 is attached in Appendix A. The general lithology of J-MW-2 consisted of the following:

- 0 - 28 ft bgs – silt topsoil and fine grained, gray sand.
- 28 – 75 ft bgs - fine grained, gray sand, with lenses of fine gravels and coal

647 Massachusetts St., Ste. 211
Lawrence, KS 66044-2255
phone: 785-843-1006
fax: 785-843-4006
email: cai@chatmaninc.com

777 E. Battlefield, Ste. 102B
Springfield, MO 65807
phone: 417-882-2888
fax: 417-889-0888
email: cai@chatmaninc.com

- 89 – 97 ft bgs – coarse sand with medium gravels
- 97 – 101 ft bgs – Bedrock – greenish gray shale

The two monitoring wells were drilled into the bedrock, which was described as a greenish gray shale. During drilling oil residue was observed in the mud pit. This is likely due to extending the boring into the shale bedrock, which released oil from the rock matrix. The oil was then transported upwards with the drilling mud into the mud pit.

The monitoring well J-MW-2 was located by Hammond-Wetmore Drilling using GPS equipment at N42°46' 02.9'' and 097° 01' 02.4''. Survey data is attached in Appendix B as the West Well.

The two monitoring wells were constructed using 5-inch diameter Schedule 40 PVC casing. The wells were screened from 87 ft bgs to 97 ft bgs with 5-inch diameter Schedule 40 PVC, slot size 0.025 on top of the bedrock surface. The borehole was backfilled with coarse grained sand filter pack to approximately 60 ft bgs with the remainder of the borehole backfilled with bentonite pellets and bentonite grout. The well construction detail forms have been included as Appendix C.

The wells were developed using airlift jetting for approximately 10 to 15 hours per well by Hammond-Wetmore Drilling. Photos of the wells are presented in Appendix D. Above ground steel well protectors with the ability to be padlocked were installed during the last week of October 2004. Water level measurements for each well were collected following development, after the water level in the well had stabilized. J-MW-1 had a water level of 16.32 ft bgs and J-MW-2 had a water level of 16.16 ft bgs.

GEOPHYSICAL DATA

The first monitoring well was electronically logged by the South Dakota Geological Survey (SDGS) on October 20, 2004 before the well casing was set by the drilling company. Natural Gamma, Spontaneous Potential, and a suite of Resistivity geophysical data were collected at J-MW-1. The geophysical data correlated well with the physical boring log; however, the geophysics data indicated two (2) feet of fines from 86 to 88 ft bgs not observed in the drill cuttings. The geophysical log is attached in Appendix E.

The second monitoring well was electronically logged by the SDGS October 21, 2004 following the installation of the PVC casing. Natural gamma geophysical data was collected at J-MW-2. These data did not indicate anything of significance to add to the physical boring log. The geophysical log is attached in Appendix E.

GEOTECHNICAL GRAINSIZE ANALYSIS

Formation samples were collected from drill cuttings every ten feet at J-MW-1 and J-MW-2. Six (6) samples from 50 to 100 ft bgs, the anticipated screen interval of a production well, for each well were analyzed by Alpha-Omega Geotech, INC. The results of the sieve analyses indicate that the formation consists mostly of fine to medium grained, poorly graded sand. Generally, the formation samples collected were described as an SP by the Unified Soil Classification System. This type of soil is known as poorly-graded sands or gravely sands with less then 5 percent fines. The sieve analysis results are attached in Appendix F.

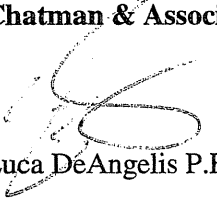
CONCLUSIONS

On-site observation and monitoring of the installation of two monitoring wells at Site J for Lewis and Clark Rural Water System was performed by CAI. Based on this observation, the following conclusions were obtained:

- The formation consists of mainly fine to medium grained, poorly graded sand as determined from geologic logging and geotechnical samples.
- The geotechnical samples collected below 80 ft bgs indicate fine grained silty sand, which is likely due to the 2 to 3 ft fine grained layer observed in the geophysical logs between 85 and 90 ft bgs.
- Depth to bedrock is 96 ft bgs.
- Depth of water is approximately 16 ft bgs
- Saturated thickness of the formation is approximately 80 ft.
- Based on the large saturated thickness and fine to medium grained sand formation, this site exhibits a good potential for water production wells.

Sincerely,

Chatman & Associates, Inc.



Luca DeAngelis P.E., R.G.

Project Geological Engineer

Enc.

APPENDIX A

Boring Logs

Chatman & Associates incorporated

WELL/BORING LOG

WELL/BORING NO: J-MW-1 Sampler: AKF

Driller: Hammond-Wetmore Drilling

Location: Vermillion, SD

Start Date/Time: 10/20/04 1005 Completion Date/Time: 10/20/04 1120

Drill Equipment: Postadrill Rotary Sample Method: Grab (cuttings)

Ground Elevation: ≈1146 ft Northing: _____ Easting: _____

Depth (bls)	Recovery (ft/ft)	Sample Depth	Sample ID and Method	Description of Material Drilled	Unified Classification	PID Monitoring: Reading (ppm)	PID Monitoring: Time	PID Monitoring: ~~Location~~ Comments (background, headspace, well head, etc.)
				Silt, Topsoil				
5				3 - 30' Sand, fine grained grayish brown, 2.5y 4/2				
10			J-MW-1 10'				1010	
15								
20			J-MW-1 20'				1015	
25								
30			J-MW-1 30'	30-31' Clay, gray 5y 4/1			1020	
35				30-70' Sand, fine grained grayish brown 2.5y 4/2 w/ fine gravels, subangular-coal, clay seams				
40			J-MW-1 40'				1025	
45								
50			J-MW-1 50'				1030	

Chatman & Associates incorporated

WELL/BORING LOG

WELL/BORING NO: J-MW-1 Sampler: AKF

Driller: Hammond-Wetmore Drilling

Location: Vermillion, SD

Start Date/Time: 10/20/04 1005 Completion Date/Time: 10/20/04 1120

Drill Equipment: Portadrill Rotary Sample Method: Grab (cuttings)

Ground Elevation: ≈1146 ft Northing: Easting:

Depth (bls)	Recovery (ft/ft)	Sample Depth	Sample ID and Method	Description of Material Drilled	Unified Classification	PID Monitoring: Reading (ppm)	PID Monitoring: Time	PID Monitoring: Location (background, headspace, well head, etc.)
55								
60			J-MW-1 60'				1035	
65								
70			J-MW-1 70'	70-75' Sand, fine grained grayish brown 2.5y 4/2			1040	
75				75-87' Sand, fine grained w/ fine gravels + clay seams 2.5y 4/2				
80			J-MW-1 80'				1045	
85								
90			J-MW-1 90'	87-97' Sand, coarse w/ med. subangular gravels			1050	Drill Chattering Hard drilling
95								
100			J-MW-1 100'	97-103' Bedrock - Shale GreenHorn, w/ med. gravels few fines			1100	Oil residue in mud pit
			J-MW-1 103'	TD = 103'			1115	

Chatman & Associates incorporated

WELL/BORING LOG

WELL/BORING NO: J-MW-2 Sampler: AKF

Driller: Hammon - Wetmore Drilling

Location: Vermillion, SD

Start Date/Time: 10/20/04 1310 Completion Date/Time: 10/20/04 1440

Drill Equipment: Portadrill Rotary Sample Method: Grab - cutting

Ground Elevation: ≈1146 ft Northing: _____ Easting: _____

Depth (bls)	Recovery (ft/ft)	Sample Depth	Sample ID and Method	Description of Material Drilled	Unified Classification	PID Monitoring: Reading (ppm)	PID Monitoring: Time	PID Monitoring: ~~Comments to Location~~ (background, headspace, well head, etc.)
				0-3' Silt, Topsoil, Brown				
5				3-30' Sand, fine grained grayish brown 2.5Y 4/2				
			J-MW-2 10'				1315	
10								
15								
			J-MW-2 20'	19' Wood bits in cuttings from log			1325	
20								
25								
			J-MW-2 30'	28-30' Coal, .25" to 2", subangular black			1335	
30				30-75' Sand, fine grained grayish brown 2.5Y 4/2 w/ coal and subangular coarse sand				
35								
40			J-MW-2 40'				1340	
45								
50			J-MW-2 50'				1345	

Chatman & Associates incorporated

WELL/BORING LOG

WELL/BORING NO: J-MW-2 Sampler: AKF

Driller: Hammond - Wetmore Drilling

Location: Vermillion, SD

Start Date/Time: 10/20/04 1310 Completion Date/Time: 10/20/04 1440

Drill Equipment: Portadrill - Rotary Sample Method:

Ground Elevation: ~1146 ft Northing: Easting:

Depth (bls)	Recovery (ft/ft)	Sample Depth	Sample ID and Method	Description of Material Drilled	Unified Classification	PID Monitoring Reading (ppm)	PID Monitoring Time	PID Monitoring Location (background, headspace, well head, etc.) Comments
55								
60			J-MW-2 60'				1355	
65								
70			J-MW-2 70'				1420	
75				75' - 76' Clay seam, gray 2.5Y 5/1				
80			J-MW-2 80'	76' - 89' Sand, fine grained w/ coarse sand grayish brown 2.5Y 4/2			1425	
85								
90			J-MW-2 90'	89' - 97' Sand, coarse and fine gravels, subangular, coal shards.			1440	Drill Chattering
95								
100			J-MW-2 100'	97' - 101' Shale Bedrock, Greenhorn Shale w/ med gravels. TD = 101'			1440	Hard Drilling; oil Residue in Mud Pit

APPENDIX E

Geophysical Logs

South Dakota Department of
Environment and Natural Resources
GEOLOGICAL SURVEY

AKELEY-LAWRENCE SCIENCE CENTER, USD
414 EAST CLARK STREET
VERMILLION, SD 57069-2390
605-677-5227
FAX 605-677-5895
INTERNET *www.state.sd.us/denr*

October 25, 2004

Amanda K. Flageolle
Chatman & Associates
647 Massachusetts Street, Suite 211
Lawrence, Kansas 66044-2255

Dear Amanda:

Enclosed are two geophysical logs for the monitoring wells drilled October 20, 2004, and a couple of site maps for the area. Monitoring Well-1 is an open hole log and MW-2 was logged through the casing. I was unable to run an induction log on MW-2, but did run natural gamma. Our induction tool just plain would not work! The locations on the site maps are accurate to within 2 to 3 meters. I hope this will help you in your characterization of the aquifer.

Regards,

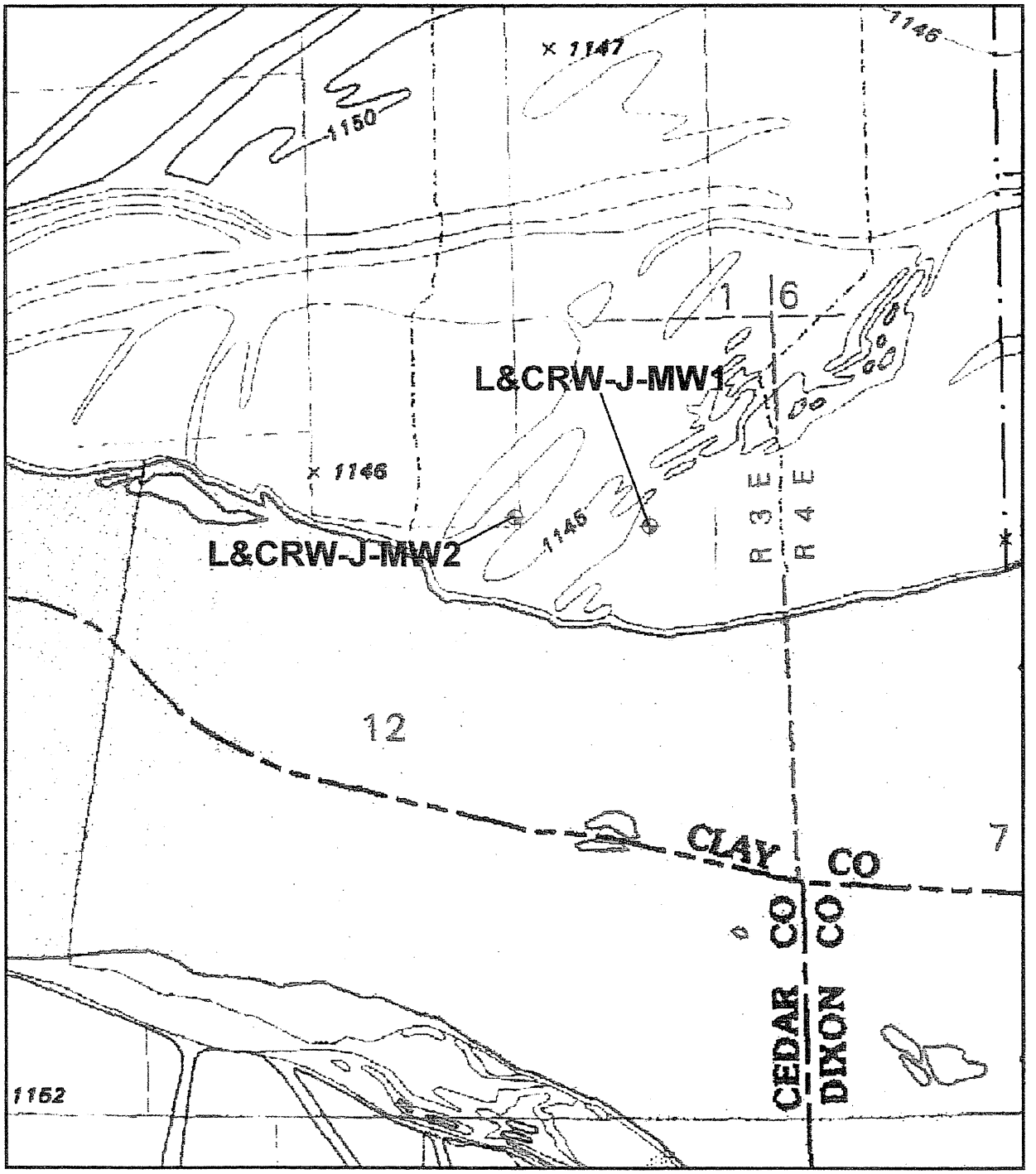
Layne D. Schulz
Senior Geologist

For the State Geologist

LDS:co

Enclosures

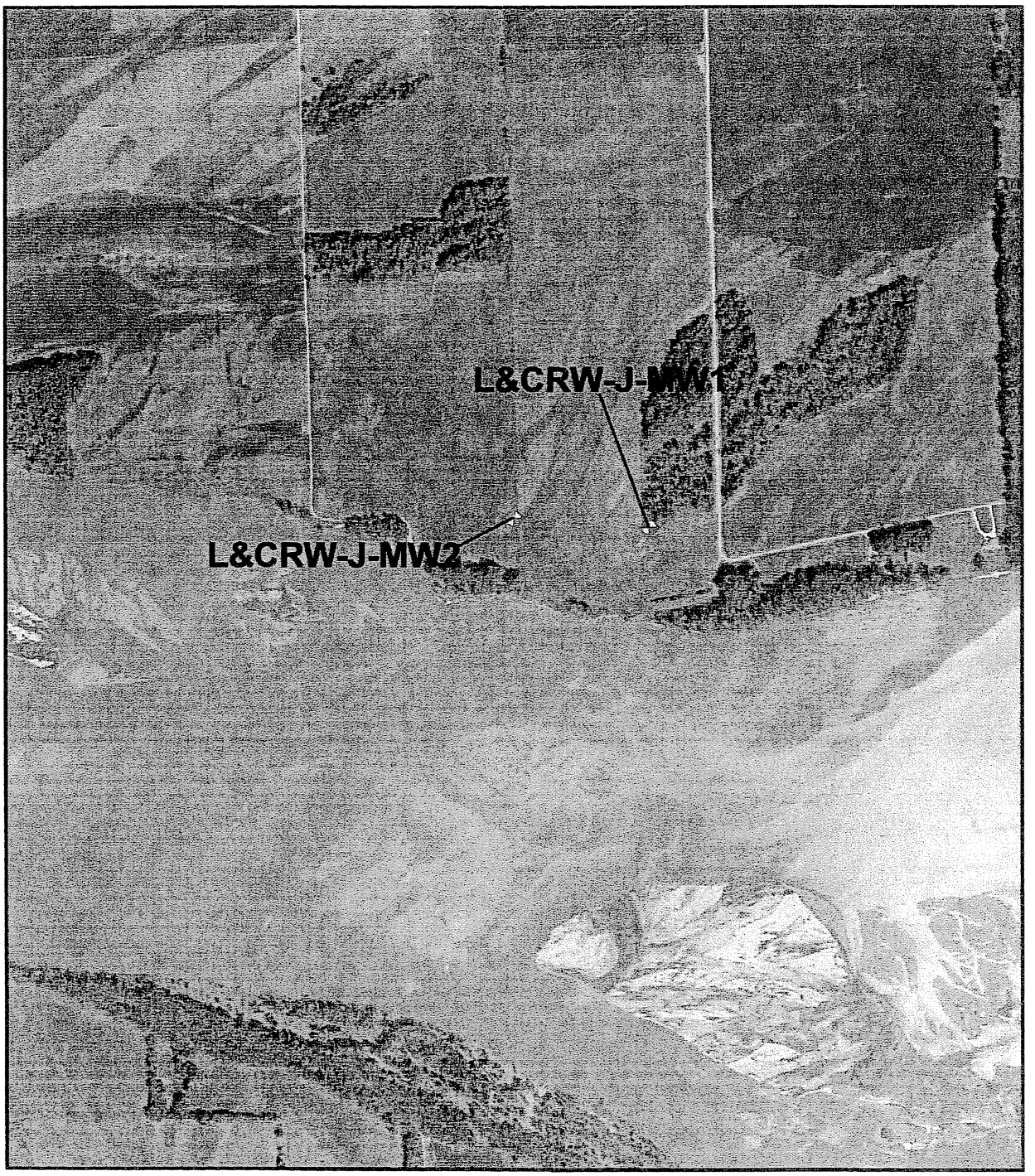
Lewis and Clark Rural Water-Site J



Scale 1:12,000

N

Lewis and Clark Rural Water-Site J



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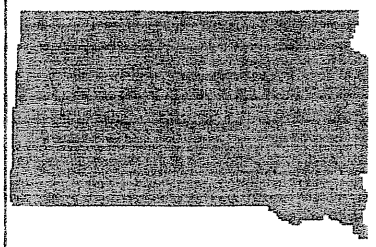


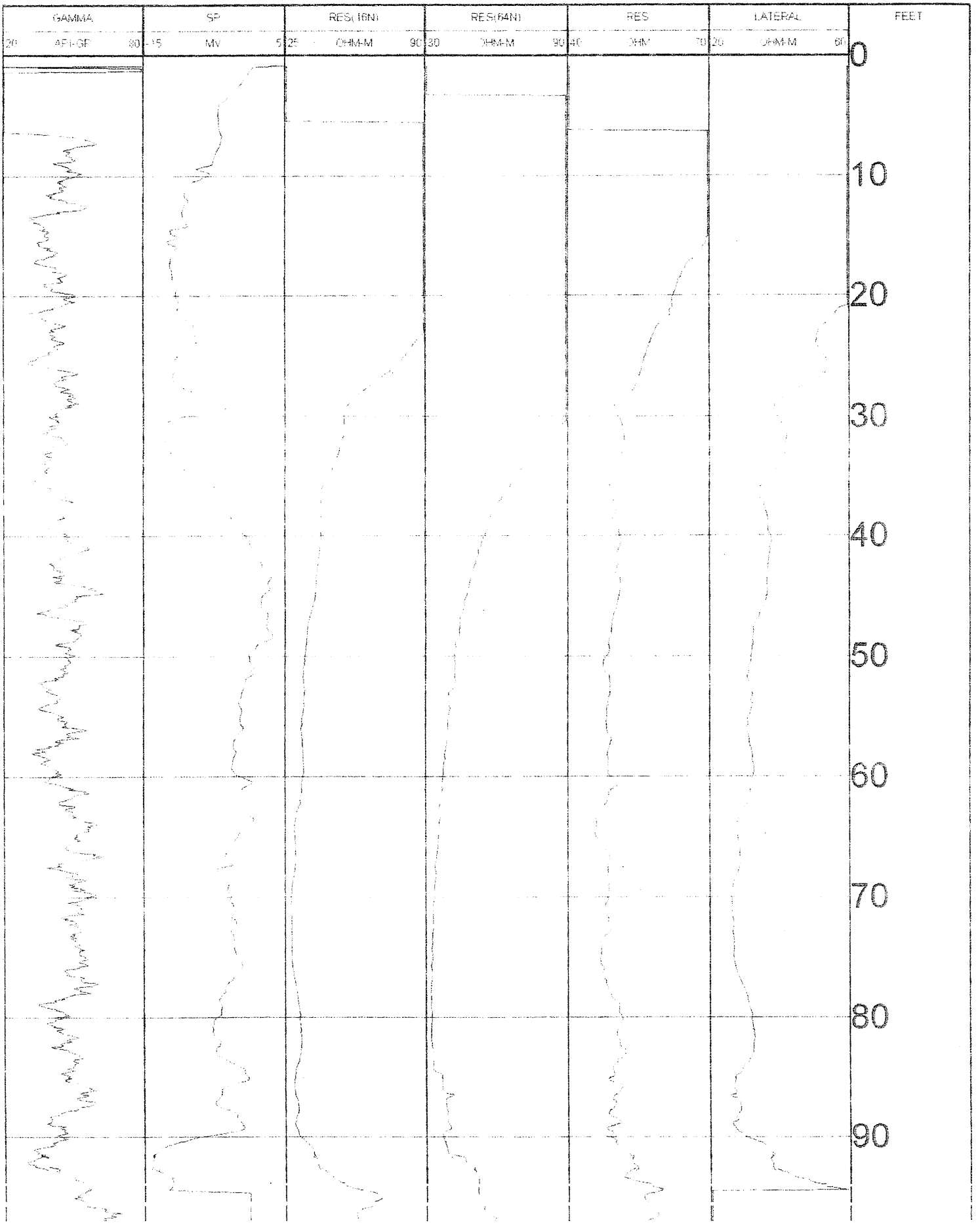
South Dakota Geological Survey

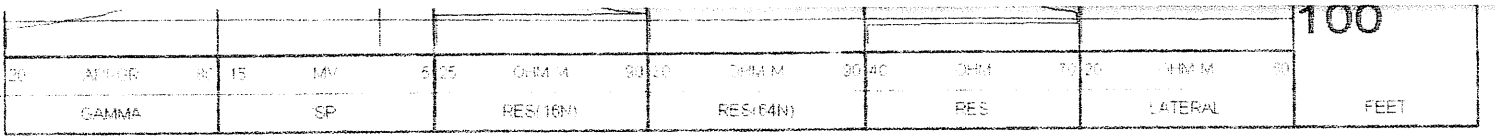
L&CRW-J-MW1

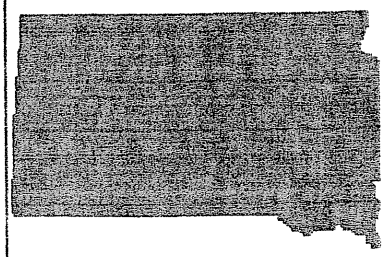
COMPANY	Hammond/Wetmore			OTHER SERVICES	
WELL	L&CRW-J-MW1				
LOCATION/FIELD	T 032N . R.03E . 12 AACD				
COUNTY	CLAY				
LOCATION	SOUTH DAKOTA				
SECTION	12	TOWNSHIP	032N	RANGE	03E
DATE	oct 20, 2004 ~~07/12/04~~	PERMANENT DATUM			
API NO. DRILLER	102			KB	
LOG BOTTOM	101.80	LOG MEASURED FROM	GL	DF	
LOG TOP	0.90	DRL MEASURED FROM	GL	GL	1144
CASING DIAMETER	NONE	LOGGING UNIT	609		
CASING TYPE		FIELD OFFICE	VERMILLION		
CASING THICKNESS RUN NO.		RECORDED BY	L. SCHULZ		
BIT SIZE	9	BOREHOLE FLUID	MUD	FILE	PROCESSED
MAGNETIC DECL.	0	RM		TYPE	8044A
MATRIX DENSITY	2.65	RM TEMPERATURE			
NEUTRON MATRIX CASING OD	SANDSTONE	MATRIX DELTA T	54		
				THRESH	99999

LEWIS AND CLARK RURAL WATER TEST
OPEN HOLE: NO CASING

WITNESSED BY


GAMMA
20 API-GP 80
SP
-15 MV 5
RES(16N)
25 OHM-M 90
RES(64N)
30 OHM-M 90
RES
40 OHM 70
LATERAL
20 OHM-M 60
FEET
0
10
20
30
40
50
60
70
80
90


100
0 API UNITS 100
GAMMA
-80 MV 20
SP
0 OHMM 100
RES(16IN)
0 OHMM 100
RES(64IN)
0.2 OHMM 2000
RES
0.2 OHMM 2000
LATERAL
FEET



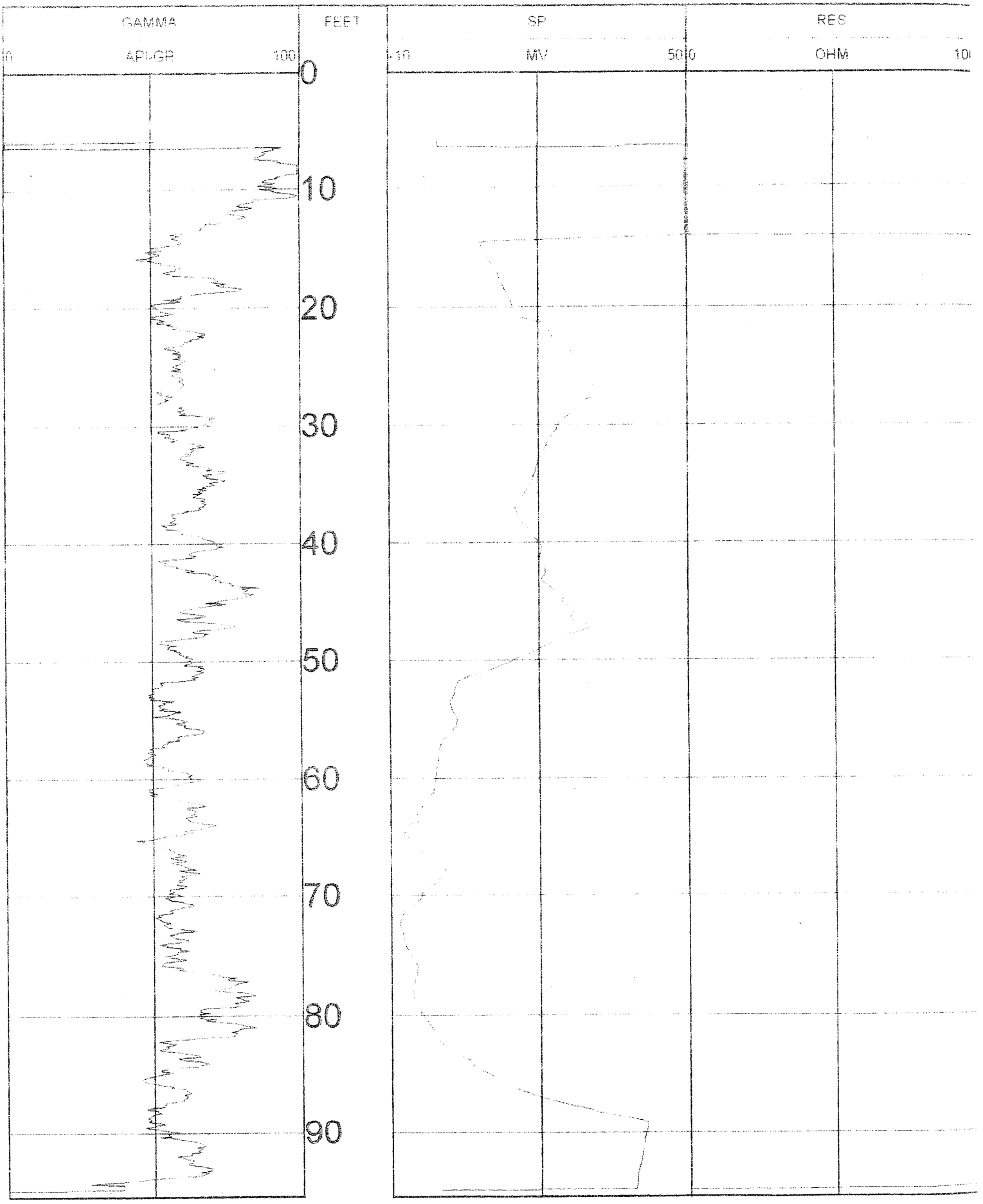
South Dakota Geological Survey

L&CRW-J-MW2

COMPANY	Hammond/Wetmore			OTHER SERVICES	
WELL	L&CRW-J-MW2				
LOCATION/FIELD	T 032N R 03E 12 ABDC				
COUNTY	CLAY				
LOCATION	SOUTH DAKOTA				
SECTION	12	TOWNSHIP	032N	RANGE	03E
DATE	oct. 22, 2004 ~~07/12/04~~	PERMANENT DATUM			
API NO. DRILLER	102			KB	
LOG BOTTOM	95.20	LOG MEASURED FROM	GL	DF	
LOG TOP	5.80	DRL MEASURED FROM	GL	GL	1144
CASING DIAMETER	5	LOGGING UNIT	609		
CASING TYPE		FIELD OFFICE	VERMILLION		
CASING THICKNESS/ RUN NO.		RECORDED BY	L. SCHULZ		
BIT SIZE	9	BOREHOLE FLUID	MUD	FILE	PROCESSED
MAGNETIC DECL	0	RM		TYPE	9060A
MATRIX DENSITY	2.65	RM TEMPERATURE			
NEUTRON MATRIX CASING OD	SANDSTONE	MATRIX DELTA T	54	THRESH	99999

N-gamma only cased well

WITNESSED BY


GAMMA
FEET
0
APIGR
100
SP
RES
-10
MV
50
OHM
10
0
10
20
30
40
50
60
70
80
90

APPENDIX F

Geotechnical Test Results

RECEIVED NOV 5 2004

November 1, 2004

GEOTECHNICAL SERVICES: DESIGN • CONSTRUCTION • FORENSIC

Ms. Amanda Flageolle
Chatman & Associates, Inc.
647 Massachusetts, Suite 211
Lawrence, KS 66044

Fax # (785) 843-4006 **(17 Pages)**

Lewis & Clark – Site J (A-OG Project #4-732T)

Dear Ms. Flageolle:

We have completed our laboratory testing services for your above-referenced project.

The detailed results of these tests are enclosed. As you directed, these testing services were provided in accordance with test methods that you specified.

If you have any questions regarding this information or require any further testing, please contact me at your convenience. We enjoy doing business with you.

Sincerely,
ALPHA-OMEGA GEOTECH, INC.

Thomas J. Burdick
Laboratory Manager

Enclosures

TJB:dc

Alpha-Omega Geotech, Inc.
1701 State Avenue
Kansas City, Kansas 66102
(913) 371-0000
FAX (913) 371-6710

SUMMARY OF LABORATORY TESTING

PROJECT NAME: Lewis & Clark - Site J
PROJECT LOCATION: South Dakota
PROJECT NUMBER: 4-732T
DATE: 11/1/2004

Boring Number	Sample Number	Depth or Elevation	Description	Natural Moisture (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	USCS Class.	% Passing No. 200	Unconfined Compression PSF	%e	% Swell	Remarks
	J-MW-1	50'	Poorly graded sand with silt						SP-SM	7.9				
	J-MW-1	60'	Poorly graded sand						SP	1.6				
	J-MW-1	70'	Poorly graded sand						SP	1.6				
	J-MW-1	80'	Poorly graded sand						SP	1.3				
	J-MW-1	90'	Silty sand						SM	15.3				
	J-MW-1	100'	Poorly graded sand with gravel						SP	4.4				
	J-MW-2	50'	Poorly graded sand						SP	4.3				
	J-MW-2	60'	Poorly graded sand						SP	0.0				
	J-MW-2	70'	Poorly graded sand						SP	1.9				
	J-MW-2	80'	Silty sand						SM	15.3				

Alpha-Omega Geotech, Inc.

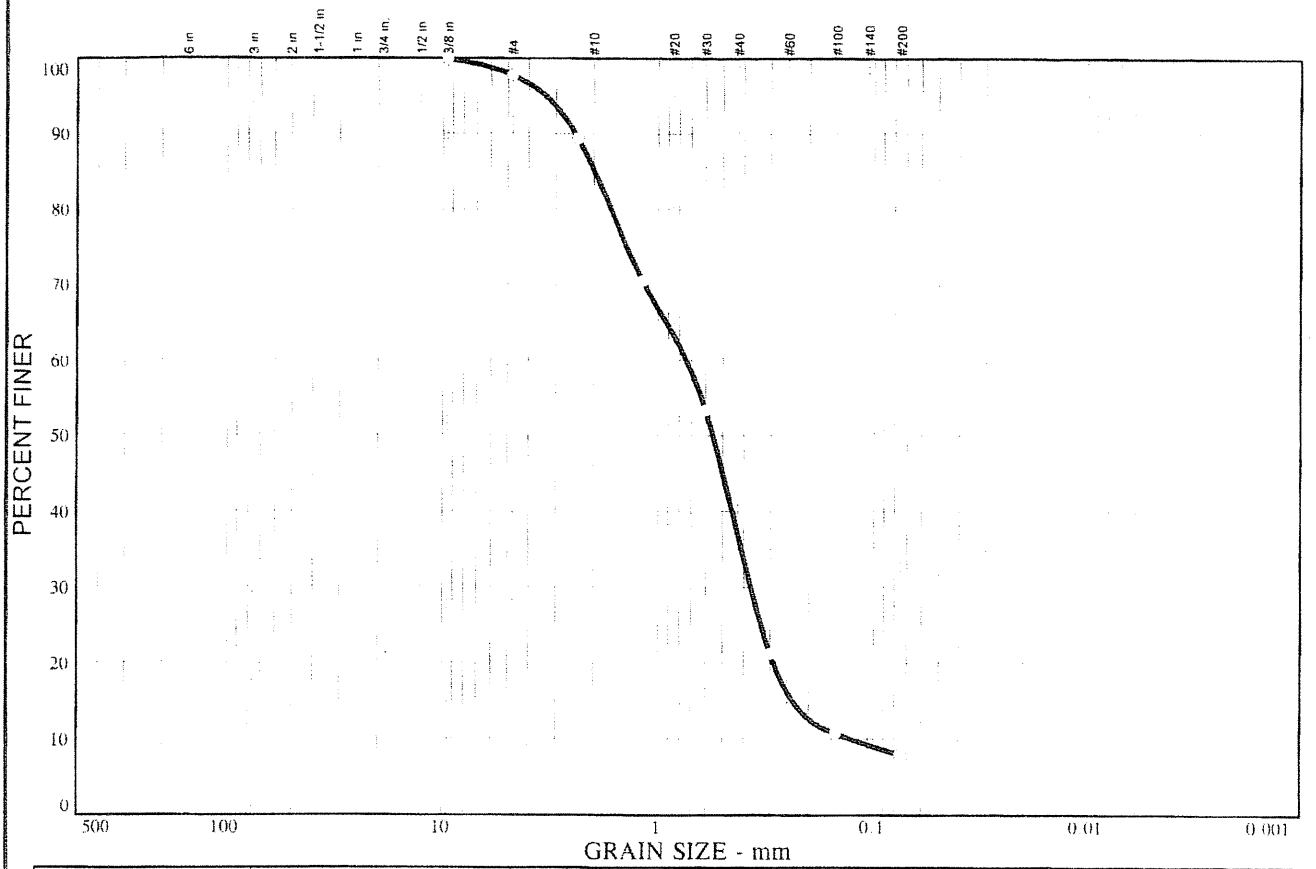
SUMMARY OF LABORATORY TESTING

PROJECT NAME: Lewis & Clark - Site J
PROJECT LOCATION: South Dakota
PROJECT NUMBER: 4-732T
DATE: 11/1/2004

Boring Number	Sample Number	Depth or Elevation	Description	Natural Moisture (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	USCS Class.	% Passing No. 200	Unconfined Compression PSF	%c	% Swell	Remarks
	J-MW-2	90'	Poorly graded sand						SP	4.6				
	J-MW-2	100'	Well-graded sand with silt						SW-SM	8.8				

Alpha-Omega Geotech, Inc.

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	2.2	12.5	48.3	29.1	7.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	97.8		
#8	89.4		
#16	70.5		
#30	53.3		
#50	21.2		
#100	10.7		
#200	7.9		

* (no specification provided)

Soil Description

Poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85} = 1.98 D_{60} = 0.739 D_{50} = 0.554
D_{30} = 0.369 D_{15} = 0.237 D_{10} = 0.128
C_u = 5.77 C_c = 1.44

Classification

USCS= SP-SM AASHTO=

Remarks

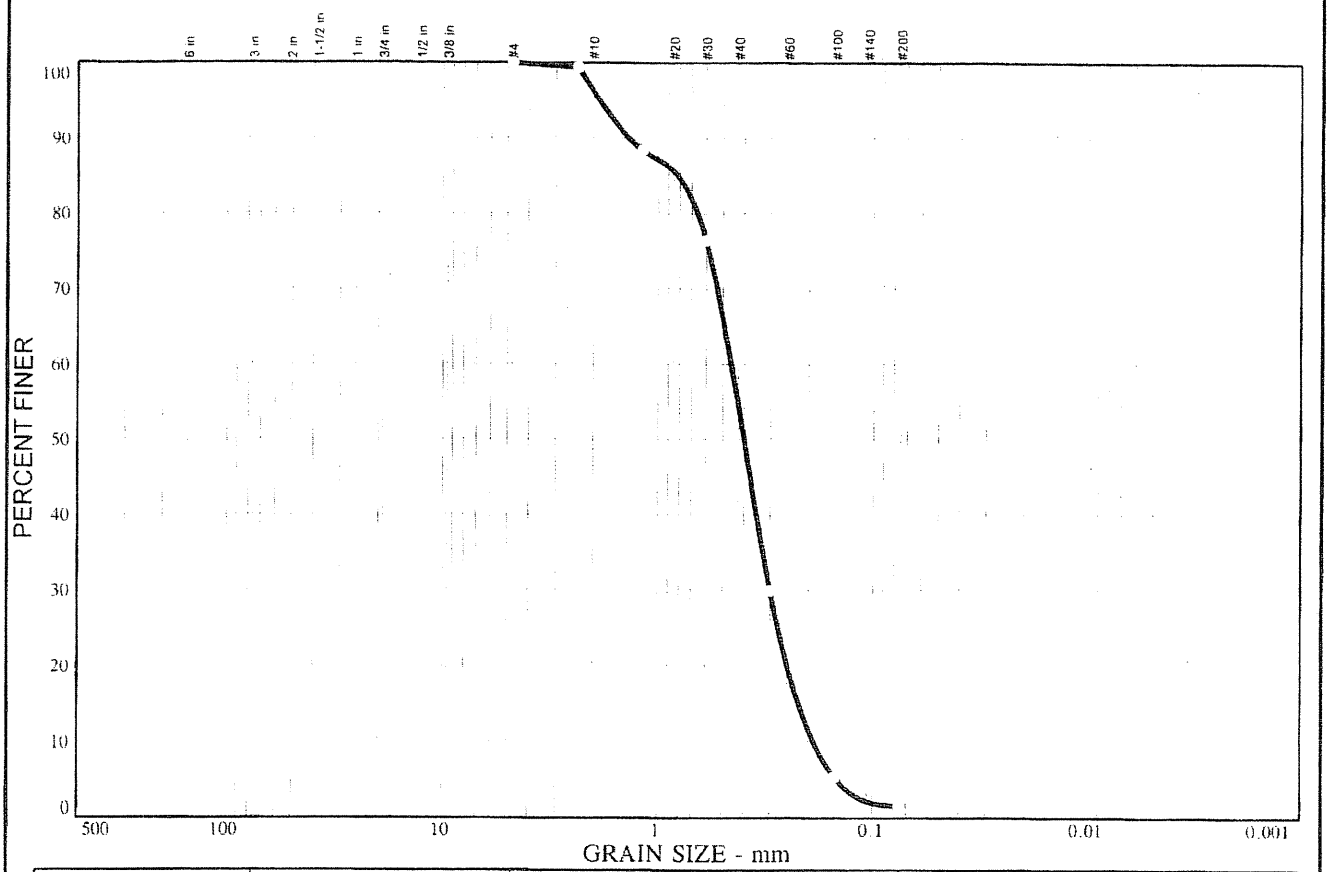
Sample No.: J-MW-1 **Source of Sample:** **Date:** 10-26-2004
Location: **Elev./Depth:** 50'

Alpha-Omega Geotech, Inc.

Client: Chatman & Associates, Inc.
Project: Lewis & Clark - Site J

Project No: 04-732T **Figure**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	3.8	41.6	53.0	1.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.4		
#16	88.4		
#30	76.4		
#50	29.9		
#100	5.3		
#200	1.6		

* (no specification provided)

Soil Description

Poorly graded sand

Atterberg Limits

PL = LL= PI =

Coefficients

D_{85} = 0.811 D_{60} = 0.457 D_{50} = 0.399
D_{30} = 0.300 D_{15} = 0.221 D_{10} = 0.189
C_u = 2.43 C_c = 1.05

Classification

USCS = SP AASHTO=

Remarks

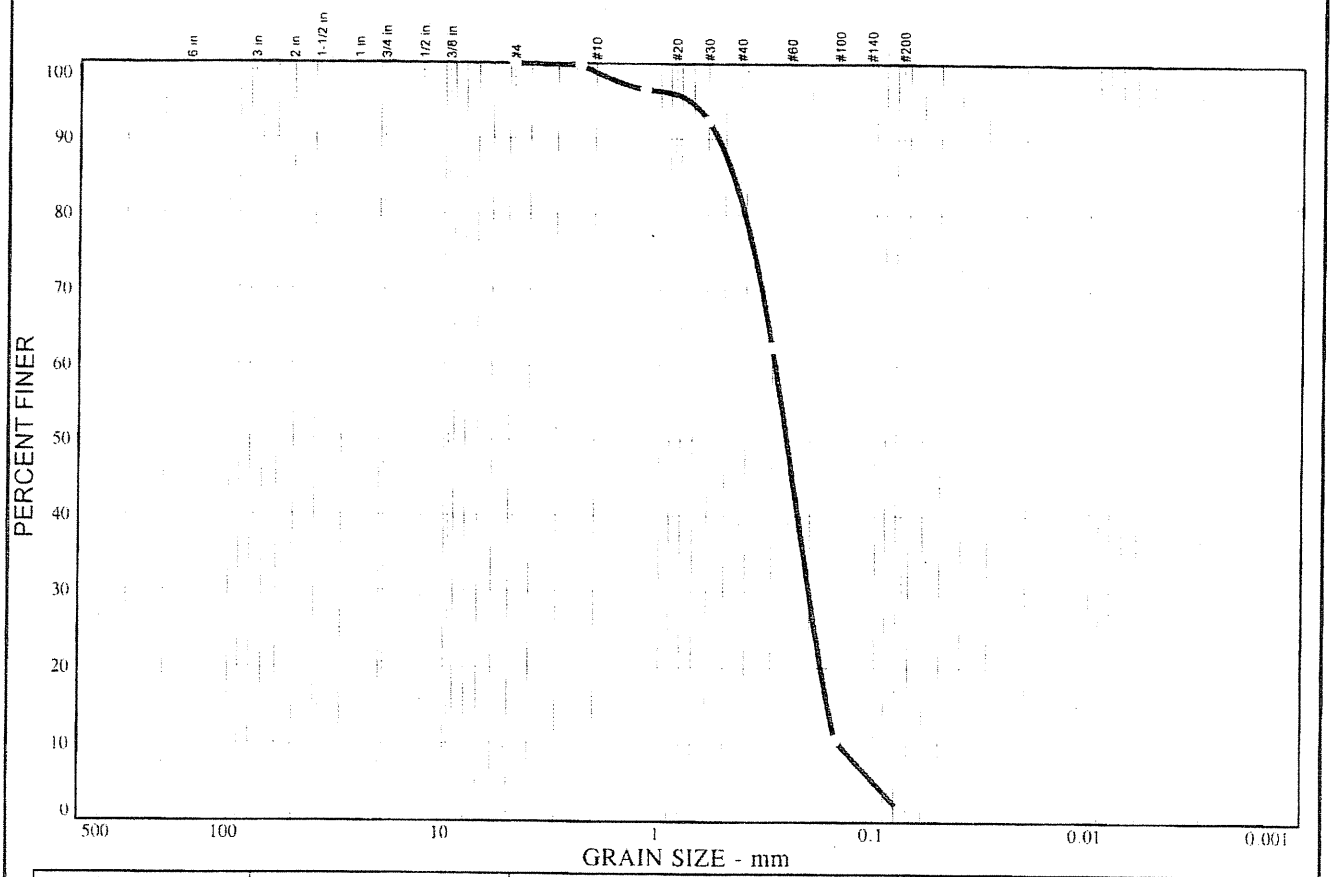
Sample No.: J-MW-1 **Source of Sample:** **Date:** 10-26-2004
Location: **Elev./Depth:** 60'

Alpha-Omega Geotech, Inc.

Client: Chatman & Associates, Inc.
Project: Lewis & Clark - Site J

Project No: 04-732T **Figure**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	1.2	16.8	80.4	1.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.8		
#16	96.6		
#30	92.4		
#50	62.4		
#100	10.6		
#200	1.6		

* (no specification provided)

Soil Description

Poorly graded sand

Atterberg Limits

PL = LL= PI =

Coefficients

D_{85} = 0.458 D_{60} = 0.290 D_{50} = 0.256
D_{30} = 0.200 D_{15} = 0.162 D_{10} = 0.143
C_u = 2.03 C_c = 0.97

Classification

USCS = SP AASHTO=

Remarks

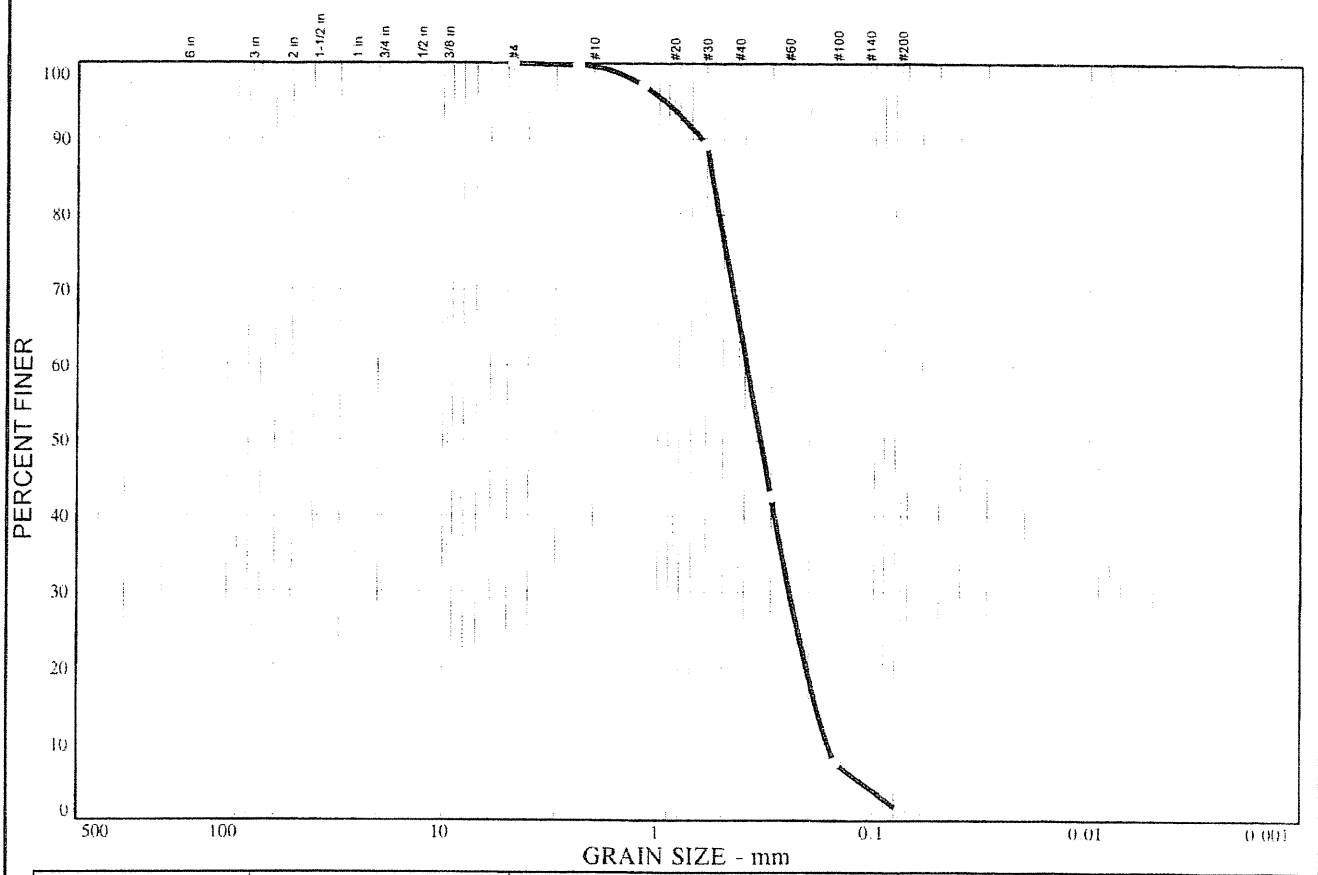
Sample No.: J-MW-1 **Source of Sample:** **Date:** 10-26-2004
Location: **Elev./Depth:** 70'

Alpha-Omega Geotech, Inc.

Client: Chatman & Associates, Inc.
Project: Lewis & Clark - Site J

Project No: 04-732T **Figure**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.4	33.8	64.5	1.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.8		
#16	97.1		
#30	89.3		
#50	42.6		
#100	7.6		
#200	1.3		

* (no specification provided)

Soil Description

Poorly graded sand

Atterberg Limits

PL = LL = PI =

Coefficients

D_{85} = 0.563 D_{60} = 0.390 D_{50} = 0.336
D_{30} = 0.245 D_{15} = 0.184 D_{10} = 0.162
C_u = 2.41 C_c = 0.95

Classification

USCS = SP AASHTO=

Remarks

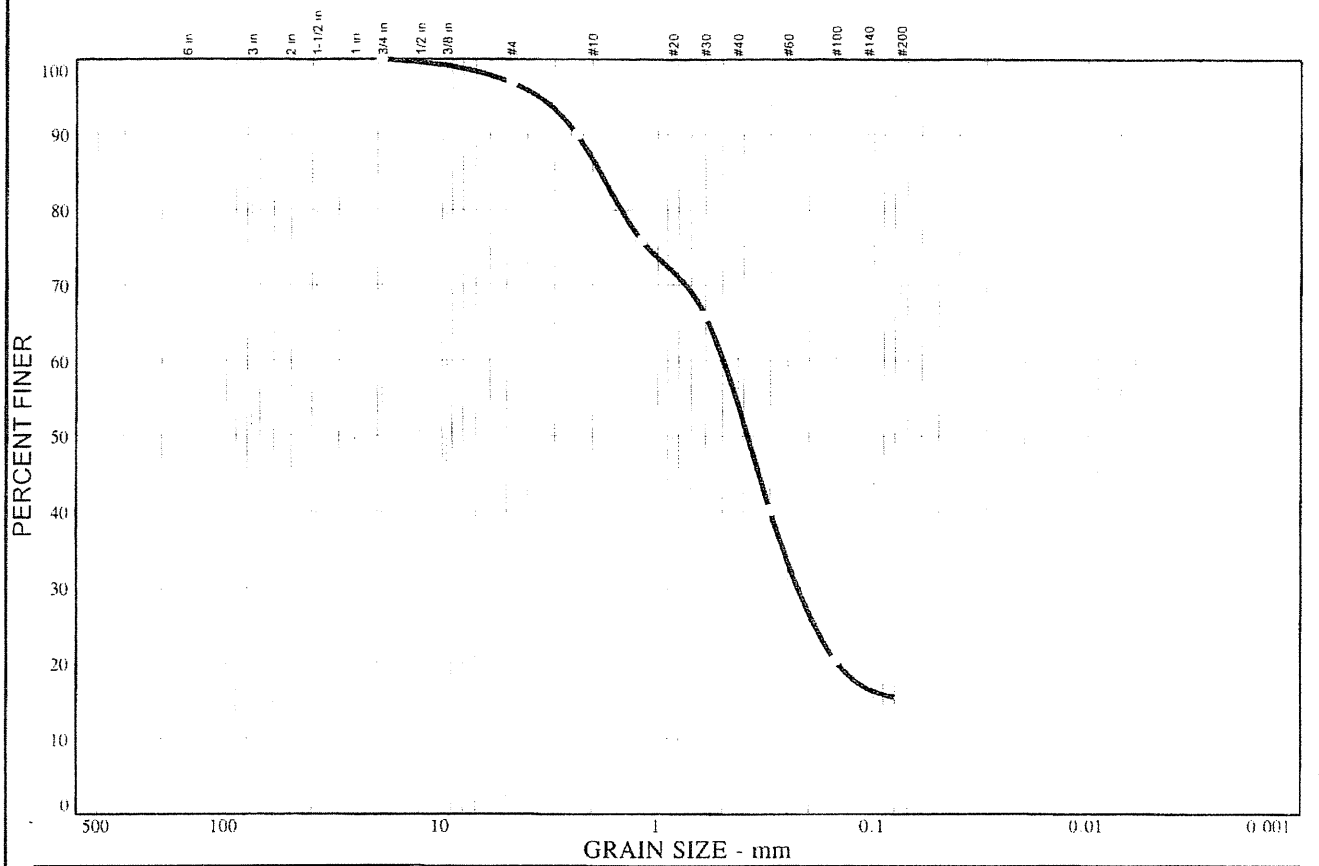
Sample No.: J-MW-1 **Source of Sample:** **Date:** 10-26-2004
Location: **Elev./Depth:** 80'

Alpha-Omega Geotech, Inc.

Client: Chatman & Associates, Inc.
Project: Lewis & Clark - Site J

Project No: 04-732T **Figure**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	3.1	10.1	32.5	39.0	15.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
#4	96.9		
#8	90.0		
#16	75.9		
#30	65.9		
#50	40.2		
#100	20.4		
#200	15.3		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85} = 1.84 D_{60} = 0.495 D_{50} = 0.382
D_{30} = 0.224 D_{15} = D_{10} =
C_u = C_c =

Classification

USCS= SM AASHTO=

Remarks

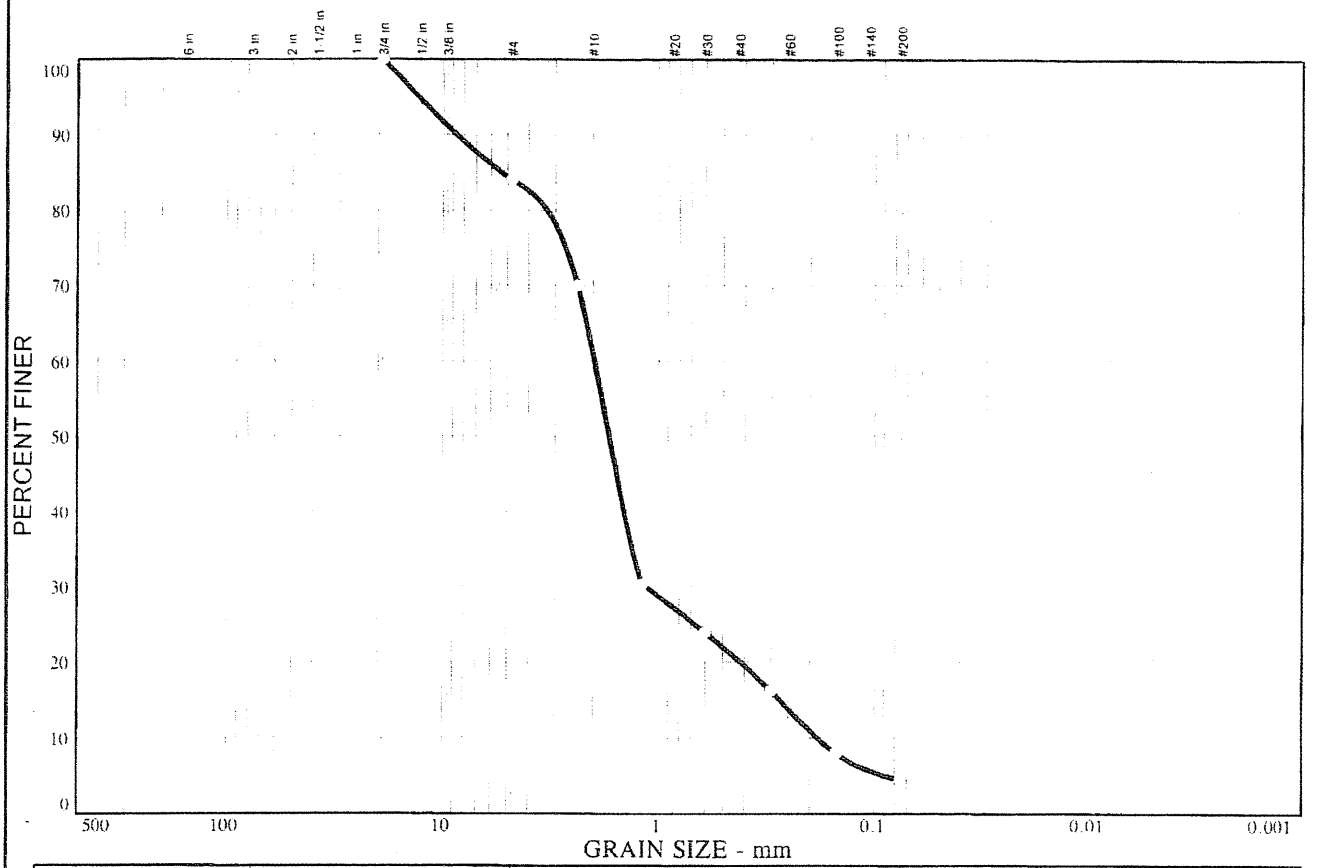
Sample No.: J-MW-1 **Source of Sample:** **Date:** 10-26-2004
Location: **Elev./Depth:** 90'

Alpha-Omega Geotech, Inc.

Client: Chatman & Associates, Inc.
Project: Lewis & Clark - Site J

Project No: 04-732T **Figure**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	15.9	23.2	40.6	15.9	4.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
#4	84.1		
#8	70.0		
#16	30.3		
#30	23.9		
#50	16.2		
#100	8.0		
#200	4.4		

* (no specification provided)

Soil Description

Poorly graded sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85} = 5.28 D_{60} = 1.97 D_{50} = 1.69
D_{30} = 1.14 D_{15} = 0.273 D_{10} = 0.183
C_u = 10.78 C_c = 3.61

Classification

USCS= SP AASHTO=

Remarks

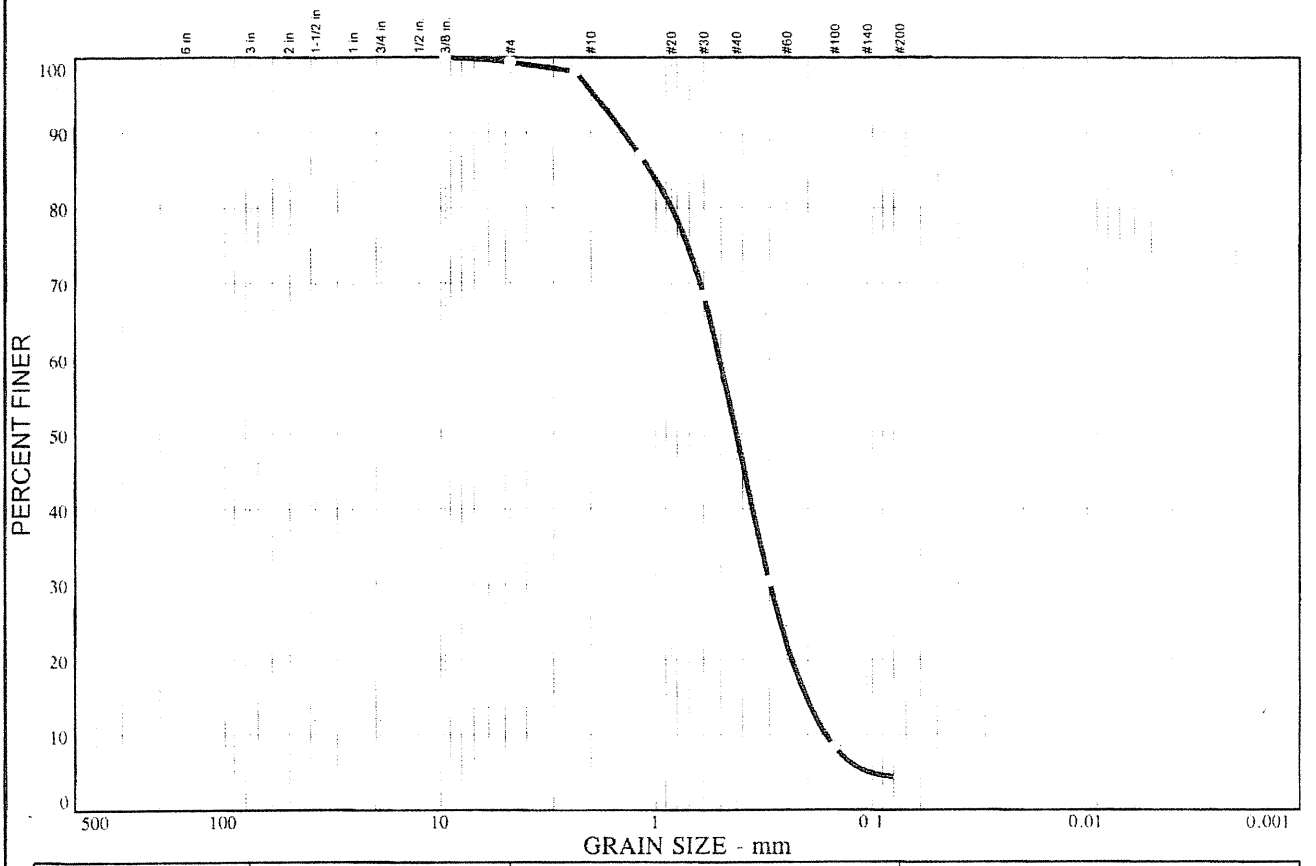
Sample No.: J-MW-1 **Source of Sample:** **Date:** 10-27-2004
Location: **Elev./Depth:** 100'

Alpha-Omega Geotech, Inc.

Client: Chatman & Associates, Inc.
Project: Lewis & Clark - Site J

Project No: 04-732T **Figure**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.6	3.8	45.7	45.6	4.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	99.4		
#8	98.2		
#16	87.0		
#30	68.4		
#50	30.4		
#100	8.4		
#200	4.3		

* (no specification provided)

Soil Description

Poorly graded sand

Atterberg Limits

PL = LL = PI =

Coefficients

D_{85} = 1.06 D_{60} = 0.507 D_{50} = 0.425
D_{30} = 0.298 D_{15} = 0.202 D_{10} = 0.164
C_u = 3.08 C_c = 1.06

Classification

USCS = SP AASHTO=

Remarks

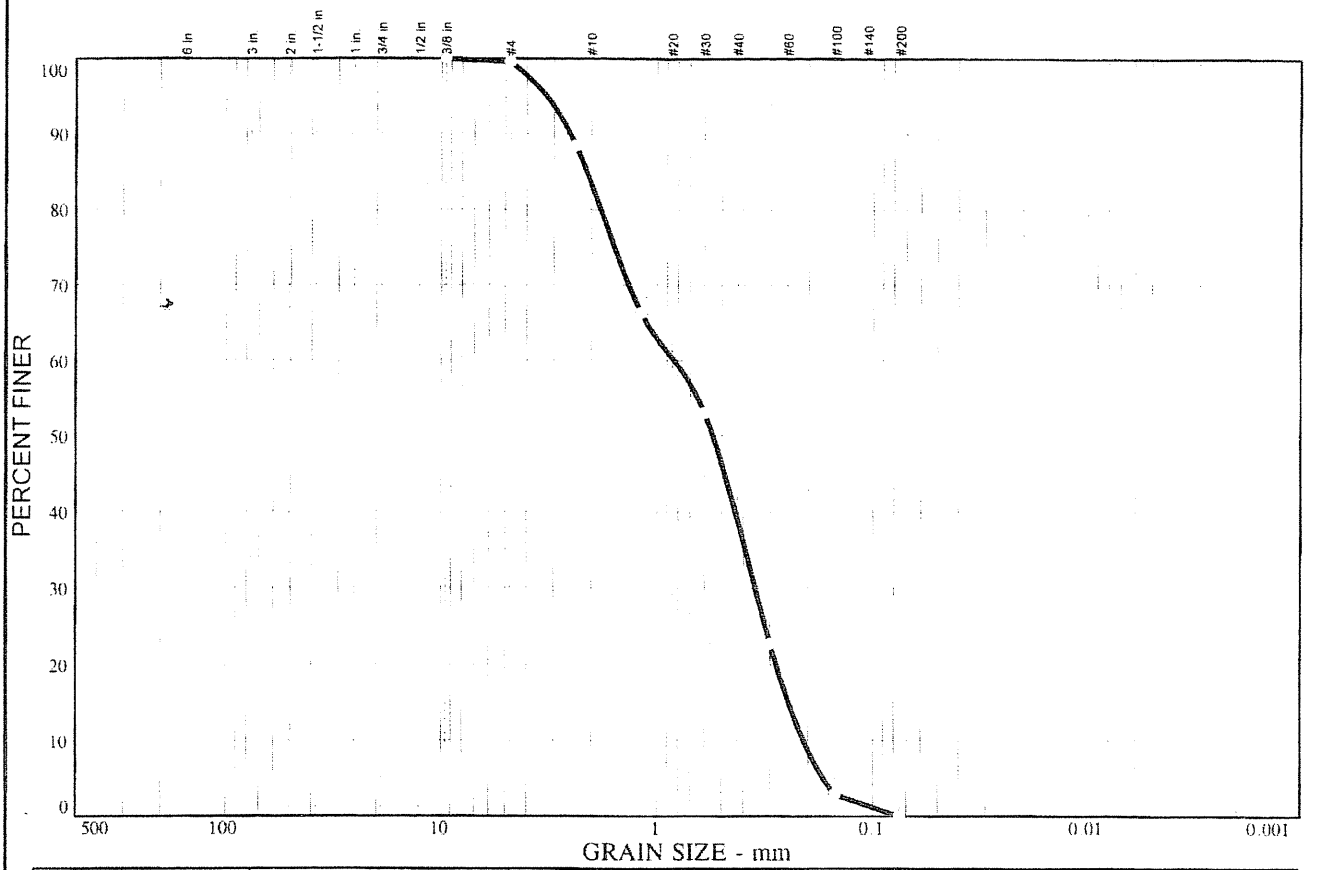
Sample No.: J-MW-2 **Source of Sample:** **Date:** 10-27-2004
Location: **Elev./Depth:** 50'

Alpha-Omega Geotech, Inc.

Client: Chatman & Associates, Inc.
Project: Lewis & Clark - Site J

Project No: 04-732T **Figure**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.4	16.2	44.3	39.1	0.0	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	99.6		
#8	88.5		
#16	66.3		
#30	53.0		
#50	22.8		
#100	2.9		
#200	0.0		

* (no specification provided)

Soil Description

Poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85} = 2.10 D_{60} = 0.832 D_{50} = 0.549
D_{30} = 0.351 D_{15} = 0.246 D_{10} = 0.210
C_u = 3.97 C_c = 0.71

Classification

USCS= SP AASHTO=

Remarks

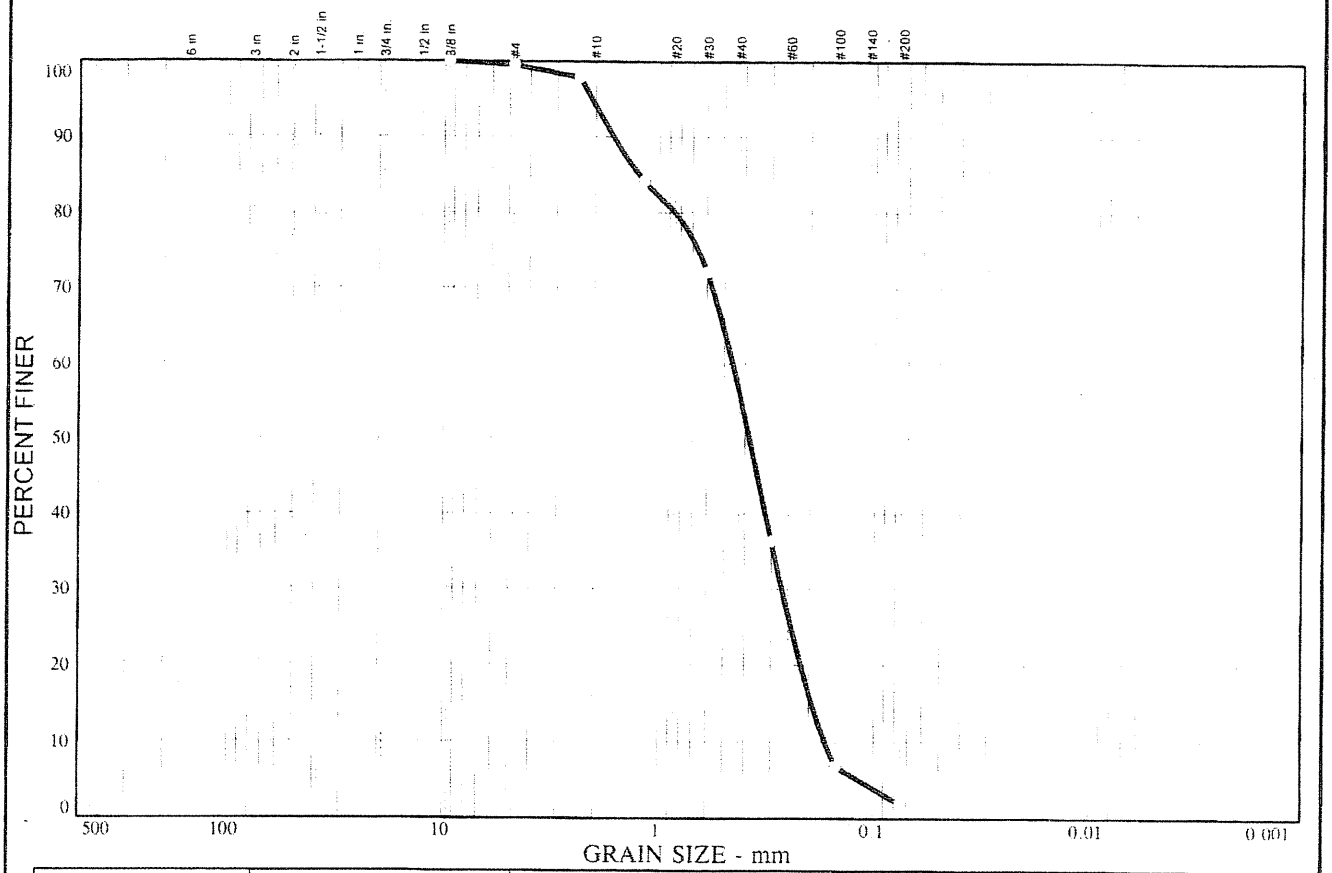
Sample No.: J-MW-2 **Source of Sample:** **Date:** 10-26-2004
Location: **Elev./Depth:** 60'

GEOTECH **Alpha-Omega Geotech, Inc.**

Client: Chatman & Associates, Inc.
Project: Lewis & Clark - Site J

Project No: 04-732T **Figure**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.4	5.4	37.9	54.4	1.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	99.6		
#8	97.9		
#16	84.2		
#30	72.1		
#50	36.4		
#100	6.8		
#200	1.9		

* (no specification provided)

Soil Description

Poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85} = 1.25 D_{60} = 0.456 D_{50} = 0.380
D_{30} = 0.267 D_{15} = 0.194 D_{10} = 0.168
C_u = 2.71 C_c = 0.93

Classification

USCS= SP AASHTO=

Remarks

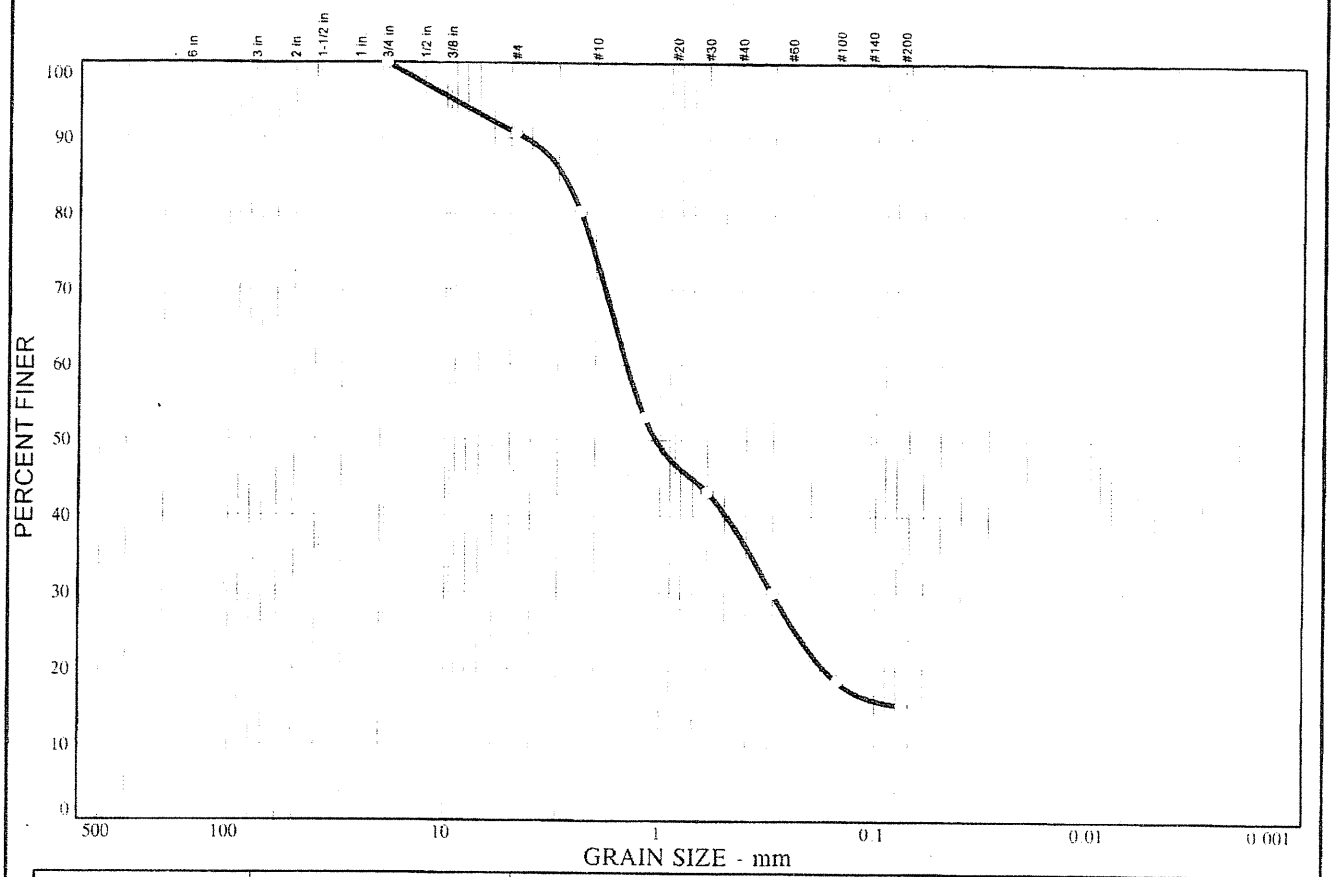
Sample No.: J-MW-2 **Source of Sample:** **Date:** 10-26-2004
Location: **Elev./Depth:** 70'

GEOTECH **Alpha-Omega Geotech, Inc.**

Client: Chatman & Associates, Inc.
Project: Lewis & Clark - Site J

Project No: 04-732T **Figure**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	9.3	16.4	36.9	22.1	15.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
#4	90.7		
#8	80.4		
#16	53.0		
#30	43.2		
#50	30.0		
#100	18.5		
#200	15.3		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 2.82 D_{60}= 1.43 D_{50}= 1.05
D_{30}= 0.300 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

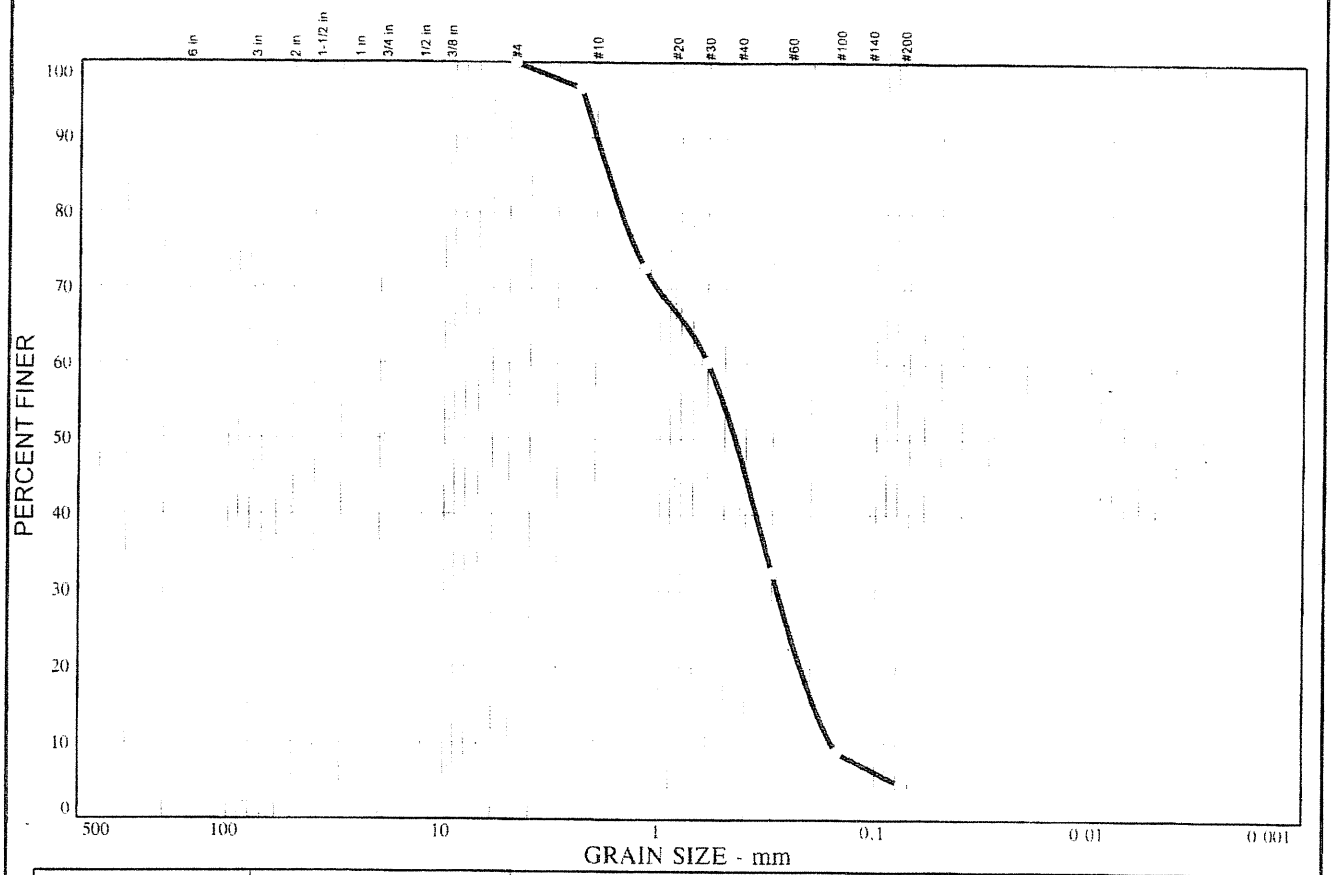
Sample No.: J-MW-2 **Source of Sample:** **Date:** 10-26-2004
Location: **Elev./Depth:** 80'

Alpha-Omega Geotech, Inc.

Client: Chatman & Associates, Inc.
Project: Lewis & Clark - Site J

Project No: 04-732T Figure

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	10.0	42.1	43.3	4.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	96.6		
#16	72.7		
#30	60.2		
#50	32.4		
#100	8.9		
#200	4.6		

* (no specification provided)

Soil Description

Poorly graded sand

Atterberg Limits

PL = LL= PI =

Coefficients

D_{85} = 1.76 D_{60} = 0.596 D_{50} = 0.448
D_{30} = 0.284 D_{15} = 0.191 D_{10} = 0.158
C_u = 3.76 C_c = 0.86

Classification

USCS = SP AASHTO=

Remarks

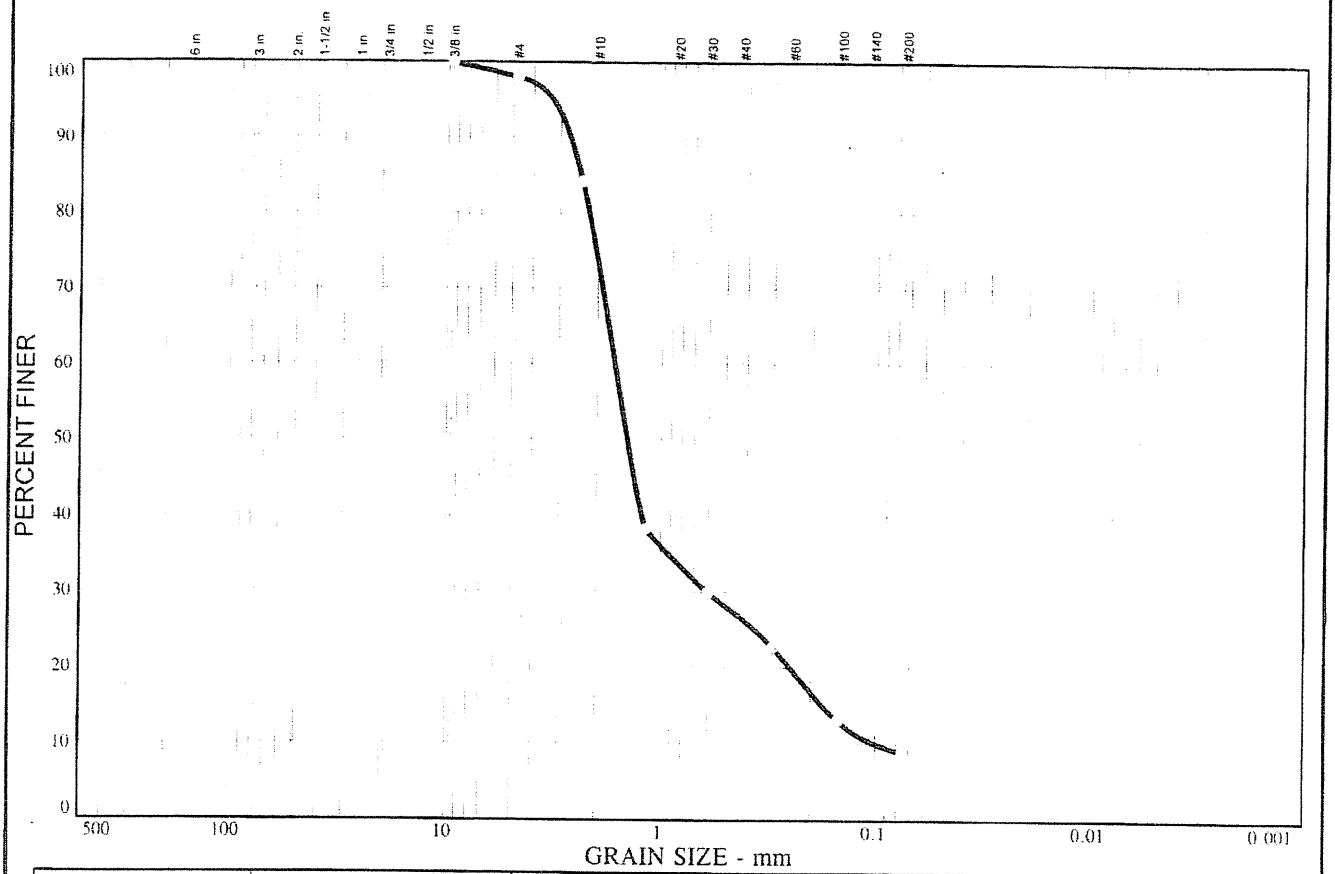
Sample No.: J-MW-2 **Source of Sample:** **Date:** 10-26-2004
Location: **Elev./Depth:** 90'

Alpha-Omega Geotech, Inc.

Client: Chatman & Associates, Inc.
Project: Lewis & Clark - Site J

Project No: 04-732T **Figure**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	2.0	24.1	47.3	17.8	8.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	98.0		
#8	84.2		
#16	38.3		
#30	29.9		
#50	22.7		
#100	13.0		
#200	8.8		

* (no specification provided)

Soil Description

Well-graded sand with silt

Atterberg Limits

PL = LL= PI =

Coefficients

D_{85} = 2.40 D_{60} = 1.66 D_{50} = 1.44
D_{30} = 0.605 D_{15} = 0.177 D_{10} = 0.100
C_u = 16.48 C_c = 2.20

Classification

USCS = SW-SM AASHTO=

Remarks

Sample No.: J-MW-2 **Source of Sample:** **Date:** 10-26-2004
Location: **Elev./Depth:** 100'

Alpha-Omega Geotech, Inc.

Client: Chatman & Associates, Inc.
Project: Lewis & Clark - Site J

Project No: 04-732T **Figure**