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FINAL REPORT SEISMIC DOWNHOLE SURVEYING

Bay Geophysical

a division of Blackhawk GeoServices

Bay Geophysical Project No.: 00-184
April 5, 2001

FINAL REPORT

SEISMIC DOWNHOLE SURVEYING FOR THE MIXED OXIDE FUEL FABRICATION FACILITY AT THE SAVANNAH RIVER SITE AIKEN, SOUTH CAROLINA

Prepared for:
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Englewood, CO

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List of Figures

List of Appendices

SEISMIC DOWNHOLE SURVEYING FOR THE MIXED OXIDE FUEL FABRICATION FACILITY AT THE SAVANNAH RIVER SITE AIKEN, SC

1 INTRODUCTION

Bay Geophysical Associates, Inc. (Bay) in response to Duke COGEMA Stone & Webster, LLC Request for Proposal Number DCS-0024 of April 28, 2000, proposed to conduct a seismic downhole test at the Mixed Oxide (MOX) Fuel Fabrication Facility at the Savannah River Site with a subsequent bid package released May 11, 2000. This work was performed under Department of Energy contract number DE-AC02-99CH10888.

This report summarizes all data acquisition and field methods used on this project. Data quality, processing methods and interpretation of results are also discussed. Figures are provided for each borehole tested depicting S- and P- Wave interval velocities. An appendix is included and provides support data for this report.

1.1 BACKGROUND INFORMATION

1.1.1 SITE DESCRIPTION

The test borings for the seismic downhole testing were located on the site of the Mixed Oxide (MOX) Fuel Fabrication Facility at the Savannah River Site near Aiken, South Carolina.

1.1.2 PURPOSE

The purpose of the seismic downhole test is to record and measure Seismic Shear Wave (S- Wave) velocities in each of three test borings. Additionally, Seismic Compressional Waves (P-Wave) were recorded to measure P- Wave velocities in each of three test borings. The primary goal of the requested downhole survey testing was to augment S- Wave velocities recorded during a Cone Penetrometer test (CPT) investigation.

2 PROJECT PERSONNEL

2.1 FIELD PERSONNEL

The following personnel conducted the survey in the field:

Geophysicist/Project Manager:	John Clark, Bay Geophysical Associates, Inc.
Field Engineer/Observer:	Jim Mattison, Bay Geophysical Associates, Inc.
Geophysicist:	Mike Waddell of Earth Sciences Resource Institute, University of South Carolina

3 FIELD ACTIVITIES

On September 26, 2000, Bay began conducting the downhole survey in three test borings BH-2, BH-5 and BH-10 at the MOX Facility. Field activities were completed on September 28, 2000. Appendix B contains field activity logs for the duration of this project.

3.1 INSTRUMENTATION AND EQUIPMENT

The following summarizes the hardware and software used in the field on the downhole survey:

Energy source	Electromechanical vibrator – used for P- Wave acquisition on BH-10 only Hammer and cylinder – S- and P- Wave acquisition
Multiple Pod Downhole tool	3 sets of 3 geophones, each set 2 meters apart. Each set consists of 1 vertical and two horizontal (orthogonal to each other) 8 Hz geophones. Tool incorporates a clamping mechanism for each set and an orientation sensor.
Input Panel	Mark Products Amphib Input Panel

3.1.1 EQUIPMENT TESTING

Field equipment was tested daily to insure proper functioning of ground and recording equipment. Specifically, these tests were:

Daily Recorder Tests: A suite of tests using a pre-calibrated oscillator to determine gain accuracy, harmonic distortion, DC offset, and A/D converter accuracy of the DAS data acquisition system and associated hardware. These tests were performed on a daily basis.

Downhole tool check: Meter check of geophone continuity and geophone to ground leakage. This test was performed prior to data acquisition.

3.2 QUALITY ASSURANCE

Bay Geophysical maintains a strong corporate commitment to quality on Nuclear Projects. Bay adheres to a formal, documented Quality Assurance - Quality Control (QA/QC) program that defines policies and procedures to ensure that all work is of the highest technical quality and meets technical and regulatory requirements.

3.3 DATA ACQUISITION

Data acquisition commenced on September 26, 2000 at BH-10. After daily tests were run on the recording system, the downhole tool was lowered into the boring labeled BH-10 to determine if the orientation sensor was working properly. The results are noted on the 26 September Field Log in Appendix B. The tool was then lowered down the hole to a level one foot above bottom of the borehole. The tool was oriented properly and the sensor reading noted in the Observer's log. This sensor reading was used to re-orient the tool as it progressed up the borehole.

Test shots were taken to determine that S- and P- wave energy was arriving at the tool (geophones). Once this was determined, data acquisition proceeded up the hole at one-meter intervals for two levels then a two-meter interval. At each level, the hammer and cylinder was used to generate the S- wave energy. At each level, the cylinder was struck 8-times to the West. Each strike of the cylinder was stacked within the seismic recorder. Stacking of the data increases the signal-to-noise ratio. The cylinder source was then rotated 180 degrees to the East and the cylinder was struck an additional 8-times. This assists in interpreting the S- Wave arrival when displaying the East and West (E-W) hits side-by-side during data analysis. Theoretically, a complete 180 degree polarity reversal between the (E-W) strikes is

observed when displaying the S- Wave arrival in this fashion thereby making the arrival of the S- Wave more detectable. A North and South (N-S) direction was also recorded but not analyzed since only one direction was required for this test. However, the (N-S) directions provided more data in the event that the (E-W) directions could not be analyzed. After the S- Wave data was collected, the cylinder is oriented in the vertical position for the recording of the P- Wave arrival. A single data file was recorded for each source orientation at each interval resulting in a total of five data files recorded for each interval.

Data was collected in all boreholes in this fashion with the exception of BH-10. It was difficult to detect the P- Wave arrivals in BH-10 with the hammer and cylinder, possibly due to ambient noise. The electromechanical vibrator was used as a backup and improved the P- Wave arrival at BH-10. The recording instrument parameters are displayed below.

DAS-1 Recording Parameters

Record Length	1 second
Sample Interval	1/8 millisecond
Low Filter	3 Hz
High Filter	Out
Polarity	+
Number of channels	9
Gain	48 dB
Data Format	SEG2

4 DATA PROCESSING

Data processing was handled in a series of stages. Data was originally recorded in SEG2 and SEGY simultaneously. All data needed to be converted to an internal format recognizable via workstation software. The software used to analyze the downhole test data is Seismic Processing Workstation (SPW). Appendix A contains an in-house comparison of Geophysical Microcomputer Applications (GMA) first break picking software and SPW's picking software. GMA has previously passed V&V and constitutes the V&V for the SPW software. A description is contained in Appendix A describing the V&V process for SPW to which these two picking softwares were compared.

The table below shows the processing steps used to view and analyze the data.

Reformat
Merge same level data (i.e. combine (E-W), (N-S) and vertical strikes)

View the data

Primary sort criteria:	Trace number
Secondary sort criteria:	none
Tertiary:	Field file number

Filter data with an 18-200 bandpass
Pick the S- and P- Wave arrivals – save to text file for posting of check plots
Create check plots for each level picked
Check picks
Put picks into a velocity calculating spreadsheet
Plot preliminary interval velocities on same graph
Observe interval and average velocities
Check picks
Update velocity plots

The downhole survey data was analyzed in Bay's office using SPW. This package allows for sorting of opposite source directions on a trace-by-trace basis for each tool level and thereby finding the S- Wave arrival. SPW also allows the filtering of data to enhance the signal to noise ratio. After the data was filtered, picking of the data commenced while comparing the waveform of the shear wave energy from trace to trace to make certain the portion of the waveform picked is consistent from trace gather to trace gather for the same tool level.

Appendix D contains the check plots used for each borehole, direction of hit and level (depth) analyzed. As an example, a check plot labeled BH2 EW 13m can be identified as Borehole number 2, East-West orientation of the source and a depth of 13 meters respectively. The table below describes the check plot trace identifications for BH2 EW 13m. In this table, Trace ID, Field File Numbers (FFN) are 52 and 53, identifying the source direction toward the East and West, respectively and the geophone type (horizontal or vertical) and depth of geophone. This information is taken from the Observer's log written for this Borehole.

Trace ID (primary sort)	Field File Number (tertiary)	Geophone depth-type
1	52-53	13m-vertical W-E
2	52-53	13m-horizontal W-E
3	52-53	13m-horizontal W-E
4	52-53	15m- vertical W-E
5	52-53	15m-horizontal W-E
6	52-53	15m-horizontal W-E
7	52-53	17m vertical W-E
8	52-53	17m- horizontal W-E
9	52-53	17m- horizontal W-E

All data processing conformed to the data processing procedure outlined for seismic downhole data processing.

5 INTERPRETATION

Examination of the data revealed that the (N-S) oriented S-Wave data were contaminated by source generated noise to the extent that they were unpickable in BH-2 and BH-5. It is hypothesized that this contamination was caused by the striking direction of the hammer being toward the borehole that generated a P-Wave down the borehole (called a tube wave) which overrode the S- Wave signal in these records. The East-West (E-W) oriented S- Wave records (strike direction oriented perpendicular to the borehole) were determined to have an adequate signal to pick.

5.1 BH-10

Data quality in BH-10 was very good. The polarity reversals generated from the E-W strikes were obvious from top to bottom. The interval velocity plots for this soil boring are displayed in Figure 1. The interval velocity plot compares well with the CPT interval velocity. The data collected here is a result of good coupling of the source to ground and the coupling of the receivers to the casing of the borehole. In addition, the tightness of the grouting between the casing and the side of the borehole attributed to the quality of the data acquired here.

P- Wave data was also picked for this borehole. The source used for this test was the electromechanical vibrator. The P- Wave energy created by the hammer and cylinder was not adequate for first break picking. The interval velocity plot is displayed in Figure 1. The P- Wave interval velocity appear high from elevations 250 to 230 feet compared to typical P- wave velocities in shallow (10 to 20 feet deep) unconsolidated sediments.

5.2 BH-5

The data quality in BH-5 was fair. The interval velocity plots for BH-5 are displayed in Figure 2. The downhole data revealed realistic interval velocities. The reduced data quality in BH-5 may be caused by ambient noise near this borehole and/or loose grouting between the casing and the side of the borehole.

The P- Wave data revealed reasonable interval velocities in BH-5. These velocities are profiled in Figure 2. The interval velocities are consistent with P- Wave

velocities associated with saturated soils (velocities of around 4000 to 5000 feet/second).

5.3 BH-2

The seismic data quality in BH-2 was poor. Much of the data for this soil boring was unpickable. The quality of seismic downhole data is mostly dependent on source to ground and receiver to side of borehole coupling. Typically, the reason for data of this quality is the poor connection between the grout and the borehole casing. The S- Wave seismic downhole data acquired in BH-2 is considered unreliable along the entire length of the borehole. The S- Wave interval velocity profiles for BH-2 are in Figure 3.

The data quality for the P- Wave was poor because of coupling between the borehole casing and ground (or side of borehole). The P- Wave interval velocity seems reasonable even though the data quality was poor. The data quality, like the S- Wave data was poor.

6 SUMMARY

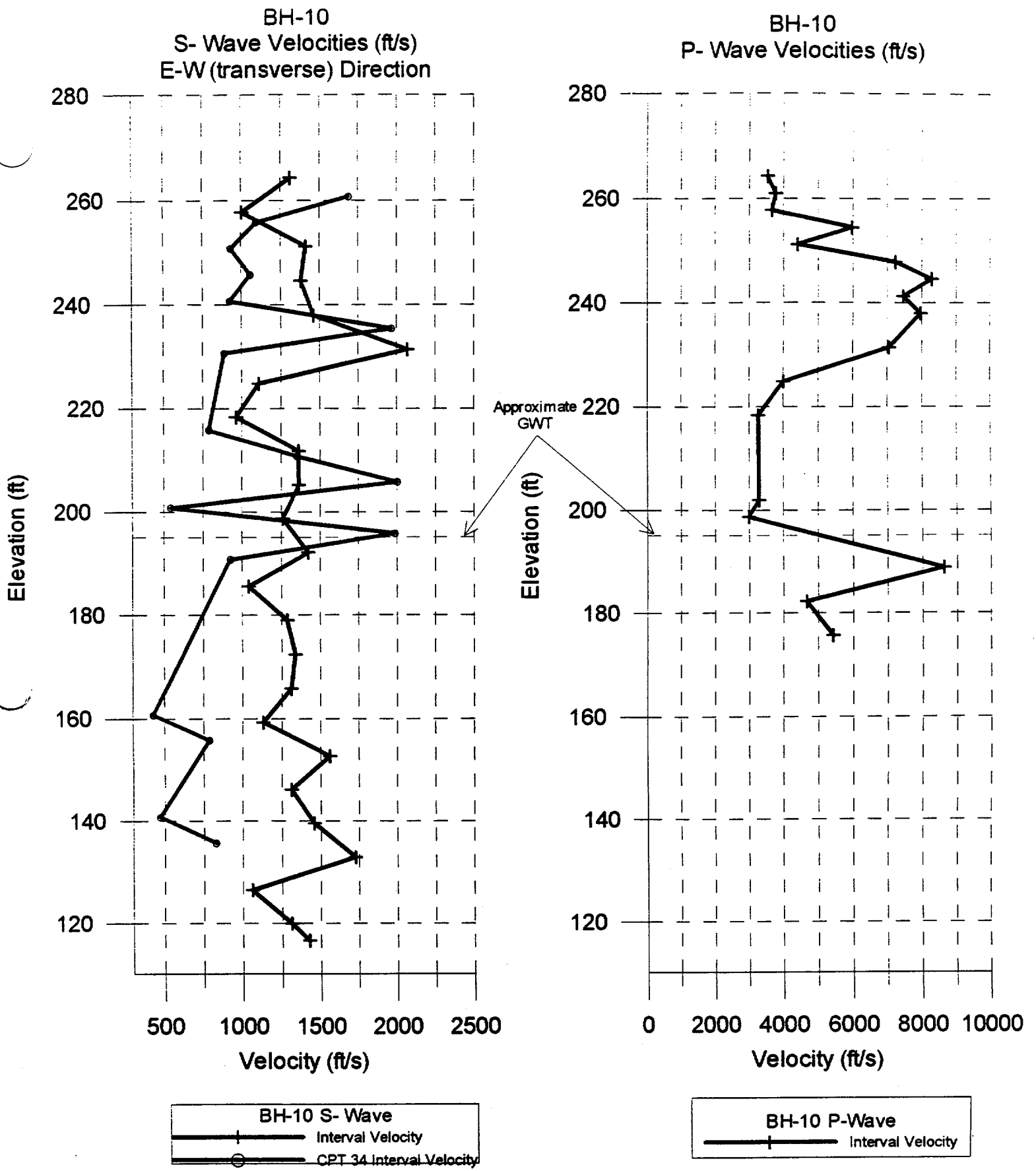
The results of the seismic downhole testing at the MOX Facility produced reasonable results in boreholes BH-10 and BH-5. BH-2 revealed less than reasonable results due to the possibility of poor coupling of seismic equipment. The S- Wave interval velocities analyzed in boreholes BH-10 and BH-5 are consistent with S- Wave interval velocities found in similar soils. The P- wave interval velocities calculated in borehole BH-10 are higher than competent soils typical of this area. P- Wave interval velocities calculated in BH-5 are typical to P-Wave interval velocities in unconsolidated saturated sediments.

The results from BH-2 indicate poor coupling. Typically in downhole surveys, employing the methodology performed, any inconsistencies during soil boring construction result in the poor data quality. Seismic energy does not propagate well through voidal spaces (air). Once seismic energy reaches a void between the casing and soil, a large percentage of that energy is attenuated. Stacking shots increases the signal to noise ratio, however, too much stacking can result in the stacking of noise.

7 REFERENCES

Applied Research Associates, Inc., 2000, CPT logs for CPT 34, CPT 11 and CPT 19.

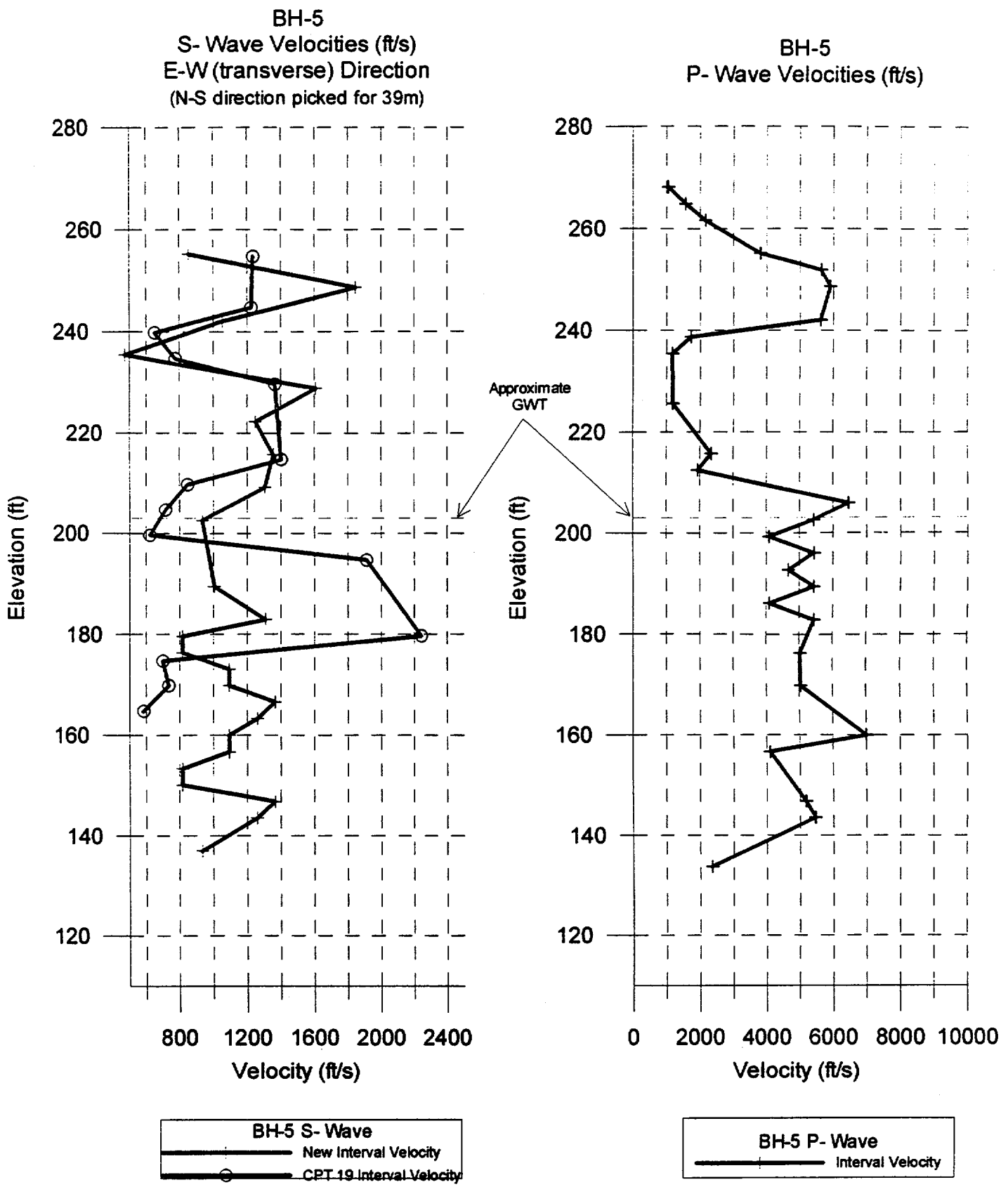
FIGURES



Excel Spreadsheets:
bh10 picks for grapher.xls (S- wave)
bh10 P- picks for grapher.xls (P- wave)
.xls worksheets used: S- Wave, Revised-2 S- Vi
P- Wave, Revised P- picks

Project Number 00-184
Drawn By: 4/6/01
Checked By: 4/6/01

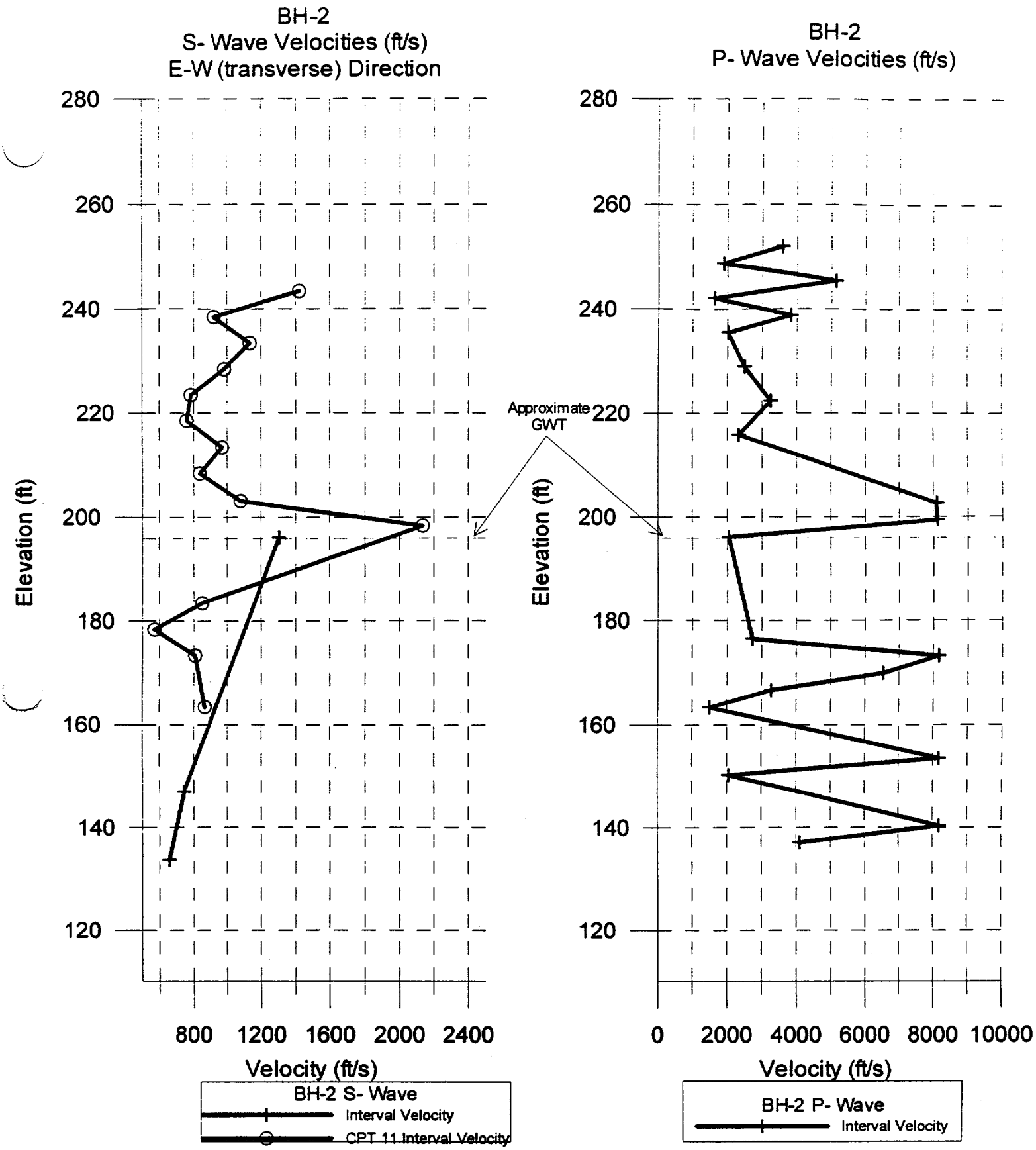
Figure 1
BH-10



Excel Spreadsheets:
bh5 picks for grapher.xls (S- wave)
bh5 P- picks for grapher.xls (P- wave)
.xls worksheets used: S- Wave, Revised S- Vi
P- Wave, Revised P- picks

Project Number 00-184
Drawn By: 4/6/01
Checked By: 4/6/01

Figure 2
BH-5



Excel Spreadsheets:
bh2 picks for grapher.xls (S- wave)
bh2 P- picks for grapher.xls (P- wave)
.xls worksheets used: S- Wave, Revised S- Vi
P- Wave, Revised P- picks

Project Number 00-184
Drawn By: [illegible] 4/6/01
Checked By: [illegible] 4/6/01

Note: S- and P- wave interval velocities in BH-2 are considered unreliable due to air space between the Borehole casing and Borehole wall.

Figure 3
BH-2
014

Appendix A

Verification and Validation of SPW Software

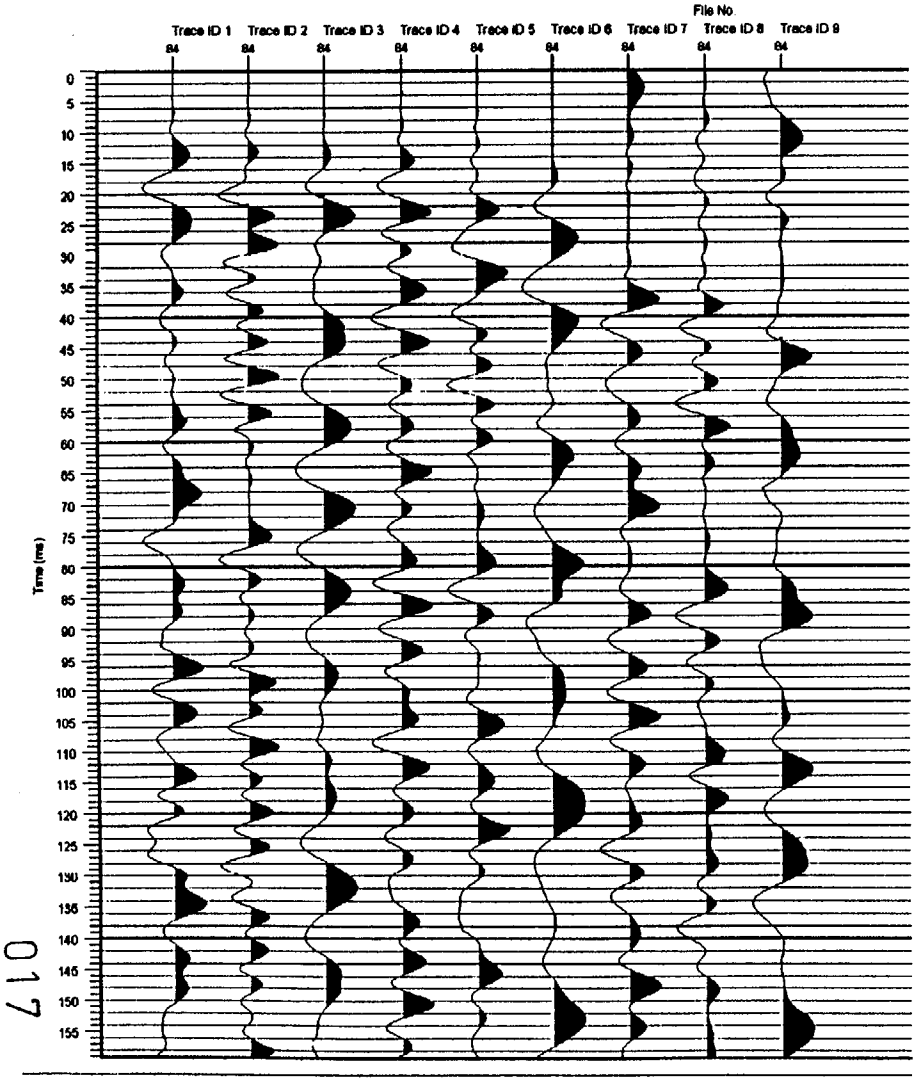
Appendix A

Seismic Processing Workshop (SPW) software did not go through the Verification and Validation (V&V) process prior to this project. Therefore, it is necessary to compare SPW data with software that has previously passed the V&V process. Geophysical Microcomputer Applications (GMA) 2D-3D has previously passed software V&V and was used as the reference to verify V&V. A raw data file, 84.SGY taken from BH-10, was used to formulate the comparison between GMA 2D-3D and SPW. The data file was scaled and filtered identically to that used in processing flow for this project. Identical manual event picking was applied to both SPW and GMA on the same events and is colored red. The picks were then imported to a spreadsheet for a side-by-side comparison of the pick values. This is displayed in tabular form above the graphical pick display for both software packages on file number 84. The values compare at 0.2 milliseconds or less. This is acceptable when considering the data was recorded at a 0.125 millisecond sample rate.

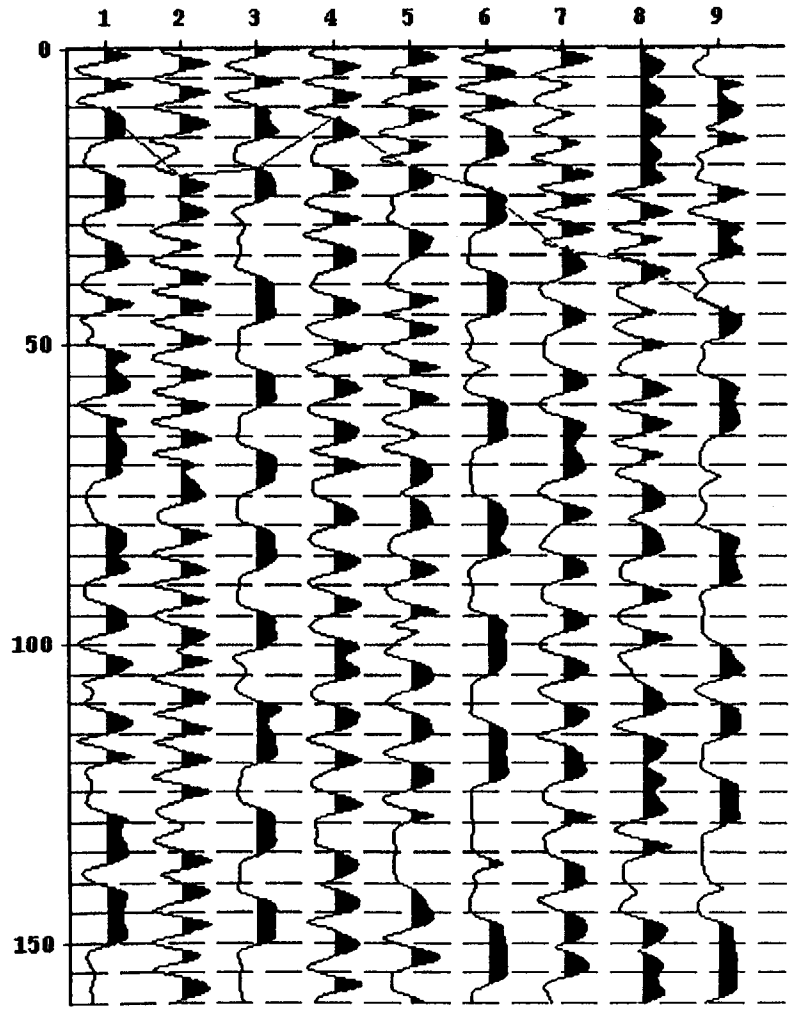
SPW is considered to be verified with respect to the ability to accurately measure event times of a seismic waveform from a standard seismic format

TRACE	SP[illegible] PICK (MS)	GMA PICK (MS)
1	10.2	10.1
2	21.7	21.7
3	20.2	20.4
4	11.9	12.0
5	20.2	20.2
6	24.0	24.0
7	34.2	34.1
8	36.0	36.3
9	43.8	44.0

SPW Pick Display



GMA Pick Display



Appendix B
Daily Logs

Bay Geophysical Associates, Inc.

868 Robinwood Ct. Traverse City, MI 49686
Tel: (231) 941-7660 Fax: (231) 941-7412

DATE: 9-26-2000
Contract No:
SHEET 1 OF 1

FIELD ACTIVITY DAILY LOG

Project Name: MOX Downhole Survey	Project No.: 00-184

Field Activity Subject: Setup, Data Acquisition,

Description of Daily Activities and Events:

0730 Arrive Badging Office. Get badges. Talk to John McConachy, Robert Justice: still missing record of training for downhole procedure. Give to Dan Bruner to fax to them.

0830 Arrive MOX site boring BH-10.unpack Gear.

0900 Safety meeting. Keith Kline, Yvonne Gentry, Dan Bruner (either DOE or Westinghouse), Rick Wentz (S-W), Mike Waddell (USC), JCC, JAM attend.

0930 Continue equipment setup.

1100 Equipment Set up. Perform field checks & diagram Pods. Problem w/ downhole compass using current method (see downhole procedure addendum). Obtain readings using resistor/voltage method. 792 ohm precision resistor used. Following are direction/voltage readings:

E: 2.893V
S: 0.845V
W: 1.468V
N: 2.317V
E: 0.207V
N: 2.195V
W: 1.512V
S: 0.904V
: 2.840V

1300 Lunch

1400 Place tool in borehole. Test shear wave response. Shear waves identifiable. Test P wave. Cannot ID P wave on tools. Repeat tests at various levels. Very difficult to ID P- wave. Decide to test vibrator for P wave source.

1700 Set up vibrator & Test. P wave can be identified. Use 40-400 sweep, 3 sec, 1 sec Listen.

!800 Acquire P wave data 39m –2m

1900 Leave Site.

Visitors on Site:	Changes from Plans and Specifications, and other special orders and important decisions:
Keith Kline, Yvonne Gentry, Dan Bruner (either DOE or Westinghouse	Use vibrator for P wave source
Weather Conditions: Clear, 60-80 deg.	Important Telephone calls: McConachy, Justice

)ersonnel on Site: JCC, JAM, MGW, R WENTZ

Field Engineer: J. C. CLARK

Bay Geophysical Associates, Inc.

868 Robinwood Ct. Traverse City, MI 49686
Tel: (231) 941-7660 Fax: (231) 941-7412

DATE: 9-27-2000
Contract No:
SHEET 1 OF 1

FIELD ACTIVITY DAILY LOG

Project Name: MOX Downhole Survey	Project No.: 00-184

Field Activity Subject: Setup, Data Acquisition,

Description of Daily Activities and Events:

0745 Arrive MOX site boring BH-10. Set up for shear wave Acq w/ hammer.

0830 Begin logging shear wave with hammer @ 42m

1100 Transverse component of pod1 goes dead. Reads open. Take tool out of hole & disassemble. Geophone element reads good. Disconnect cable & check continuity. Not continuity in downhole cable. Check surface connector OK. Problem is in downhole part of cable or in AG connector at tool. This is irreparable because we cannot mold the cable in the field and any repair we would make will leak under pressure. Discuss w/ Rick Wentz (S-W). Decide to continue with operation because sending unit for repair will take weeks. Check job spec. Job requires approx. 5 ft. interval and only one source direction. We are logging this hole at 1m with two source directions.

1300 resume acquisition.

1400 Finish borehole BH-10. Move to Bh-5

1510 begin data acquisition Bh-5. Test P wave to ensure that P waves are pickable on records.

1630 Experience problem locking tool in desired orientation approx 26 m depth. Unclamped tool & rotated into position. Tool reoriented about 30 deg off of desired orientation when re clamped. Assume hole is out of round and tool is seeking oblong orientation. Continue data acquisition. Tool can be oriented correctly about 19m depth.

1800 finish acquisition Bh-5

1830 Leave MOX site.

Visitors on Site: R Cumbest, D. Bruner,	Changes from Plans and Specifications, and other special orders and important decisions:
Weather Conditions: Clear, 60-80 deg.	Important Telephone calls

Personnel on Site: JCC, JAM, MGW, R WENTZ

Field Engineer: J. C. CLARK

Bay Geophysical Associates, Inc.

868 Robinwood Ct. Traverse City, MI 49686
Tel: (231) 941-7660 Fax: (231) 941-7412

DATE: 9-28-2000
Contract No:
SHEET 1 OF 1

FIELD ACTIVITY DAILY LOG

Project Name: MOX Downhole Survey	Project No.: 00-184

Field Activity Subject: Setup, Data Acquisition,

Description of Daily Activities and Events:

0730 Arrive MOX site boring BH-5. Set up for shear wave Acq w/ hammer.
0830 Begin logging shear wave with hammer @ 42m
0915 DAC Card goes out on DAS SN#15. Swap out with DAS SN # 44. Run Daily test & continue logging @ 38m.
1230 Begin P- wave acquisition with vibrator
1400 Finish logging P- wave; unpack inclinometer & setup for field check.
1500 Log BH-2 for verticality.
1520 Finish BH-2; move to BH-5
1540 Log BH-5 for verticality.
1

Visitors on Site: B. Triplett	Changes from Plans and Specifications, and other special orders and important decisions:
Weather Conditions: Clear, 60-80 deg.	Important Telephone calls

Personnel on Site: JCC, JAM, MGW, R WENTZ

Field Engineer: J. C. CLARK

Appendix C

Tabulated Traveltime Picks

BH-2
S- Wave Picks

Measured Depth (m)	Measured Depth (ft)	Elevation (ft)	E-W Pick Time (ms)	True Vert. Depth (ft)	True Vert. Time (ms)	Average velocity (ft/s)	Interval Velocity (ft/s)	Surface Elevation (ft)
13	42.7	215.8		42.65	0.00			258.5
15	49.2	209.3		49.21	0.00			
17	55.8	202.7	56.0	55.77	55.78	1000	118	
19	62.3	196.2	61.0	62.34	60.80	1025	1305	
20	65.6	192.9	62.0	65.62	61.82	1061	3229	
22	72.2	186.3	64.0	72.18	63.85	1130	3238	
24	78.7	179.8	64.2	78.74	64.07	1229	29298	
28	91.9	166.6	65.5	91.86	65.40	1405	9850	
34	111.5	147.0	92.0	111.55	91.91	1214	743	
36	118.1	140.4	110.0	118.11	109.90	1075	365	
38	124.7	133.8	120.0	124.67	119.90	1040	656	

BH-2
P- Wave Picks

Measured Depth (m)	Measured Depth (ft)	Elevation (ft)	V Pick Time (ms)	True Vert. Depth (ft)	True Vert. Time (ms)	Average velocity (ft/s)	Interval Velocity (ft/s)
2	6.6	251.9	2.3	6.56	0.85	7680	7680
3	9.8	248.7	4.0	9.84	2.06	4782	2725
4	13.1	245.4	4.5	13.12	2.81	4668	4356
5	16.4	242.1	6.5	16.40	4.60	3569	1838
6	19.7	238.8	7.3	19.68	5.61	3510	3242
7	23.0	235.5	8.9	22.97	7.24	3171	2008
8	26.2	232.3	9.0	26.25	7.63	3439	8419
9	29.5	229.0	10.3	29.53	9.00	3279	2392
10	32.8	225.7	10.3	32.81	9.21	3561	15719
11	36.1	222.4	11.3	36.09	10.29	3508	3053
12	39.4	219.1	11.4	39.37	10.52	3741	13908
13	42.7	215.8	12.8	42.65	11.95	3570	2304
14	45.9	212.6	12.9	45.93	12.15	3781	16273
15	49.2	209.3	13.0	49.21	12.33	3990	17794
16	52.5	206.0	13.2	52.49	12.60	4166	12323
17	55.8	202.7	13.6	55.77	13.05	4275	7320
18	59.1	199.4	14.0	59.05	13.49	4378	7425
19	62.3	196.2	15.6	62.34	15.09	4132	2054
20	65.6	192.9	15.8	65.62	15.33	4281	13564
21	68.9	189.6	16.1	68.90	15.66	4399	9825
22	72.2	186.3	16.3	72.18	15.89	4541	14113
23	75.5	183.0	16.6	75.46	16.22	4652	10050
24	78.7	179.8	16.9	78.74	16.54	4759	10137
25	82.0	176.5	18.10	82.02	17.75	4621	2726
26	85.3	173.2	18.50	85.30	18.17	4695	7838
27	88.6	169.9	19.00	88.58	18.68	4741	6368
28	91.9	166.6	20.00	91.86	19.69	4666	3261
29	95.1	163.4	22.20	95.14	21.88	4349	1499
30	98.4	160.1	22.30	98.42	22.00	4474	27486
31	101.7	156.8	22.50	101.70	22.21	4579	15166
32	105.0	153.5	22.90	104.99	22.63	4640	7953
33	108.3	150.2	24.50	108.27	24.22	4469	2053
34	111.5	147.0	24.50	111.55	24.24	4602	208152
35	114.8	143.7	24.60	114.83	24.35	4715	28918
36	118.1	140.4	25.00	118.11	24.76	4770	8011
37	121.4	137.1	25.80	121.39	25.57	4748	4074

BH-5
S- Wave Picks

Measured Depth (m)	Measured Depth (ft)	Elevation (ft)	E-W Pick Time (ms)	True Vert. Depth (ft)	True Vert. Time (ms)	Average velocity (ft/s)	Interval Velocity (ft/s)	Surface Elevation (ft)
6	19.7	255.1	23.7	19.68	22.97	857	857	274.8
8	26.2	248.6	27.0	26.25	26.52	990	1847	
10	32.8	242.0	33.1	32.81	32.75	1002	1054	
12	39.4	235.4	47.0	39.37	46.63	844	473	
14	45.9	228.9	51.0	45.93	50.70	906	1610	
16	52.5	222.3	56.2	52.49	55.95	938	1251	
18	59.1	215.7	61.0	59.05	60.78	972	1357	
20	65.6	209.2	66.0	65.62	65.81	997	1305	
22	72.2	202.6	73.0	72.18	72.83	991	935	
26	85.3	189.5	86.0	85.30	85.85	994	1007	
28	91.9	182.9	91.0	91.86	90.87	1011	1309	
29	95.1	179.7	95.0	95.14	94.87	1003	819	
30	98.4	176.4	99.0	98.42	98.87	995	820	
31	101.7	173.1	102.0	101.70	101.88	998	1092	
32	105.0	169.8	105.0	104.99	104.88	1001	1092	
33	108.3	166.5	107.4	108.27	107.29	1009	1364	
34	111.5	163.3	110.0	111.55	109.89	1015	1260	
35	114.8	160.0	113.0	114.83	112.89	1017	1092	
36	118.1	156.7	116.0	118.11	115.90	1019	1092	
37	121.4	153.4	120.0	121.39	119.90	1012	820	
38	124.7	150.1	124.0	124.67	123.90	1006	820	
39	128.0	146.8	126.4	127.95	126.30	1013	1365	
40	131.2	143.6	129.0	131.23	128.91	1018	1260	
42	137.8	137.0	136.0	137.79	135.91	1014	937	

BH-5
P- Wave Picks

Measured Depth (m)	Measured Depth (ft)	Elevation (ft)	V Pick Time (ms)	True Vert. Depth (ft)	True Vert. Time (ms)	Average velocity (ft/s)	Interval Velocity (ft/s)
2	6.6	268.2	7.9	6.56	2.93	2236	2236
3	9.8	265.0	9.4	9.84	4.84	2035	1724
4	13.1	261.7	10.6	13.12	6.62	1982	1837
6	19.7	255.1	12.0	19.68	9.22	2135	2527
7	23.0	251.8	12.5	22.97	10.17	2258	3443
8	26.2	248.6	13.0	26.25	11.02	2381	3850
10	32.8	242.0	14.1	32.81	12.61	2601	4134
11	36.1	238.7	16.0	36.09	14.57	2478	1679
12	39.4	235.4	18.8	39.37	17.35	2269	1177
15	49.2	225.6	27.1	49.21	25.71	1914	1178
18	59.1	215.7	31.3	59.05	30.16	1958	2212
19	62.3	212.5	33.0	62.34	31.91	1953	1869
21	68.9	205.9	34.0	68.90	33.08	2083	5647
22	72.2	202.6	34.6	72.18	33.74	2139	4940
23	75.5	199.3	35.4	75.46	34.59	2181	3849
24	78.7	196.1	36.0	78.74	35.24	2234	5038
25	82.0	192.8	36.2	82.02	35.50	2311	12932
26	85.3	189.5	37.1	85.30	36.43	2341	3507
27	88.6	186.2	38.1	88.58	37.46	2364	3183
28	91.9	182.9	38.7	91.86	38.10	2411	5172
29	95.1	179.7	38.9	95.14	38.33	2482	13841
30	98.4	176.4	39.2	98.42	38.67	2545	9875
31	101.7	173.1	40.6	101.70	40.08	2537	2318
32	105.0	169.8	41.30	104.99	40.81	2573	4538
35	114.8	160.0	42.70	114.83	42.27	2716	6714
36	118.1	156.7	43.50	118.11	43.09	2741	4023
39	128.0	146.8	45.40	127.95	45.03	2841	5060
40	131.2	143.6	46.00	131.23	45.64	2875	5349
43	141.1	133.7	50.20	141.07	49.86	2829	2333

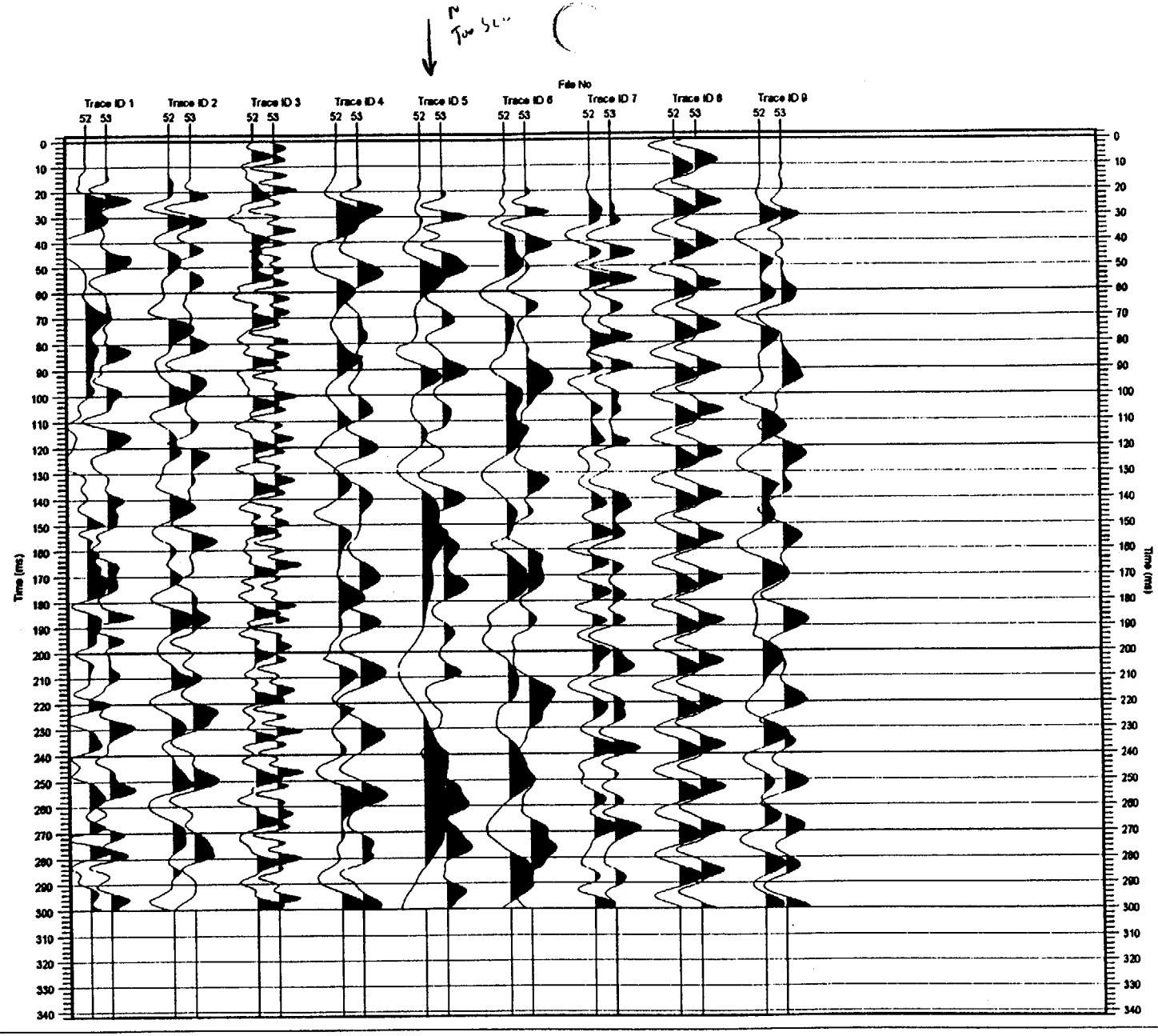
BH-10
S- Wave Picks

Measured Depth (m)	Elevation (ft)	Measured Depth (ft)	E-W Pick Time (ms)	True Vert. Depth (ft)	True Vert. Time (ms)	Average velocity (ft/s)	Interval Velocity (ft/s)	Surface Elevation (ft)
2.0	264.2	6.6	6.3	6.6	5.0	1309.4	1309.4	270.8
4.0	257.7	13.1	14.0	13.1	13.1	1003.1	1003.1	
6.0	251.1	19.7	18.3	19.7	17.7	1109.8	1409.8	
8.0	244.6	26.2	22.9	26.2	22.5	1166.7	1378.9	
10.0	238.0	32.8	27.3	32.8	27.0	1215.6	1460.4	
12.0	231.4	39.4	30.4	39.4	30.2	1305.5	2070.3	
14.0	224.9	45.9	36.3	45.9	36.1	1272.8	1106.7	
16.0	218.3	52.5	43.1	52.5	42.9	1223.4	962.3	
18.0	211.7	59.1	47.9	59.1	47.7	1237.3	1360.4	
20.0	205.2	65.6	52.7	65.6	52.5	1248.7	1361.8	
22.0	198.6	72.2	57.9	72.2	57.8	1249.6	1258.5	
24.0	192.1	78.7	62.5	78.7	62.4	1262.4	1422.5	
26.0	185.5	85.3	68.8	85.3	68.7	1242.0	1040.2	
28.0	178.9	91.9	73.9	91.9	73.8	1244.9	1284.4	
30.0	172.4	98.4	78.8	98.4	78.7	1250.6	1337.0	
32.0	165.8	105.0	83.8	105.0	83.7	1254.2	1310.6	
34.0	159.3	111.5	89.6	111.5	89.5	1246.2	1130.3	
36.0	152.7	118.1	93.8	118.1	93.7	1260.3	1560.1	
38.0	146.1	124.7	98.8	124.7	98.7	1262.9	1311.1	
40.0	139.6	131.2	103.3	131.2	103.2	1271.3	1456.7	
42.0	133.0	137.8	107.1	137.8	107.0	1287.4	1724.7	
44.0	126.4	144.4	113.3	144.4	113.2	1274.9	1057.9	
46.0	119.9	150.9	118.3	150.9	118.2	1276.4	1311.5	
47.0	116.6	154.2	120.6	154.2	120.5	1279.3	1425.5	

BH-10
P- Wave Picks

Measured Depth (m)	Measured Depth (ft)	Elevation (ft)	V Pick Time (ms)	True Vert. Depth (ft)	True Vert. Time (ms)	Average velocity (ft/s)	Interval Velocity (ft/s)	Surface Elevation (ft)
2	6.6	264.2	5.0	6.56	1.86	3533	3533	270.8
3	9.8	261.0	5.3	9.84	2.73	3609	3771	
4	13.1	257.7	5.8	13.12	3.62	3621	3660	
5	16.4	254.4	5.9	16.40	4.17	3932	5980	
6	19.7	251.1	6.4	19.68	4.92	4003	4406	
7	23.0	247.8	6.6	22.97	5.37	4276	7227	
8	26.2	244.6	6.8	26.25	5.77	4551	8291	
9	29.5	241.3	7.1	29.53	6.21	4757	7455	
10	32.8	238.0	7.4	32.81	6.62	4957	7959	
11	36.1	234.7	7.6	36.09	6.92	5216	10936	
12	39.4	231.4	8.0	39.37	7.38	5331	7043	
13	42.7	228.1	8.1	42.65	7.56	5641	18699	
14	45.9	224.9	8.9	45.93	8.38	5480	3994	
15	49.2	221.6	8.6	49.21	8.16	6032	-14721	
16	52.5	218.3	9.6	52.49	9.16	5729	3267	
17	55.8	215.0	9.8	55.77	9.40	5932	13741	
18	59.1	211.7	9.8	59.05	9.44	6254	80657	
19	62.3	208.5	10.0	62.34	9.67	6446	14373	
20	65.6	205.2	9.6	65.62	9.31	7045	-9180	
21	68.9	201.9	10.6	68.90	10.31	6681	3286	
22	72.2	198.6	11.7	72.18	11.41	6326	2990	
25	82.0	188.8	12.80	82.02	12.55	6535	8616	
26	85.3	185.5	12.10	85.30	11.88	7179	-4903	
27	88.6	182.2	12.80	88.58	12.59	7038	4662	
28	91.9	178.9	12.60	91.86	12.40	7406	-18004	
29	95.1	175.7	13.20	95.14	13.01	7314	5429	

Appendix D
Check Plots



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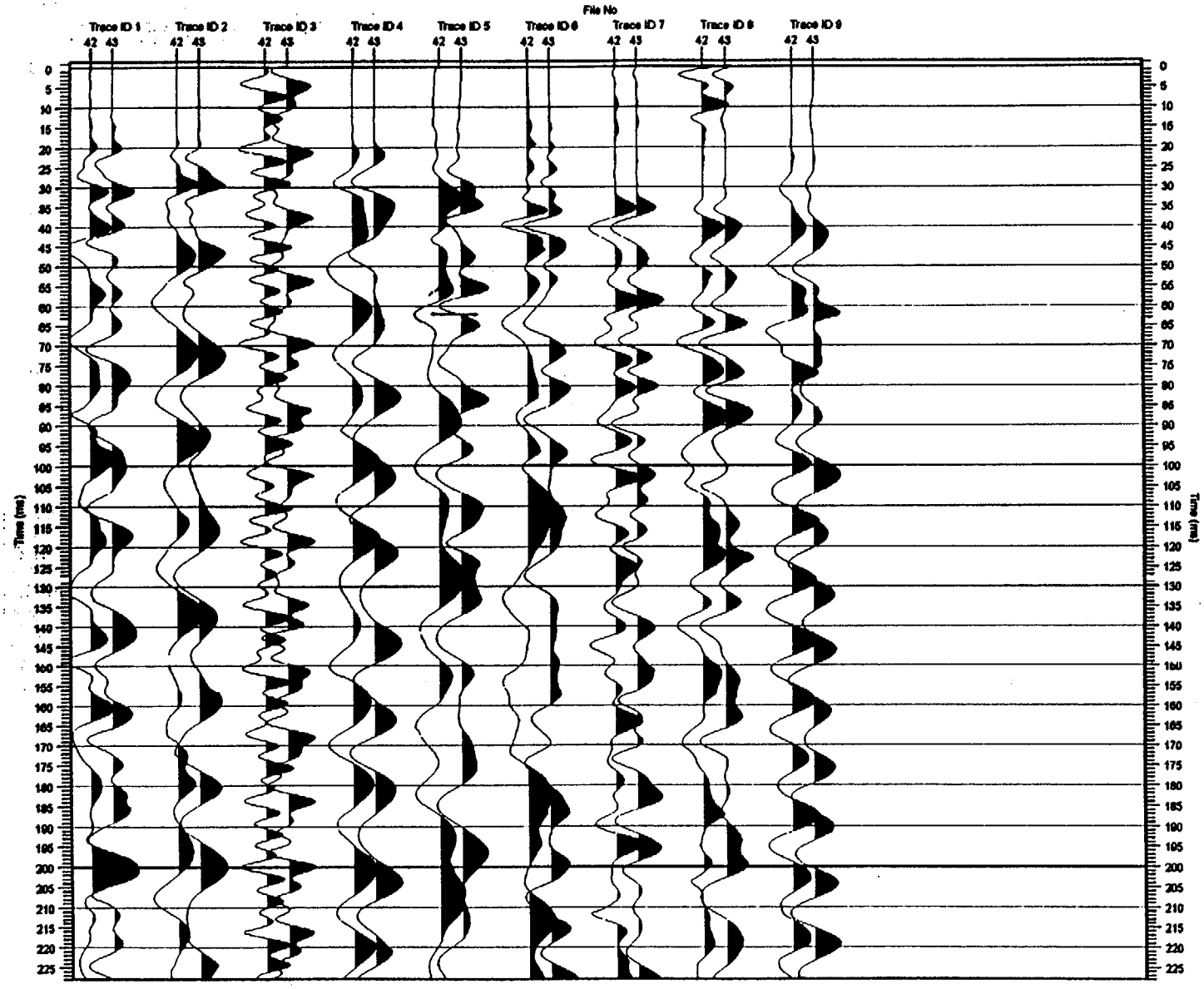

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Picked By: RCC
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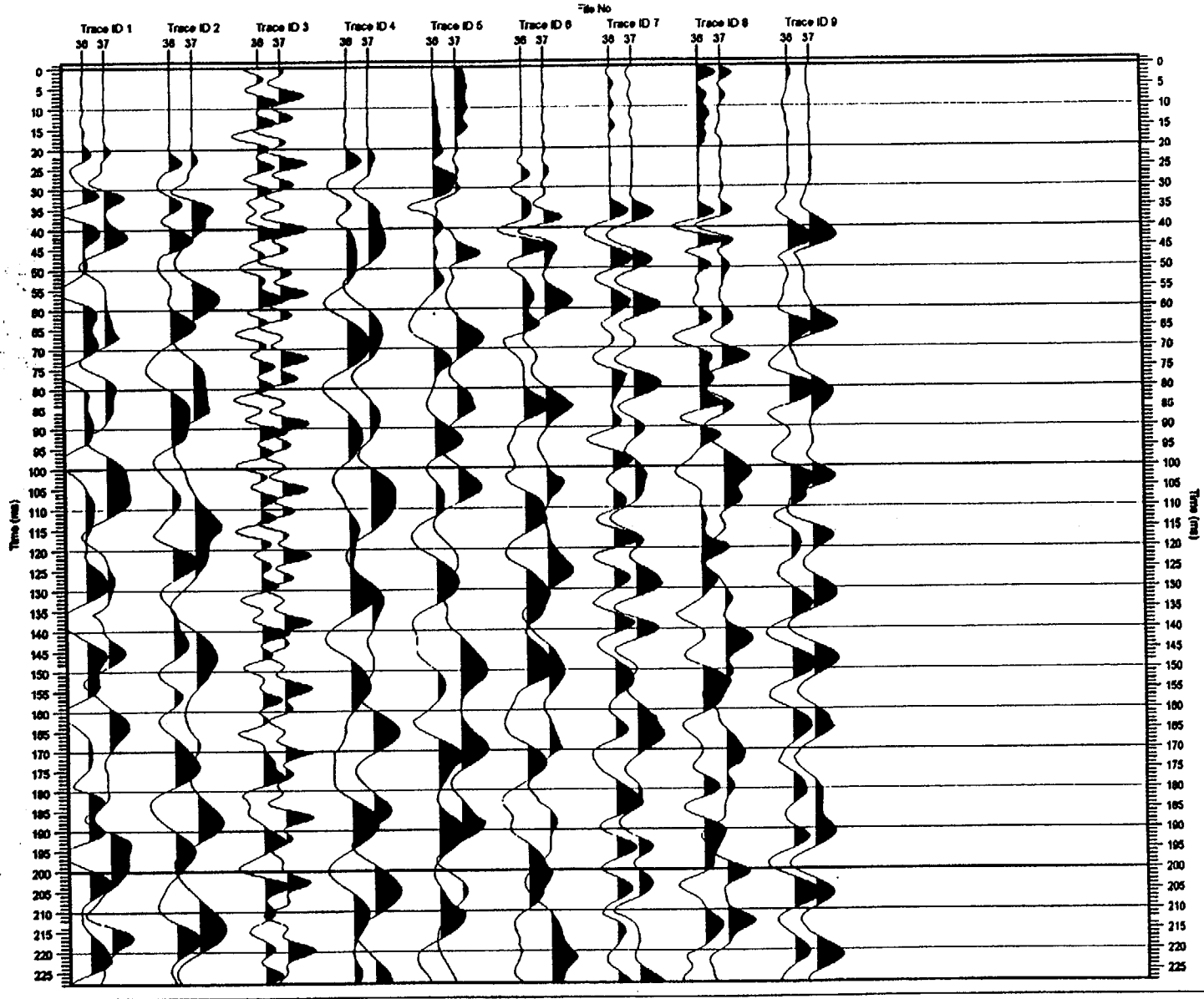

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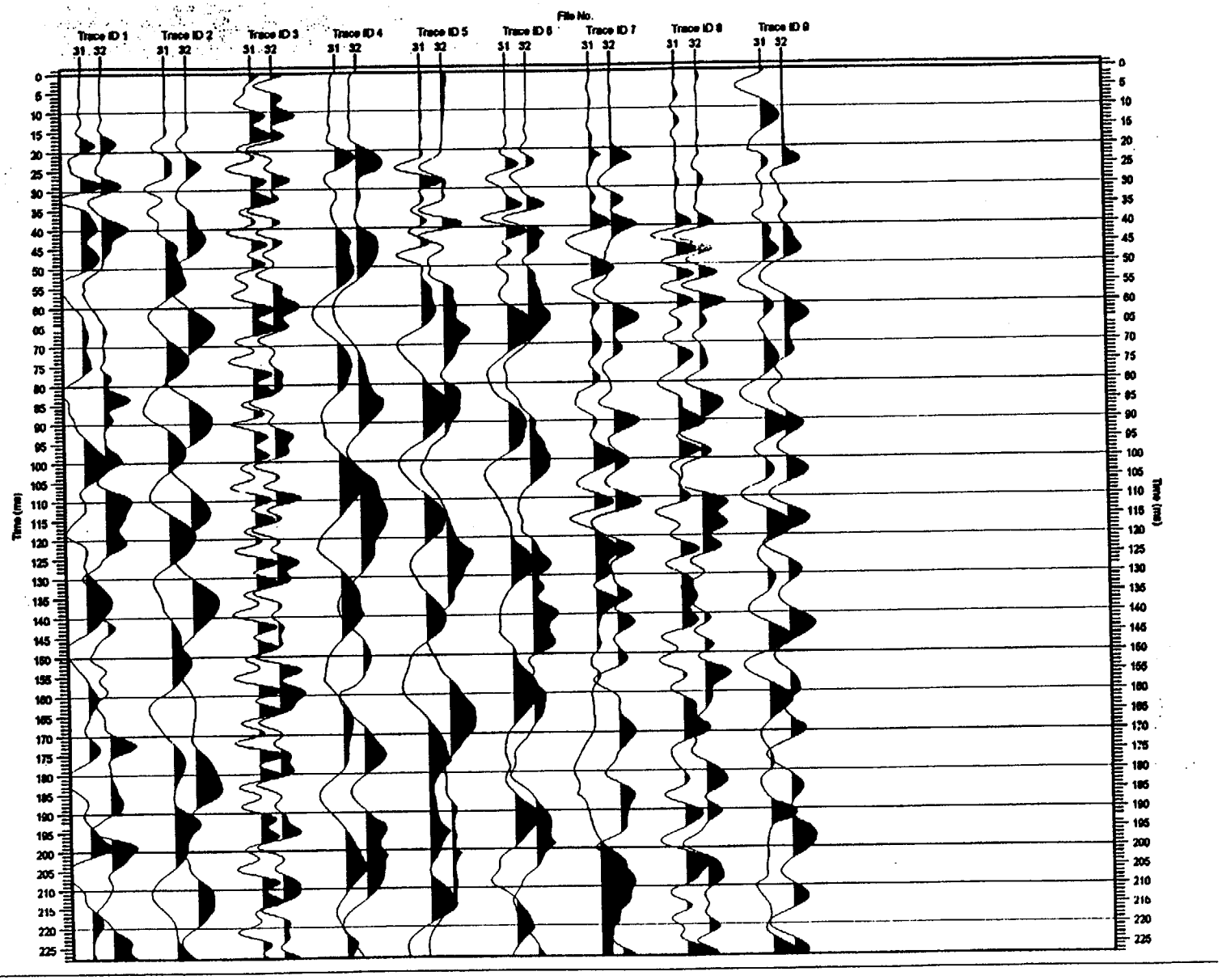

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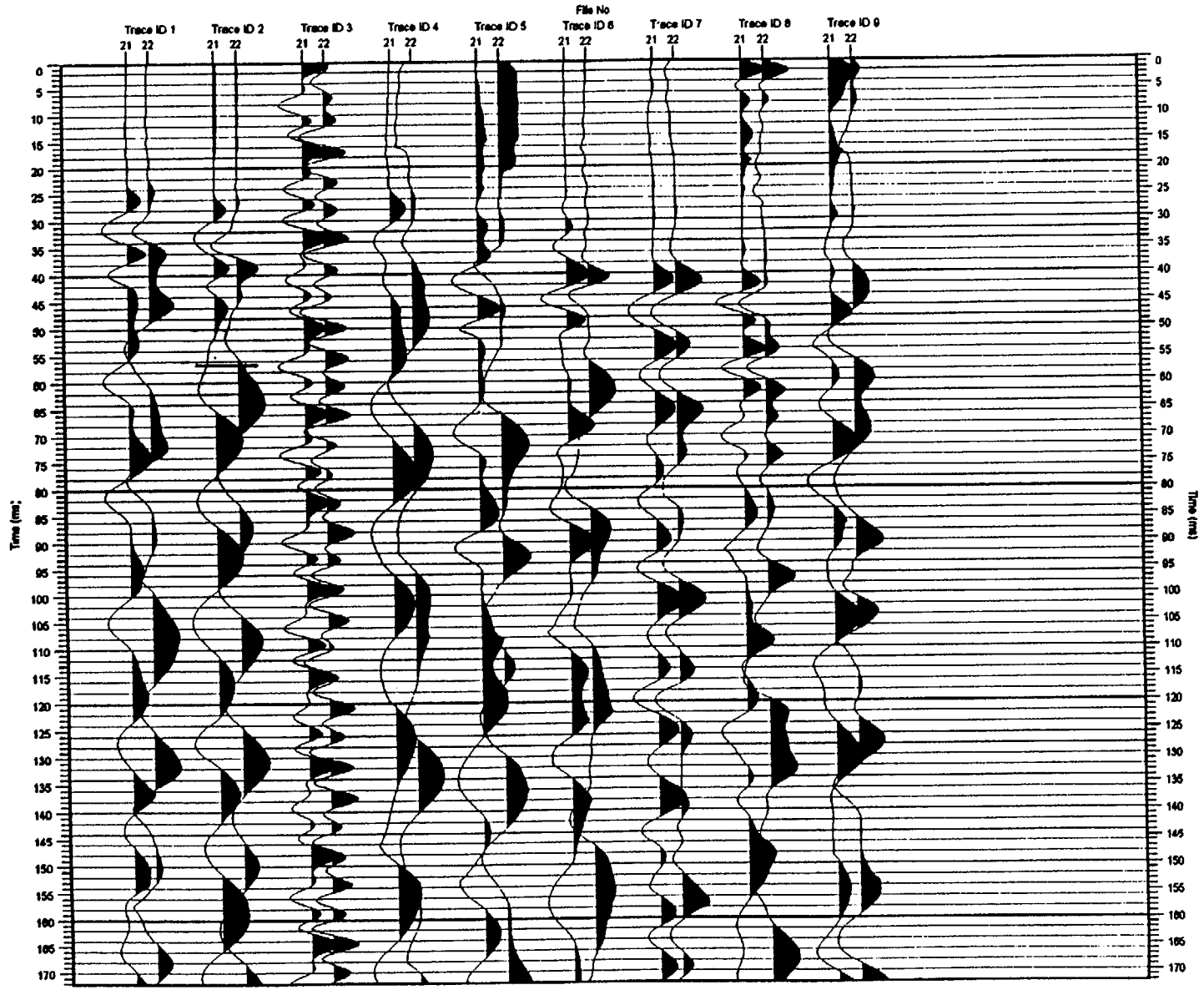

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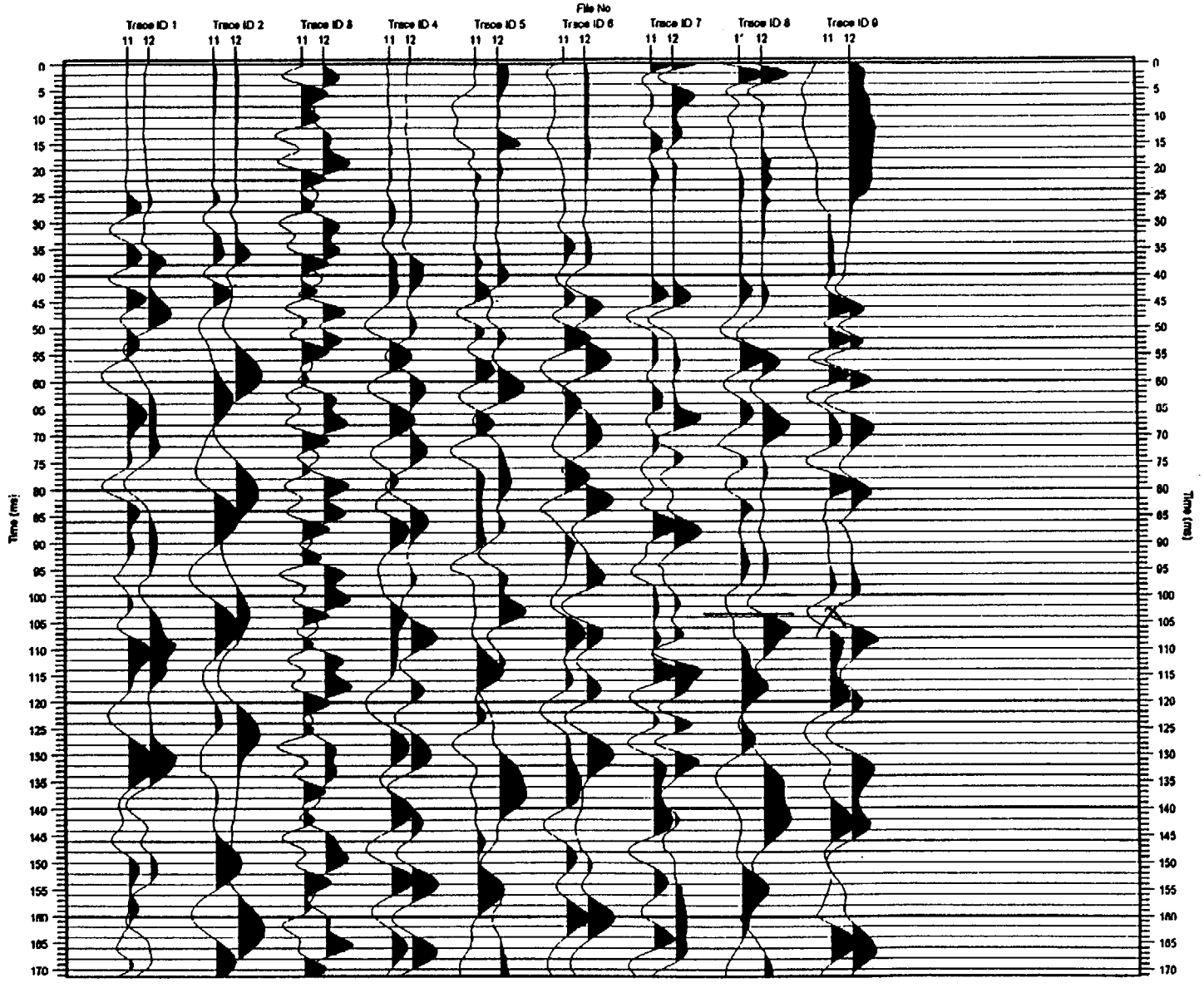

Bh2 EW 30m

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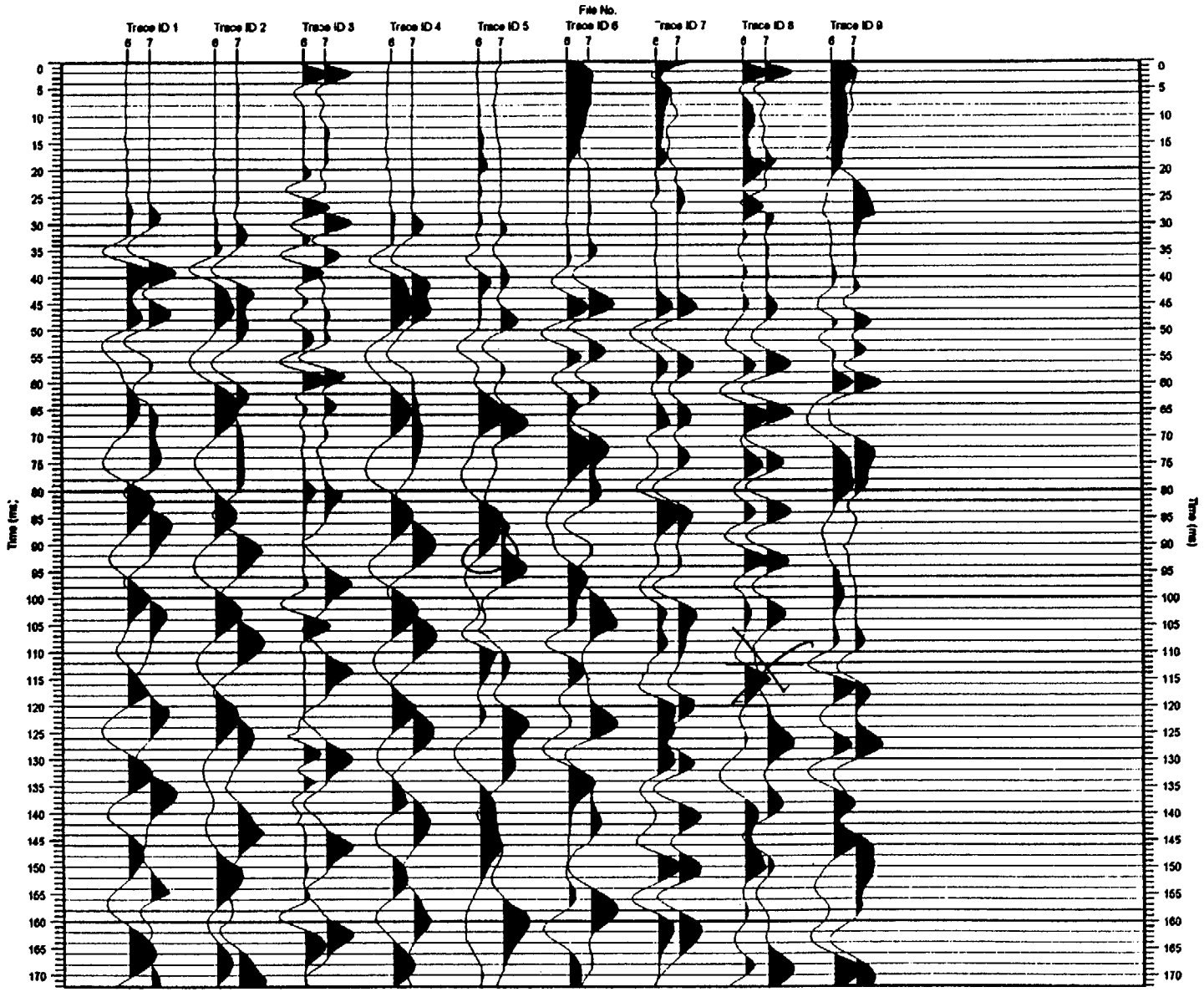

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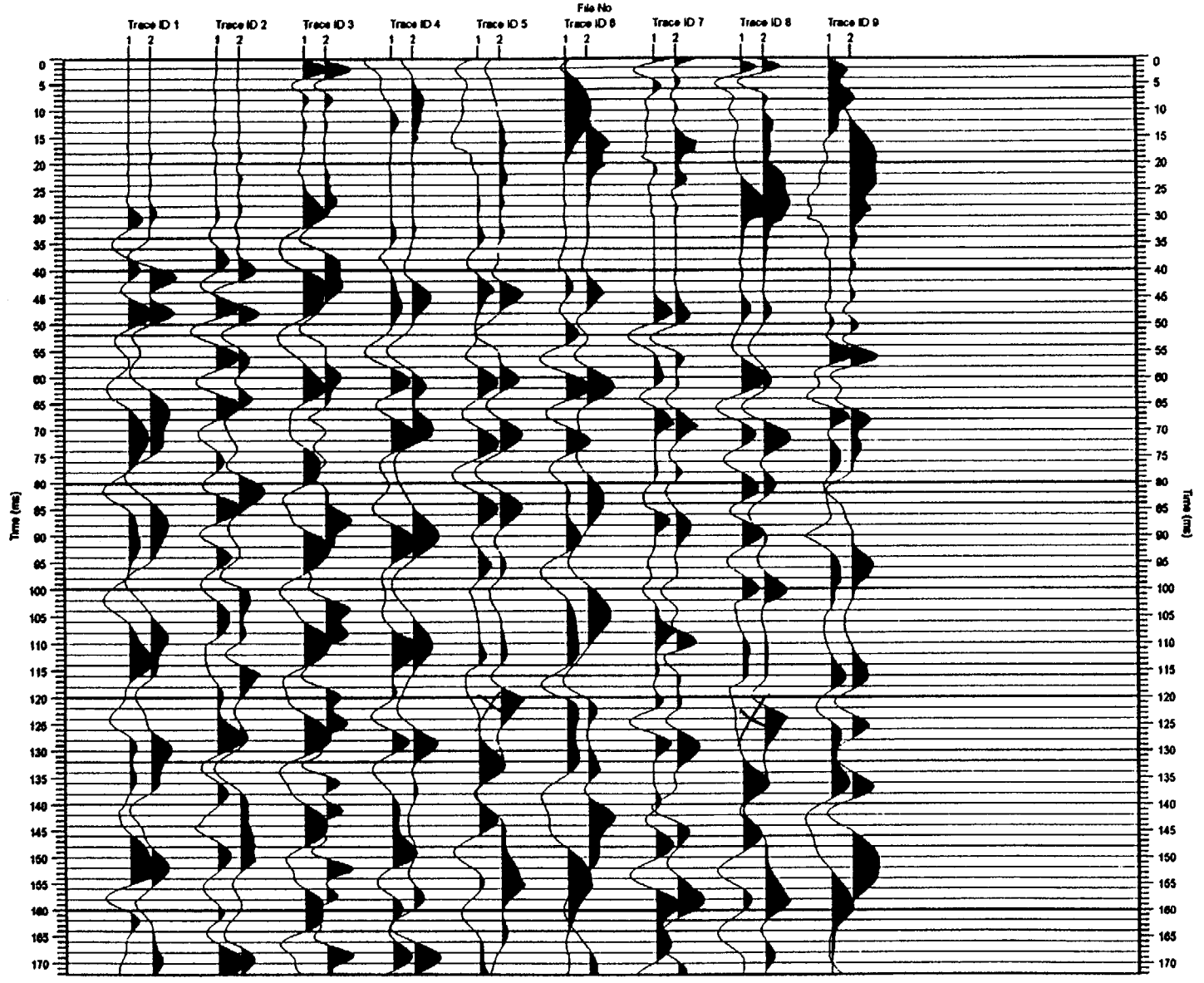

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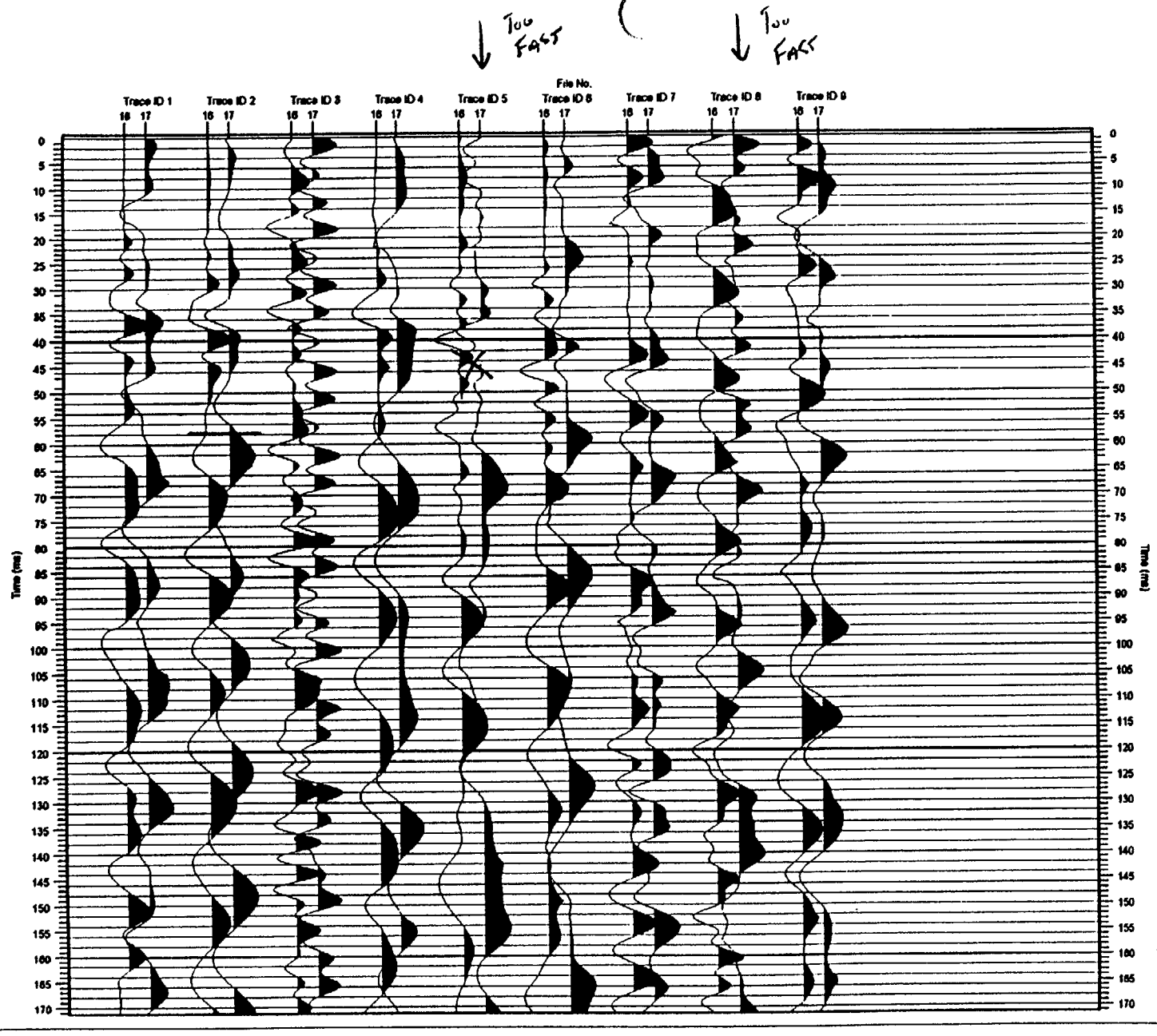

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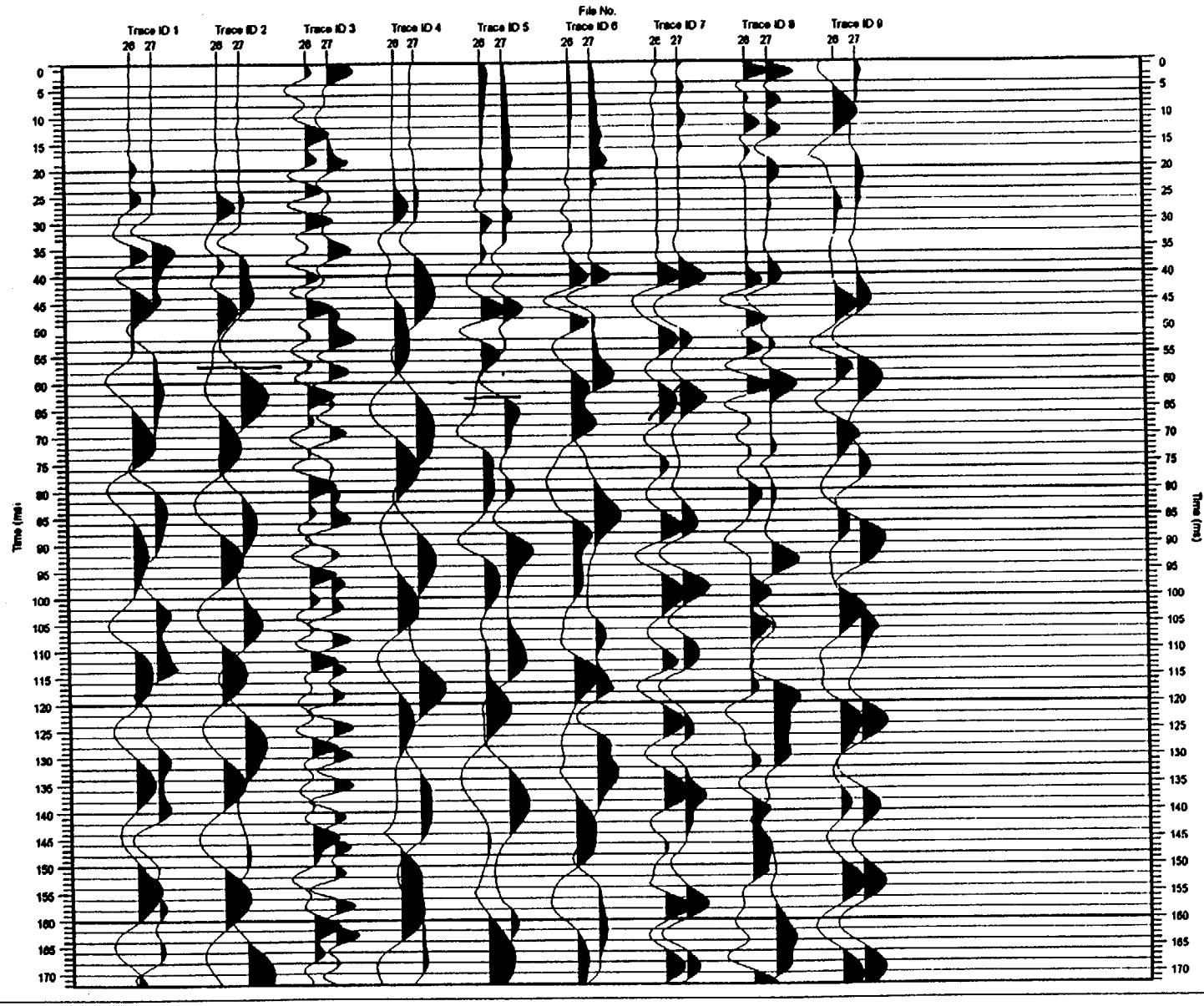

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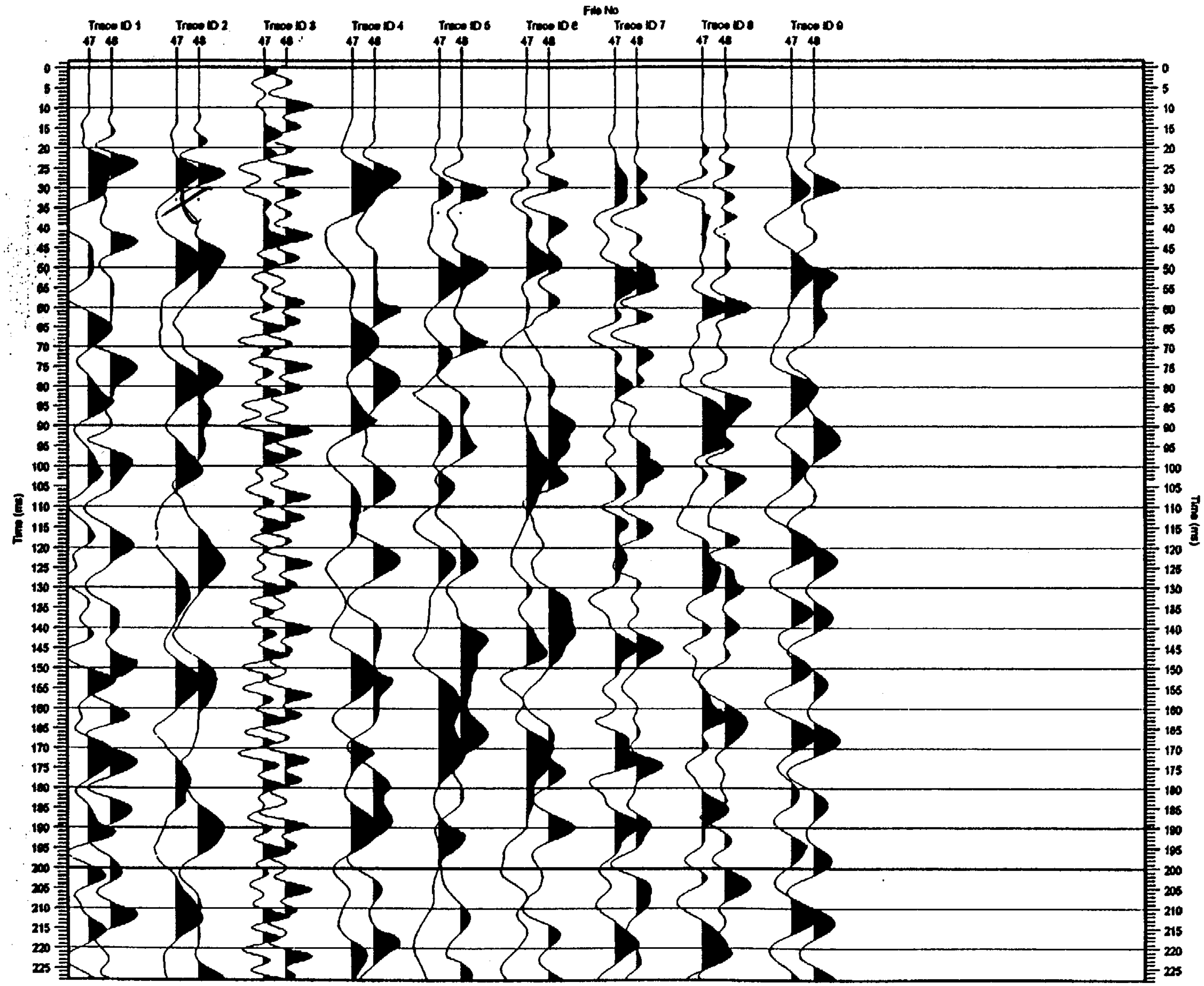

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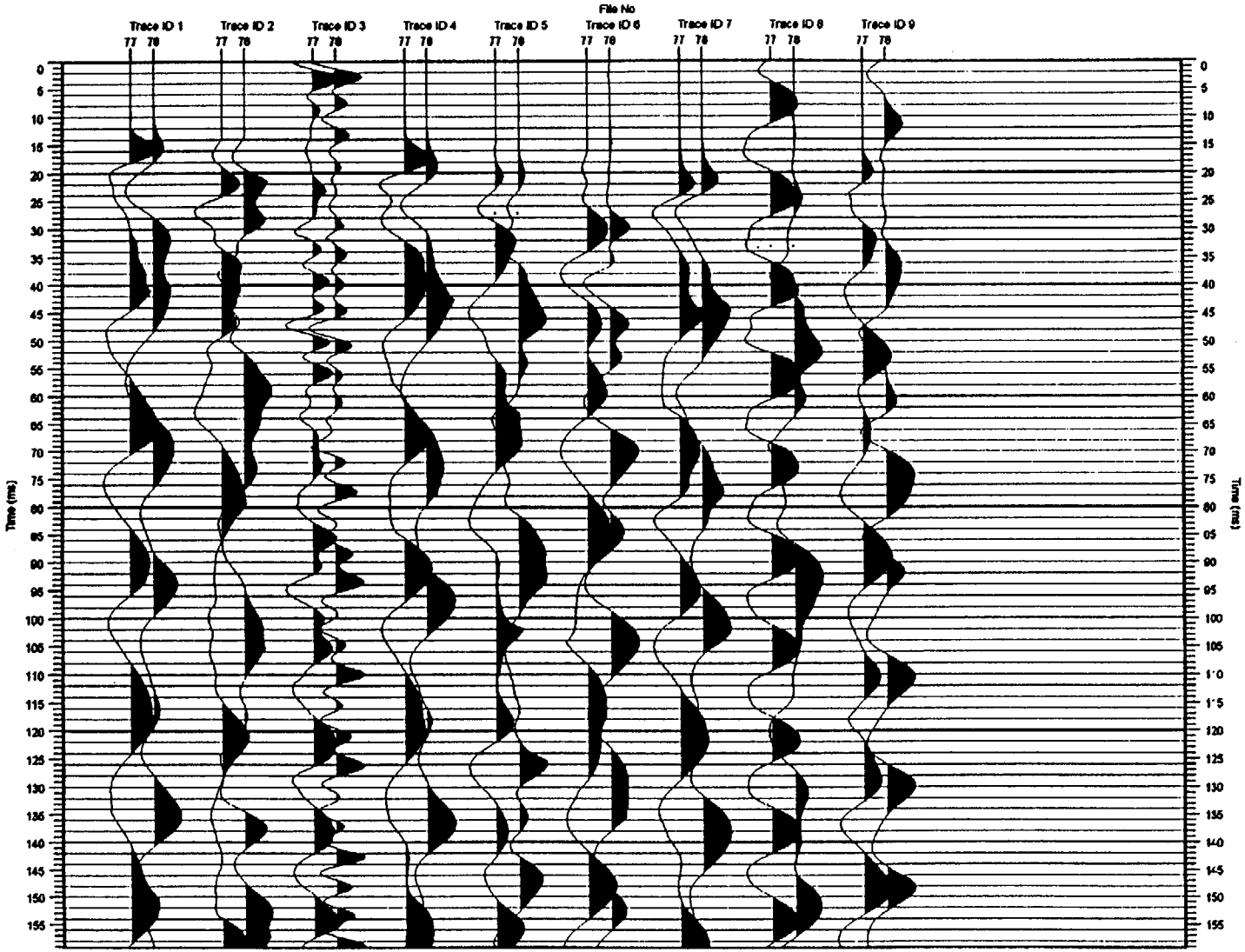

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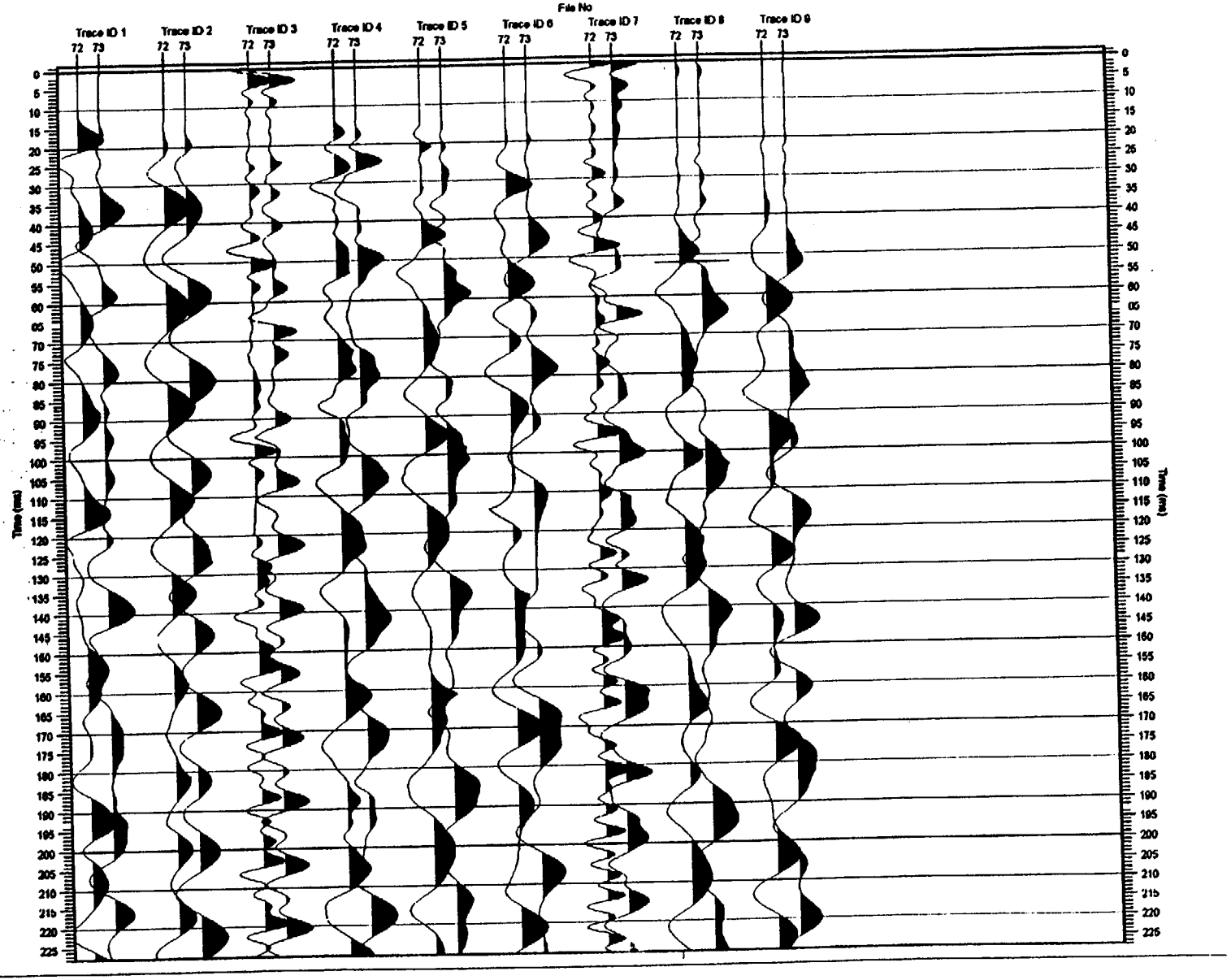

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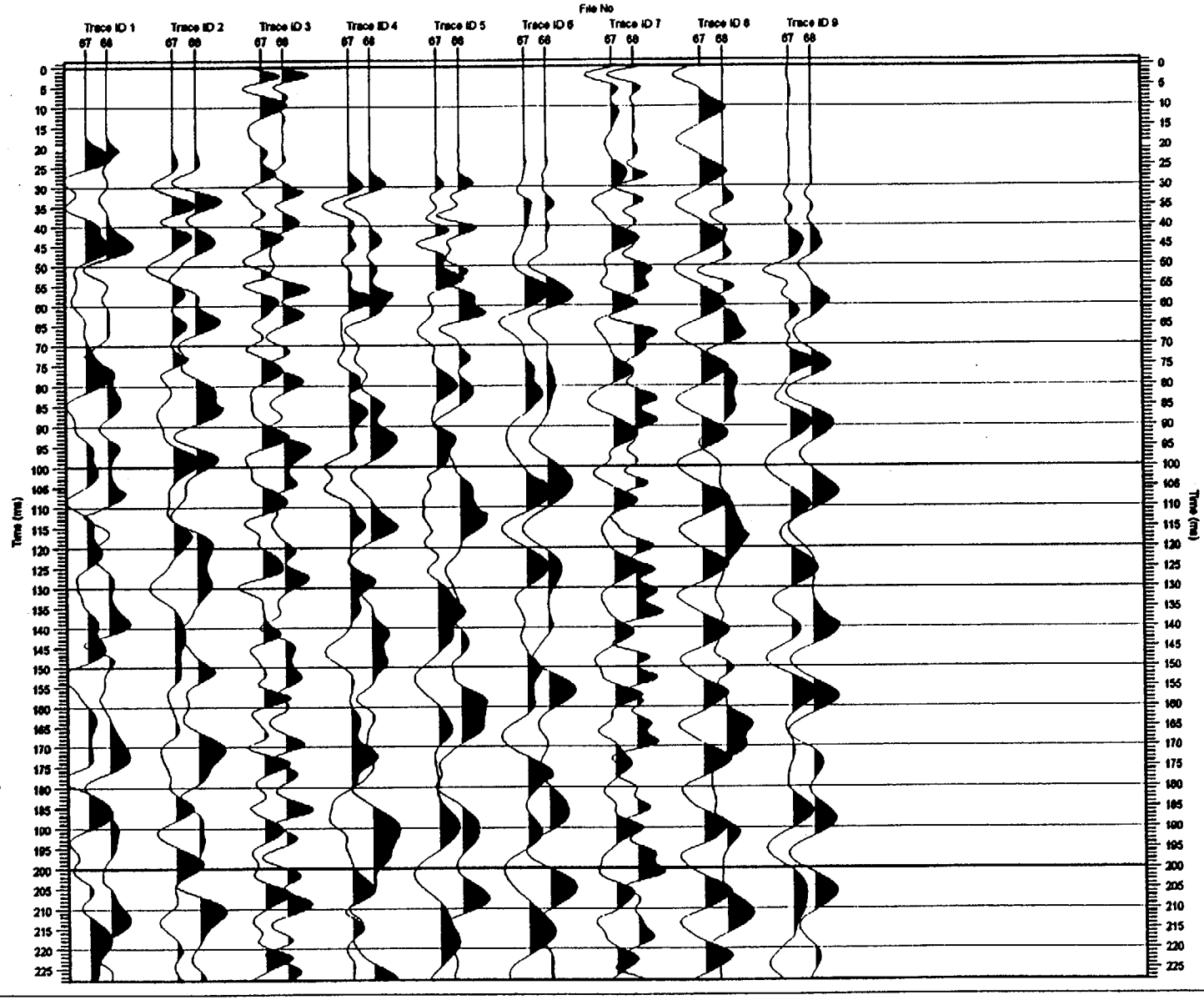

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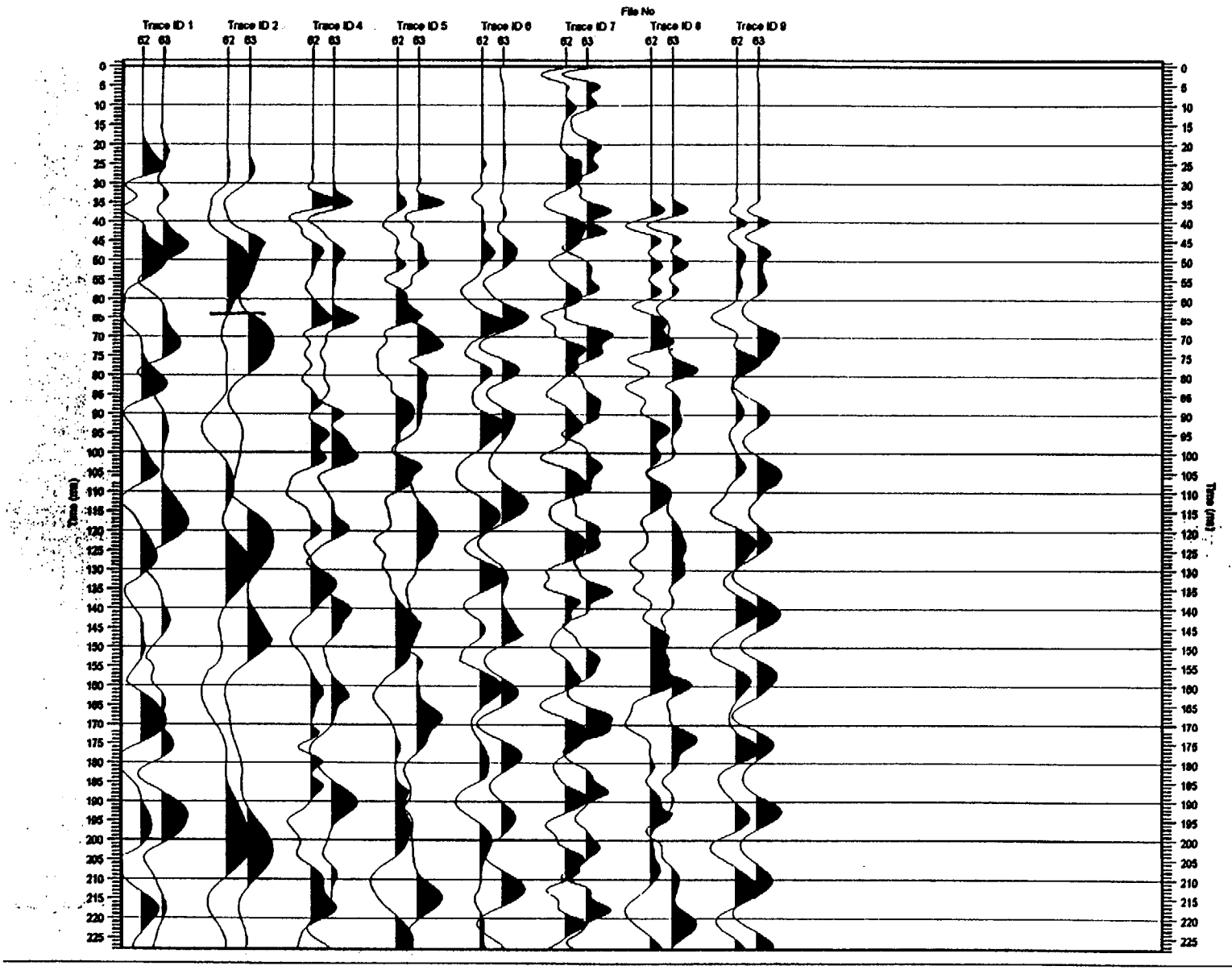

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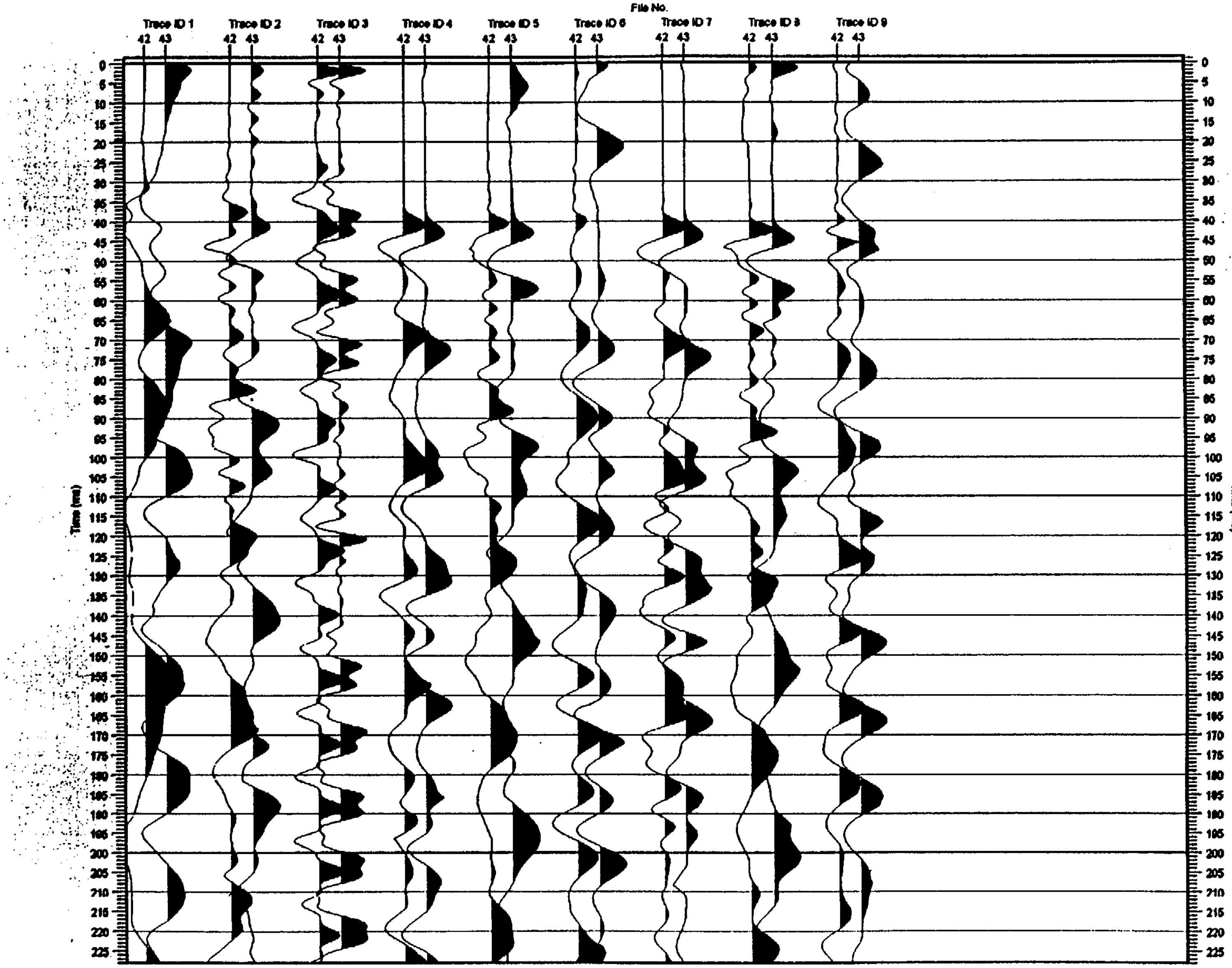

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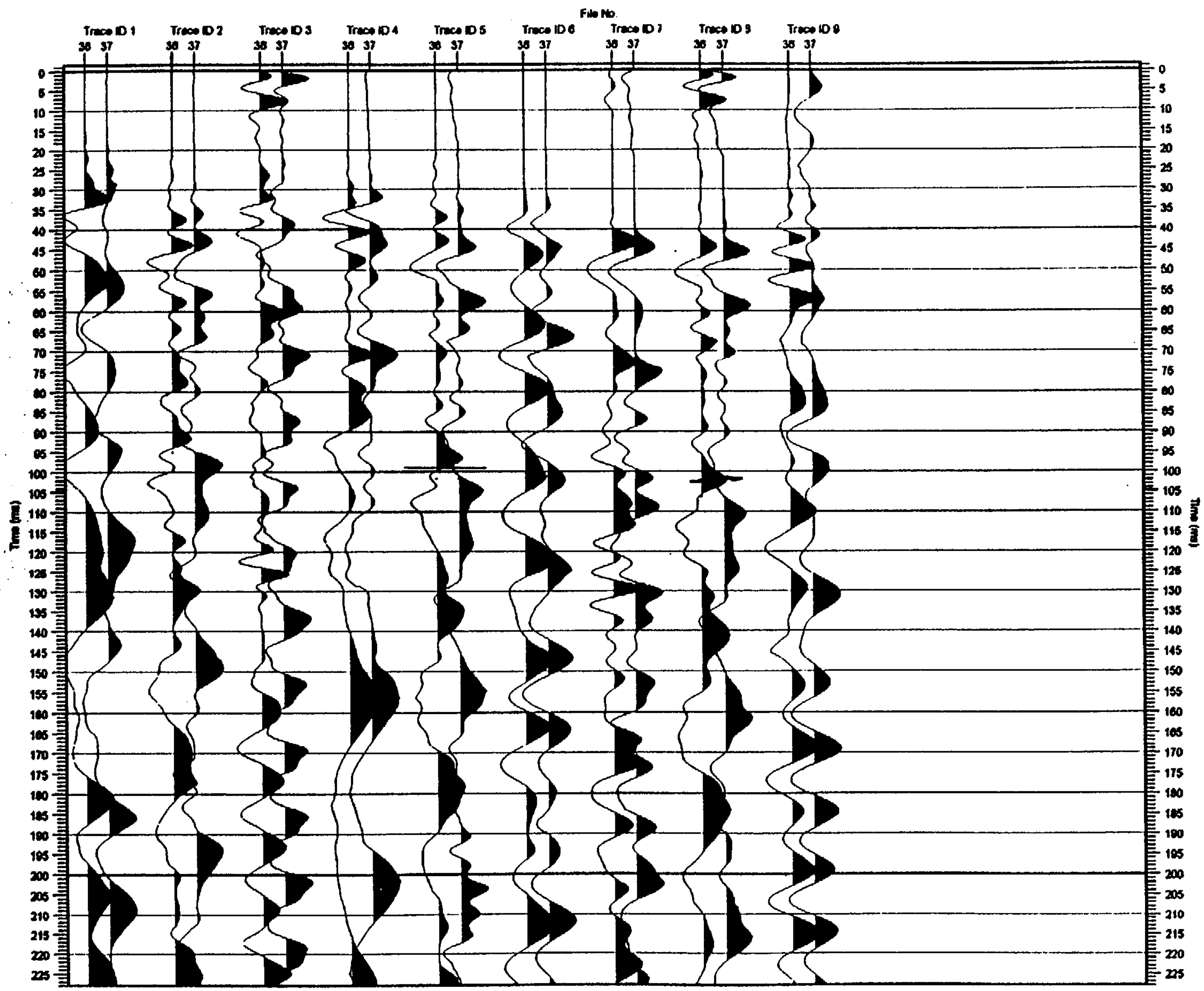

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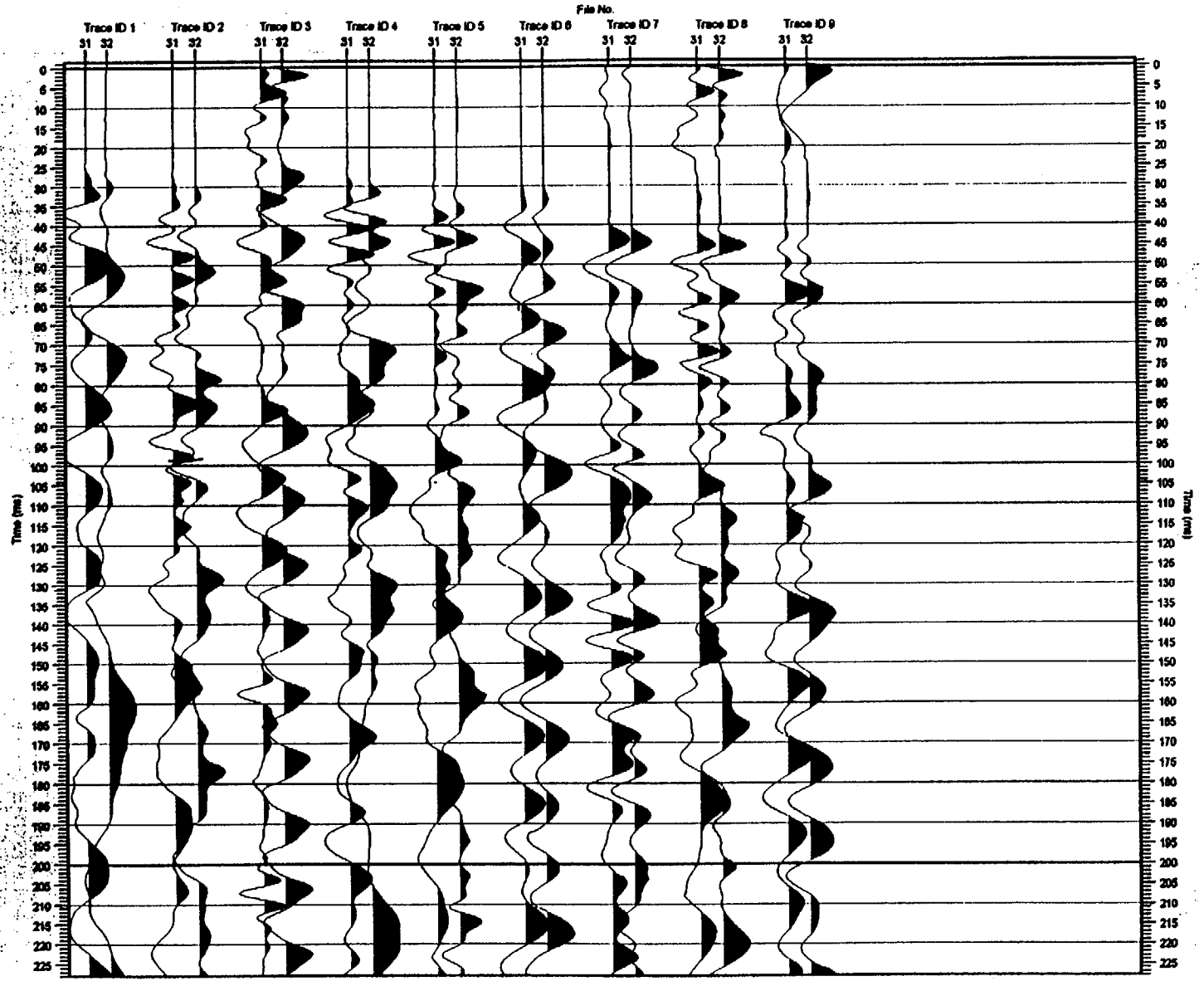

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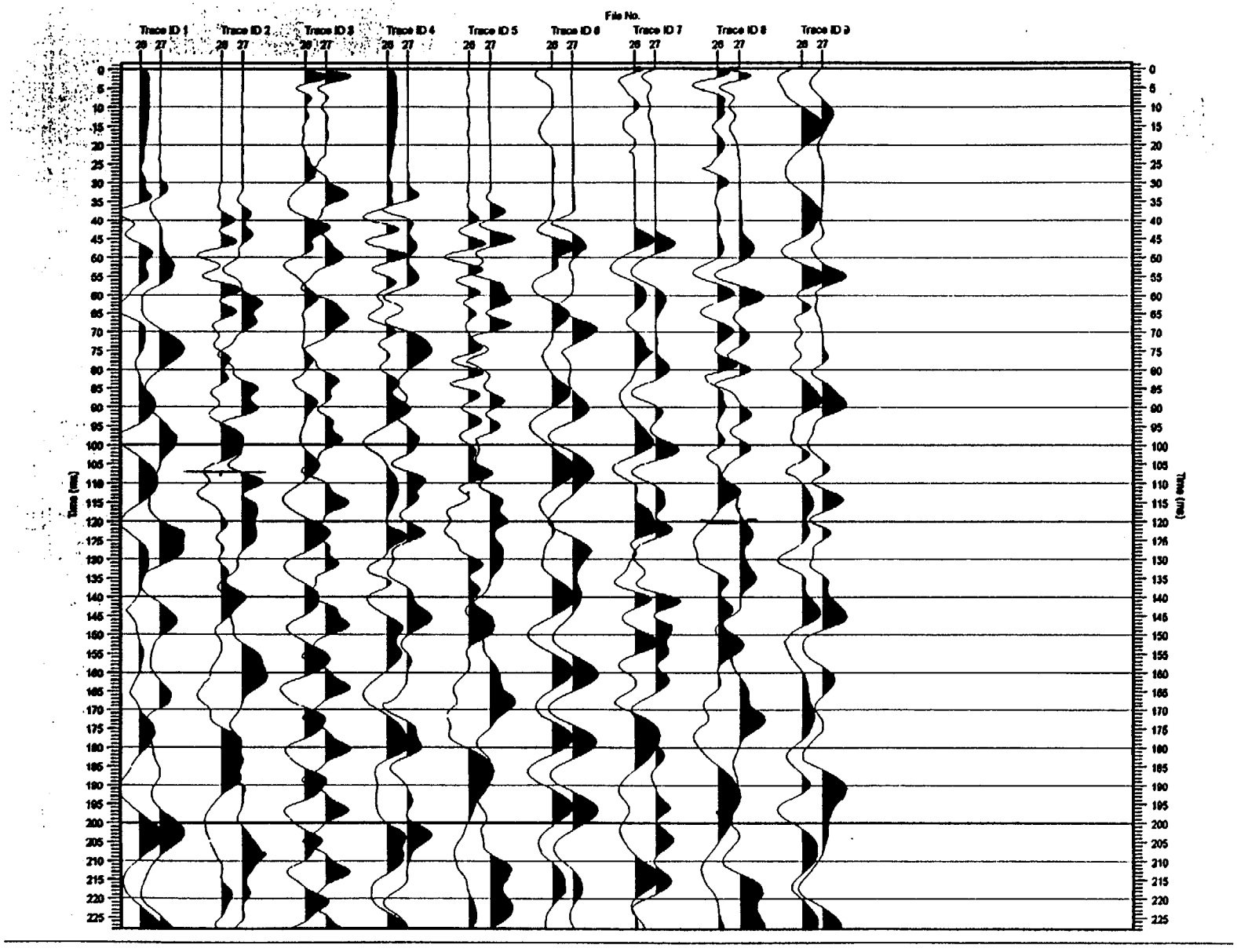

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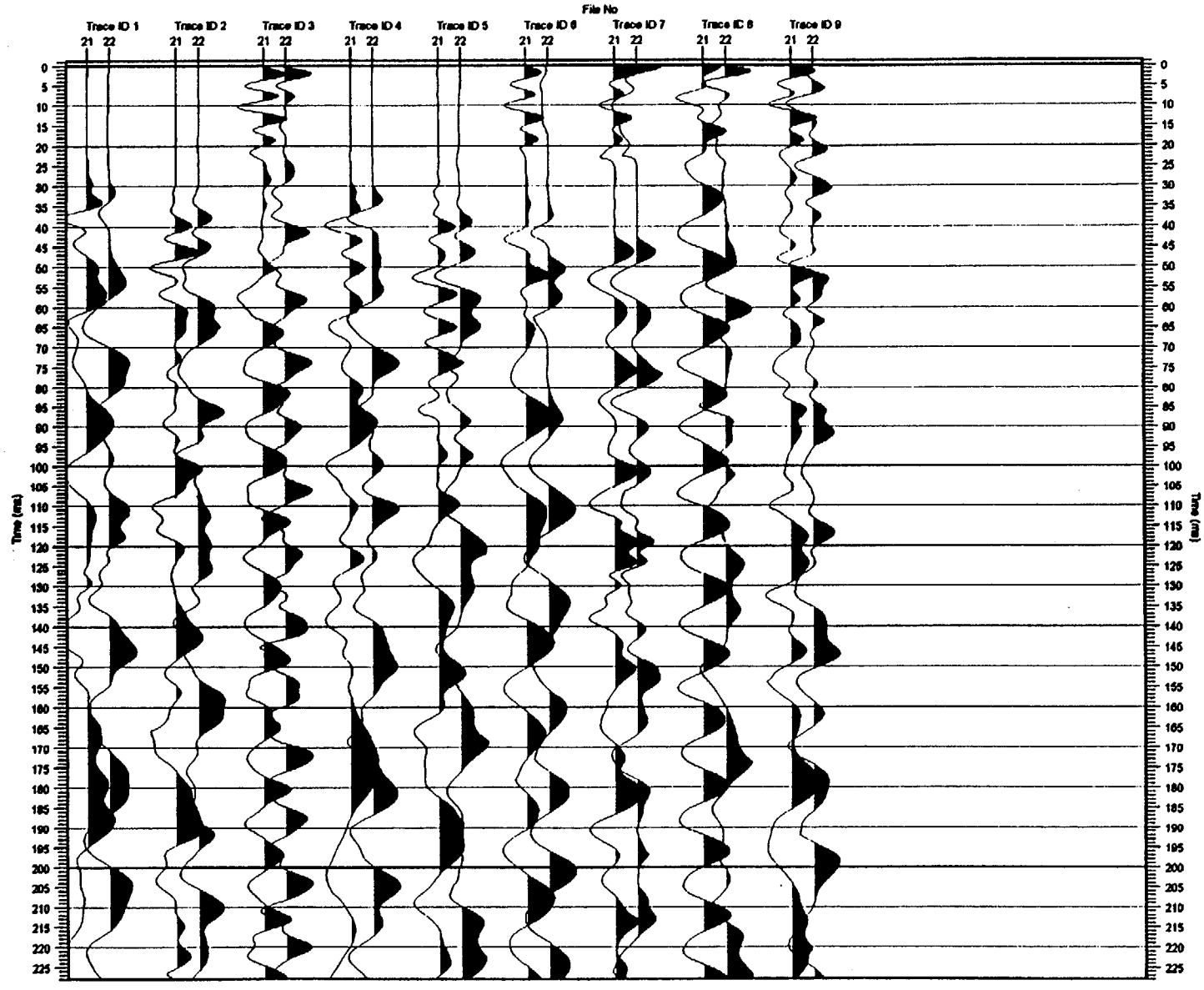

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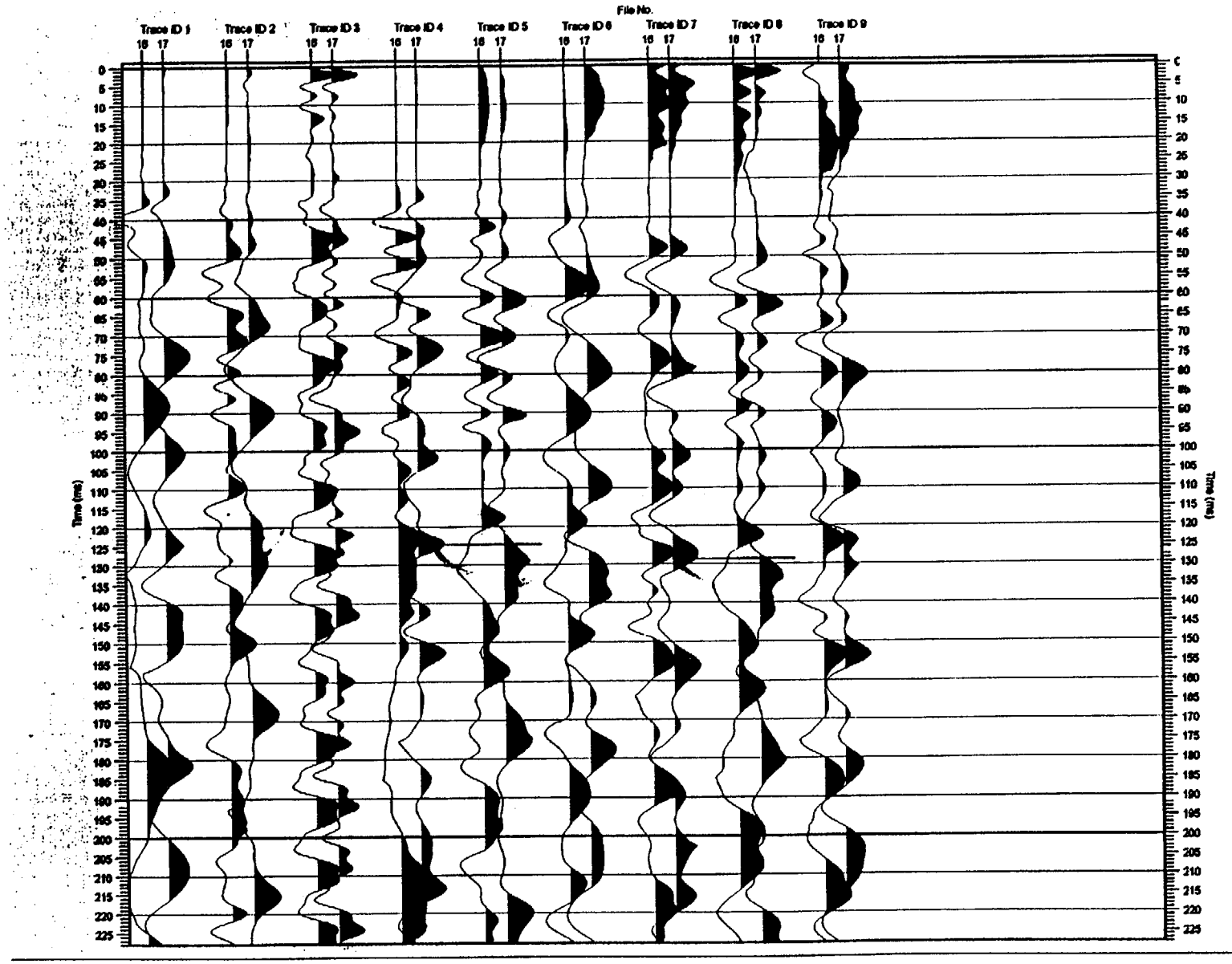

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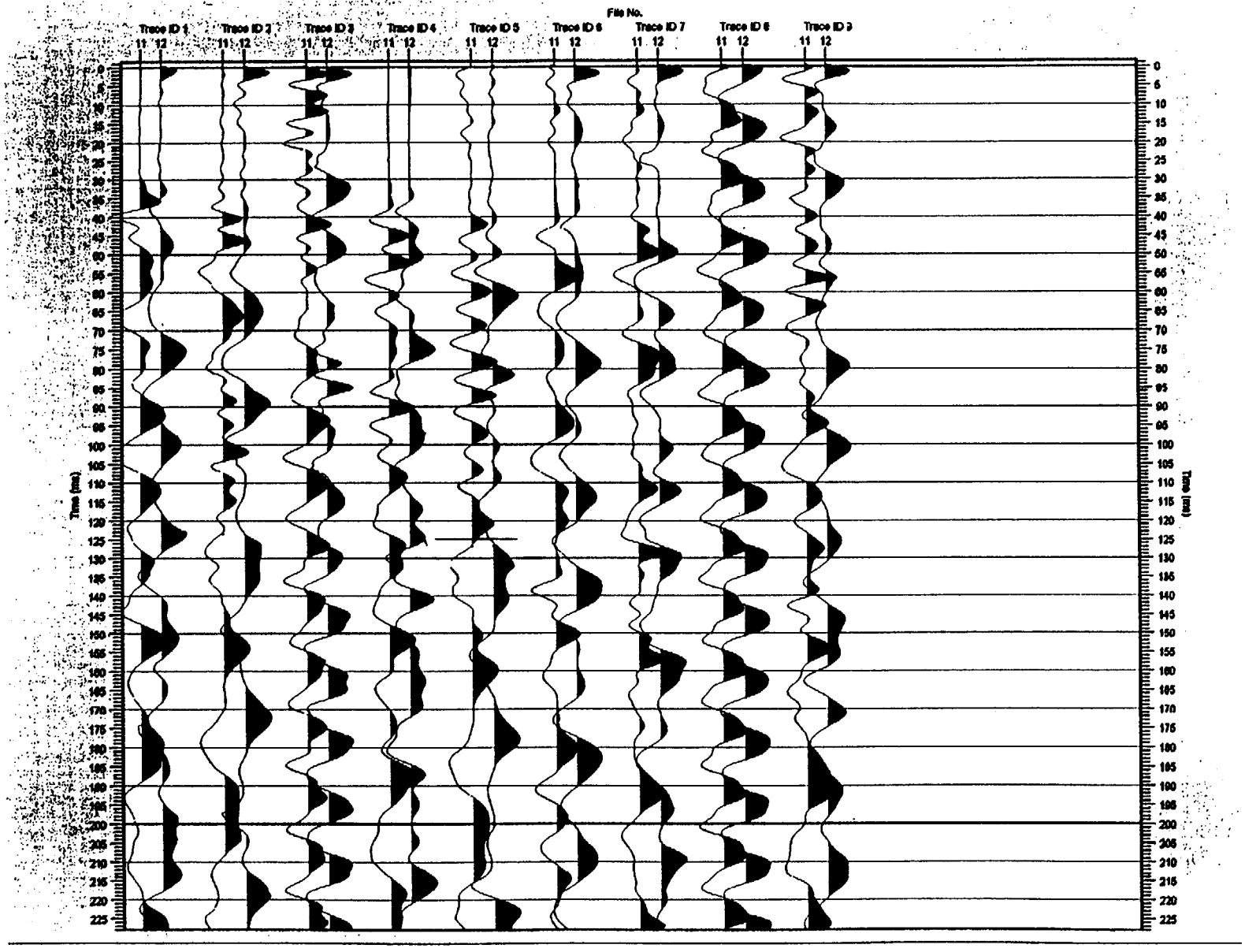

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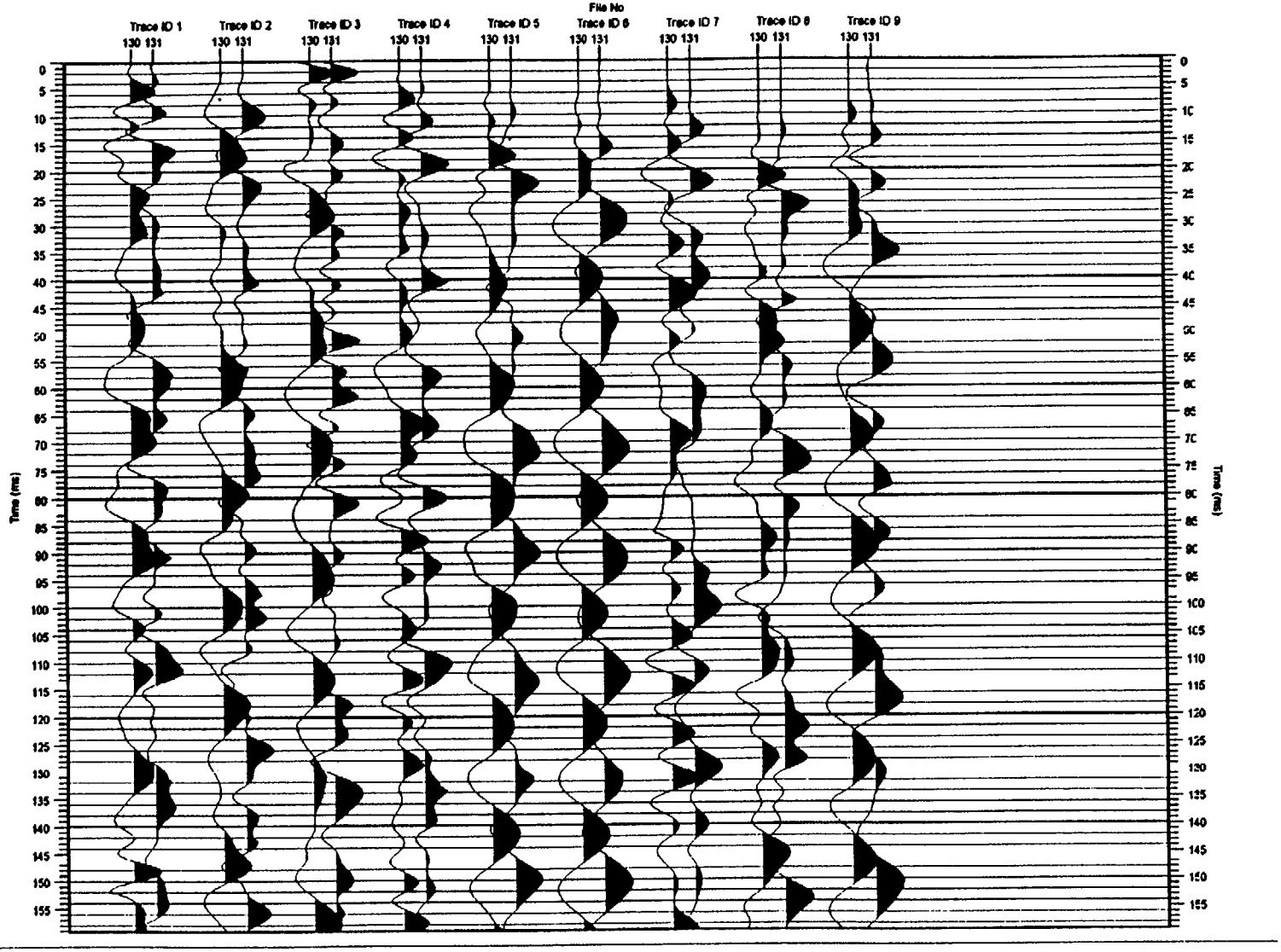

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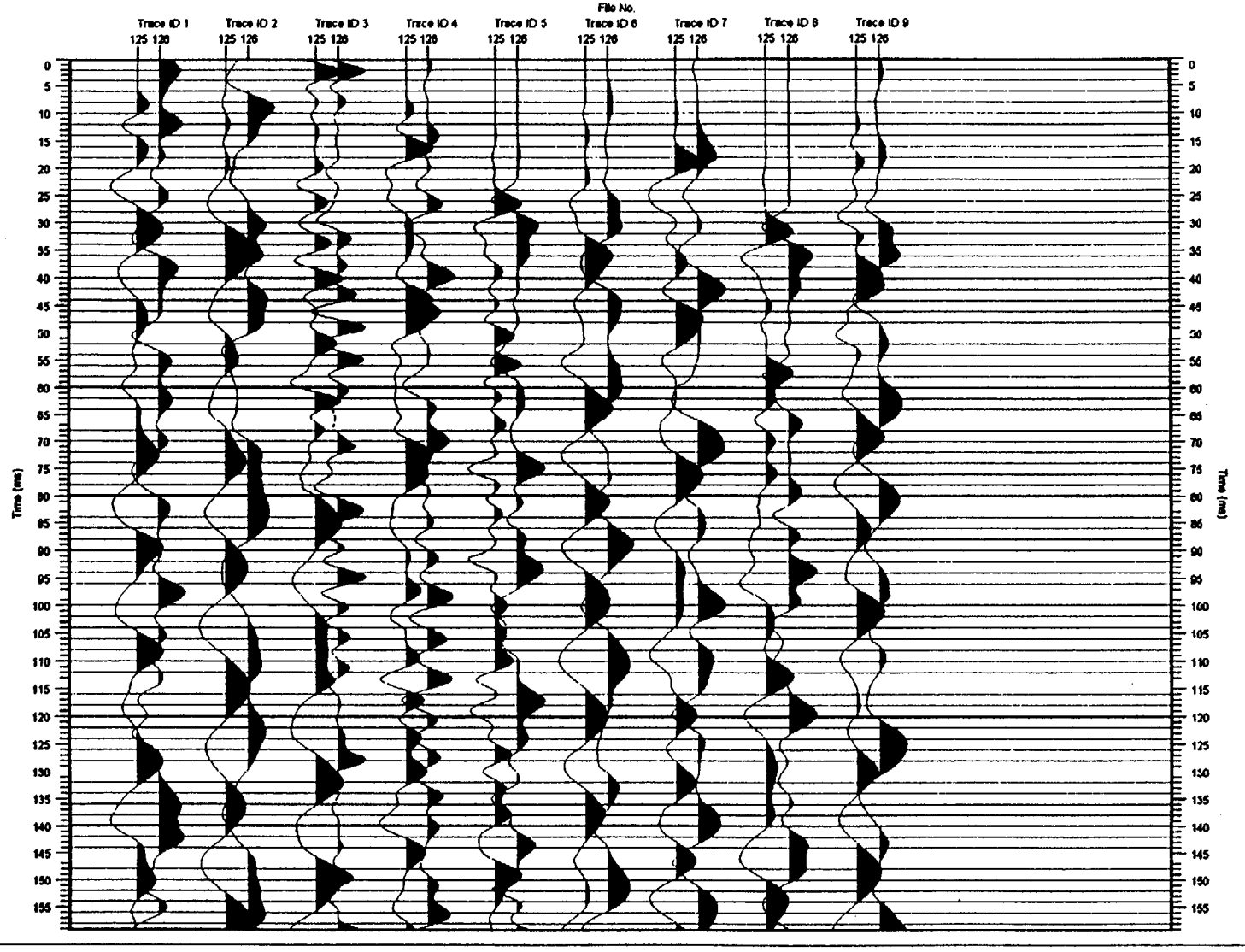

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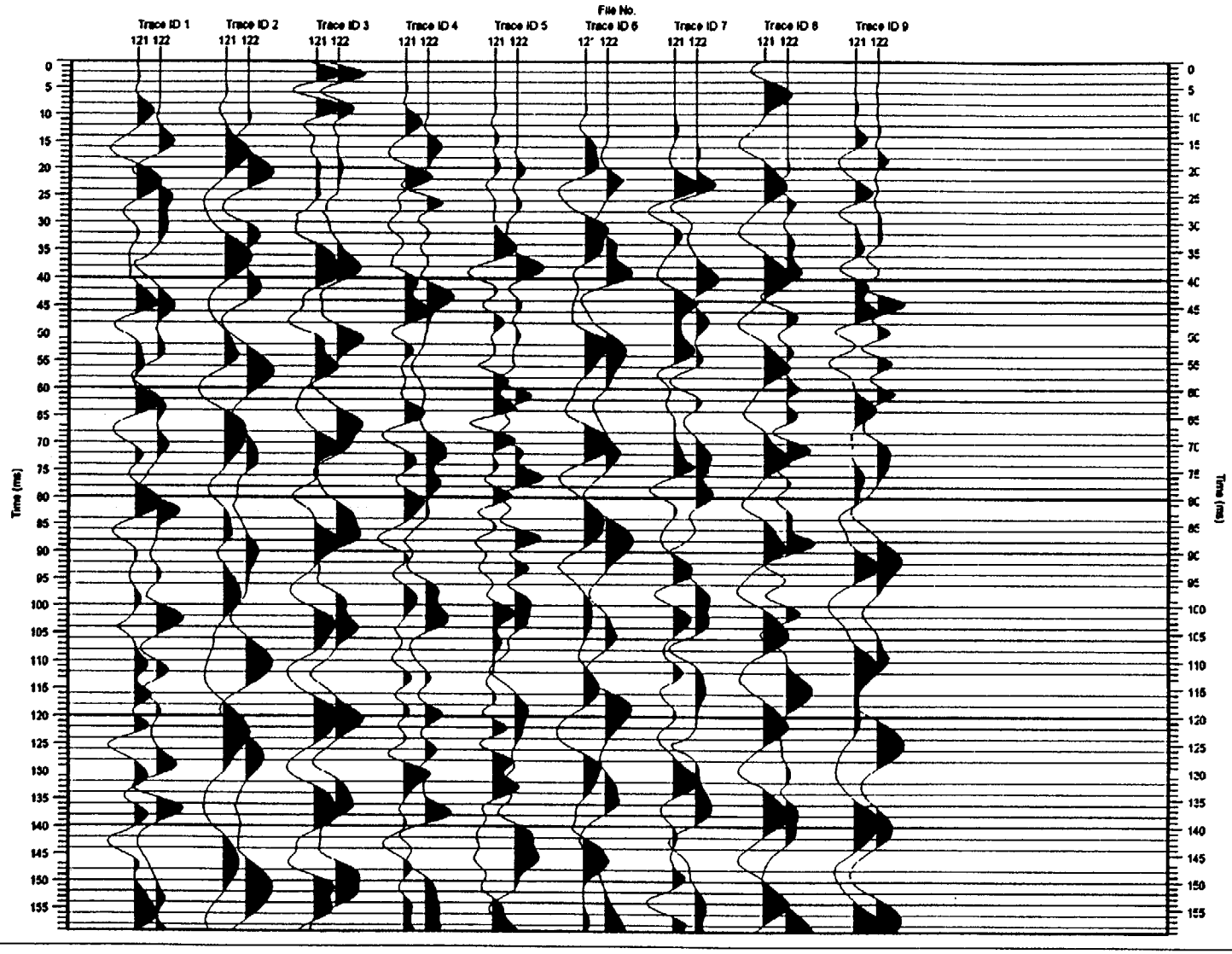

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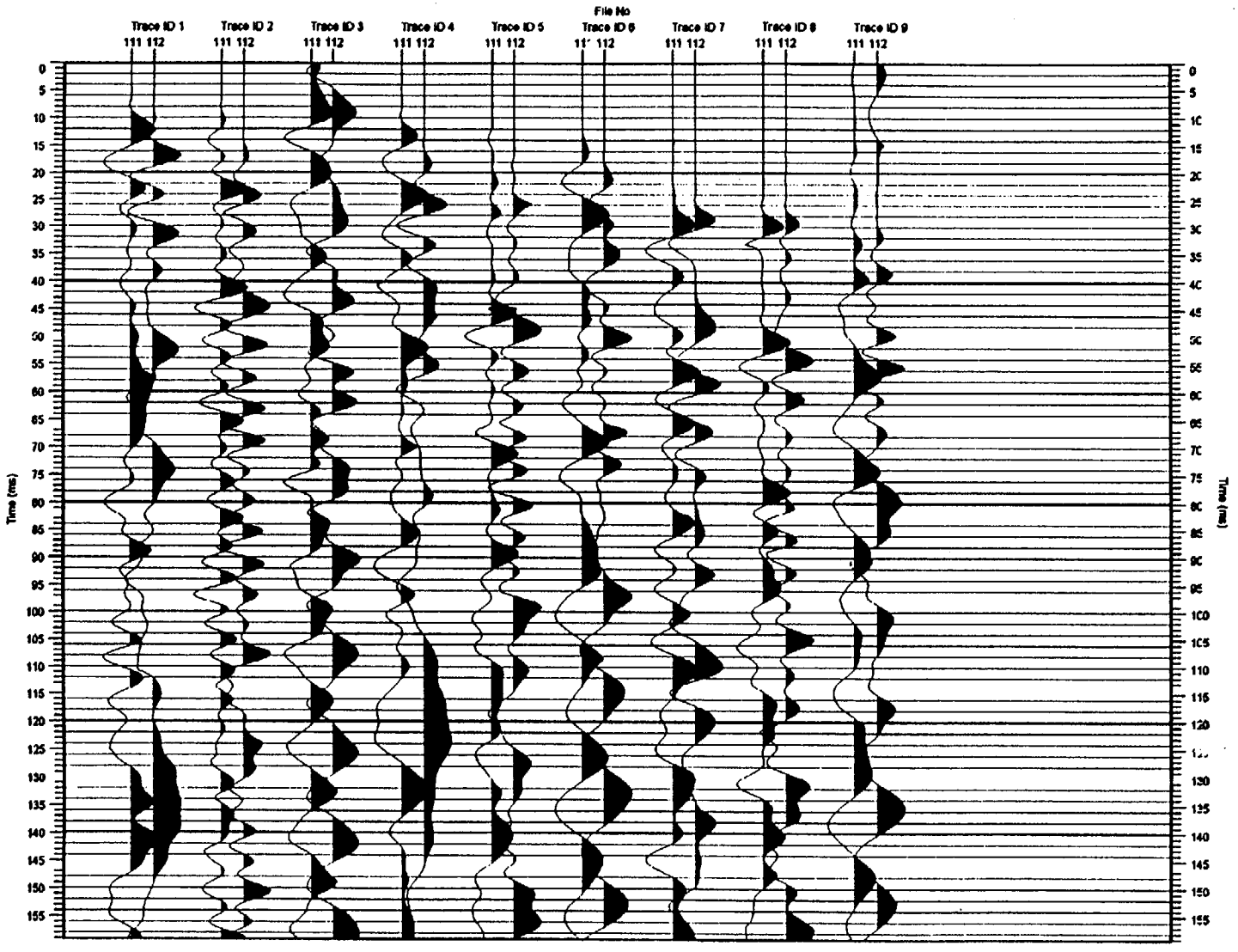

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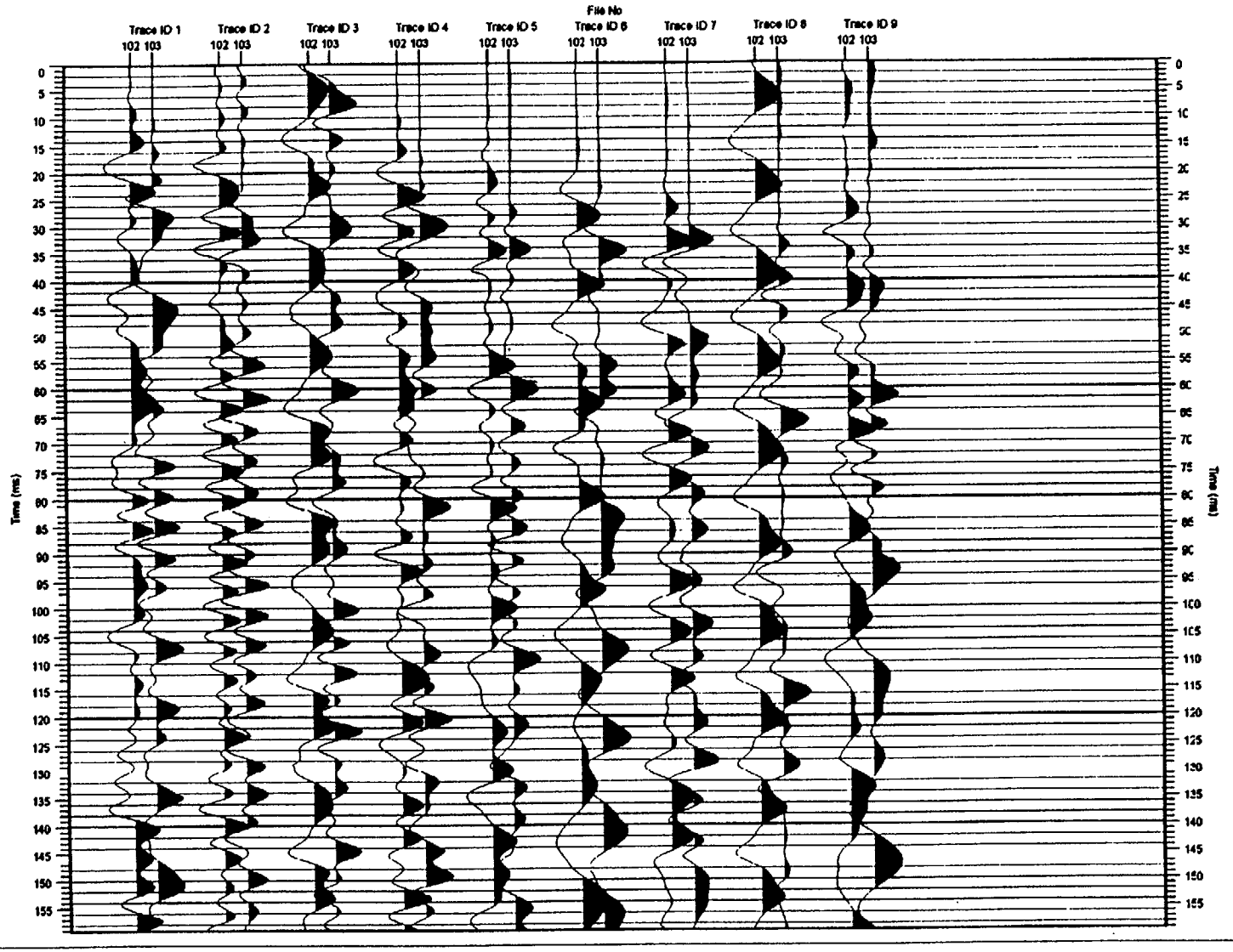

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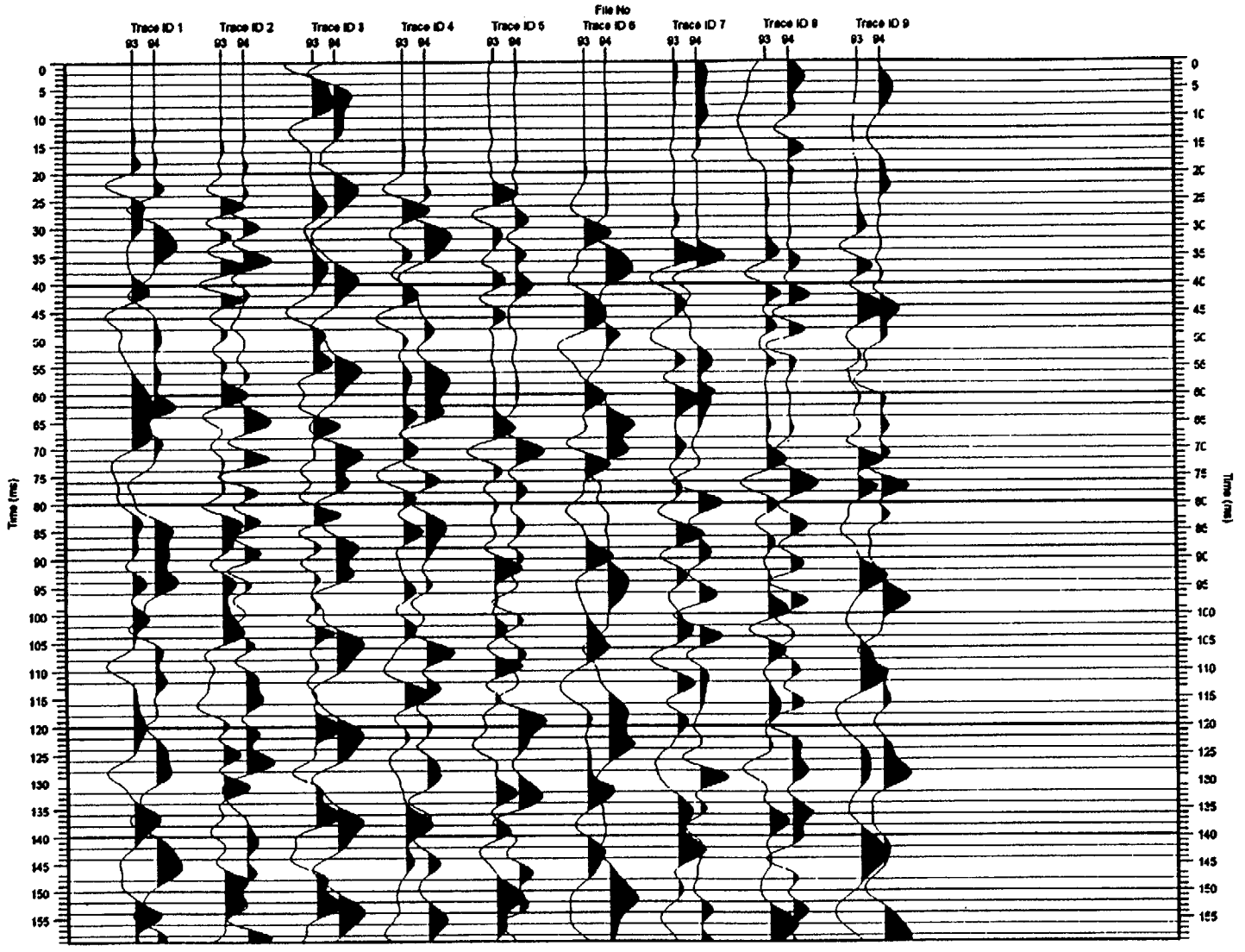

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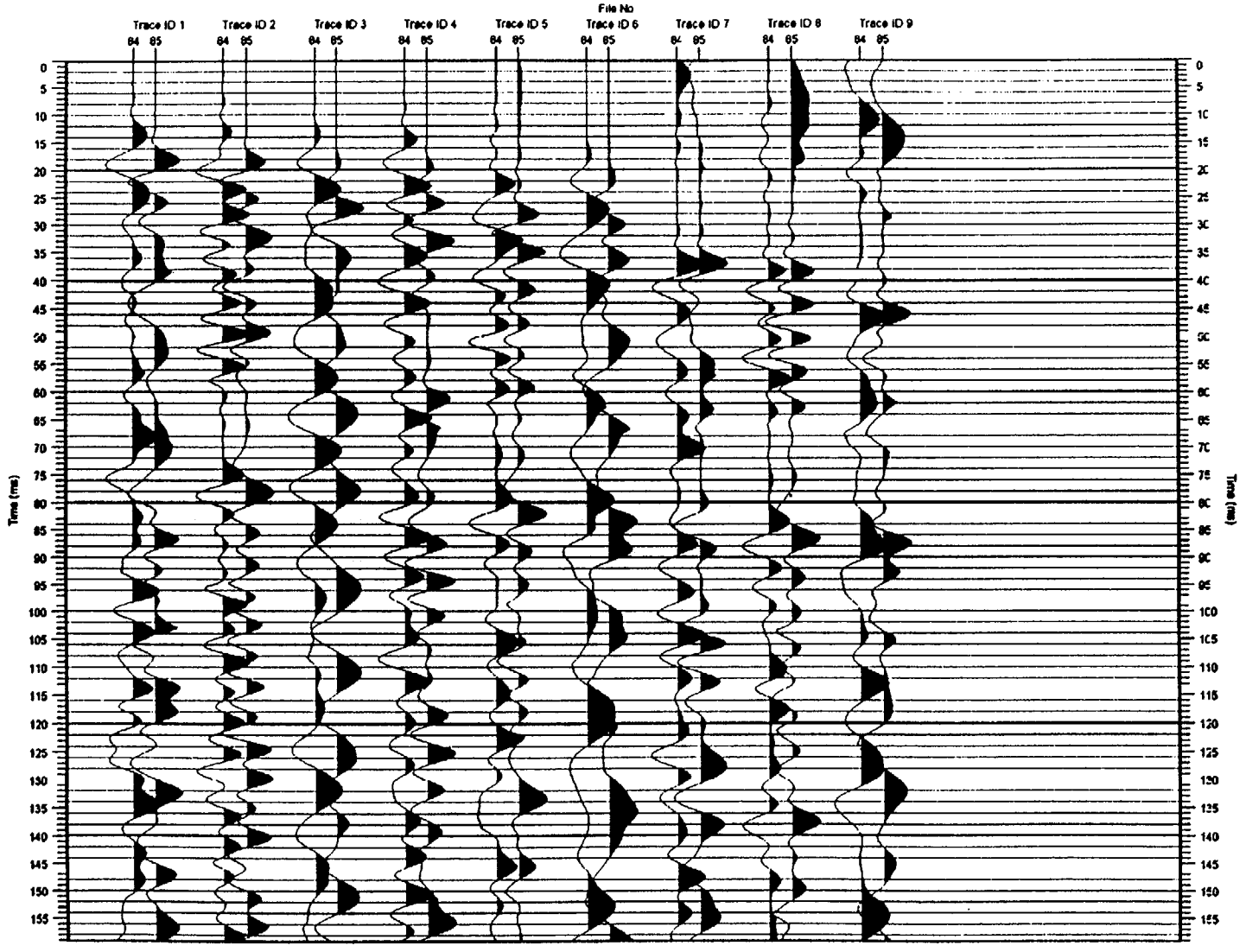

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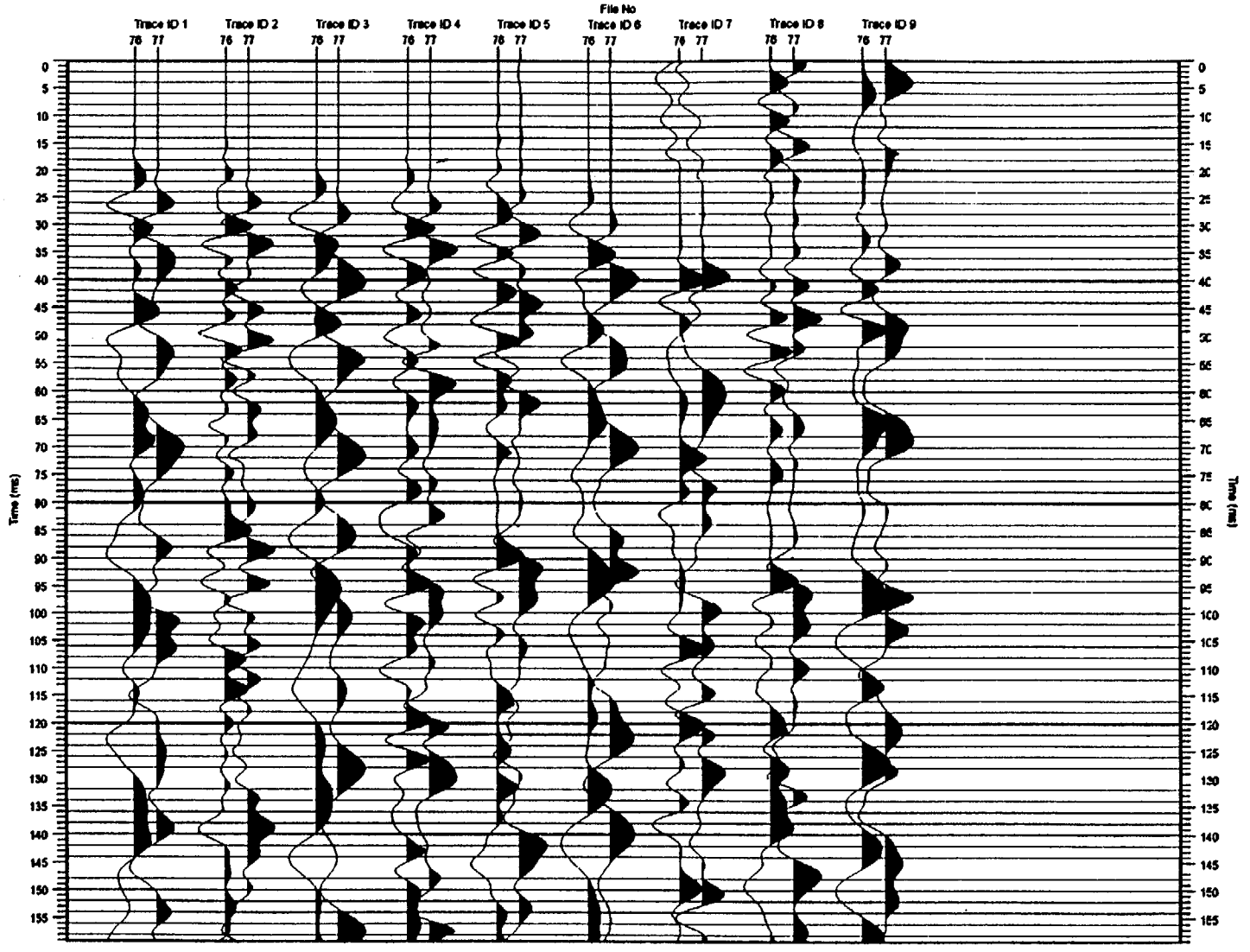

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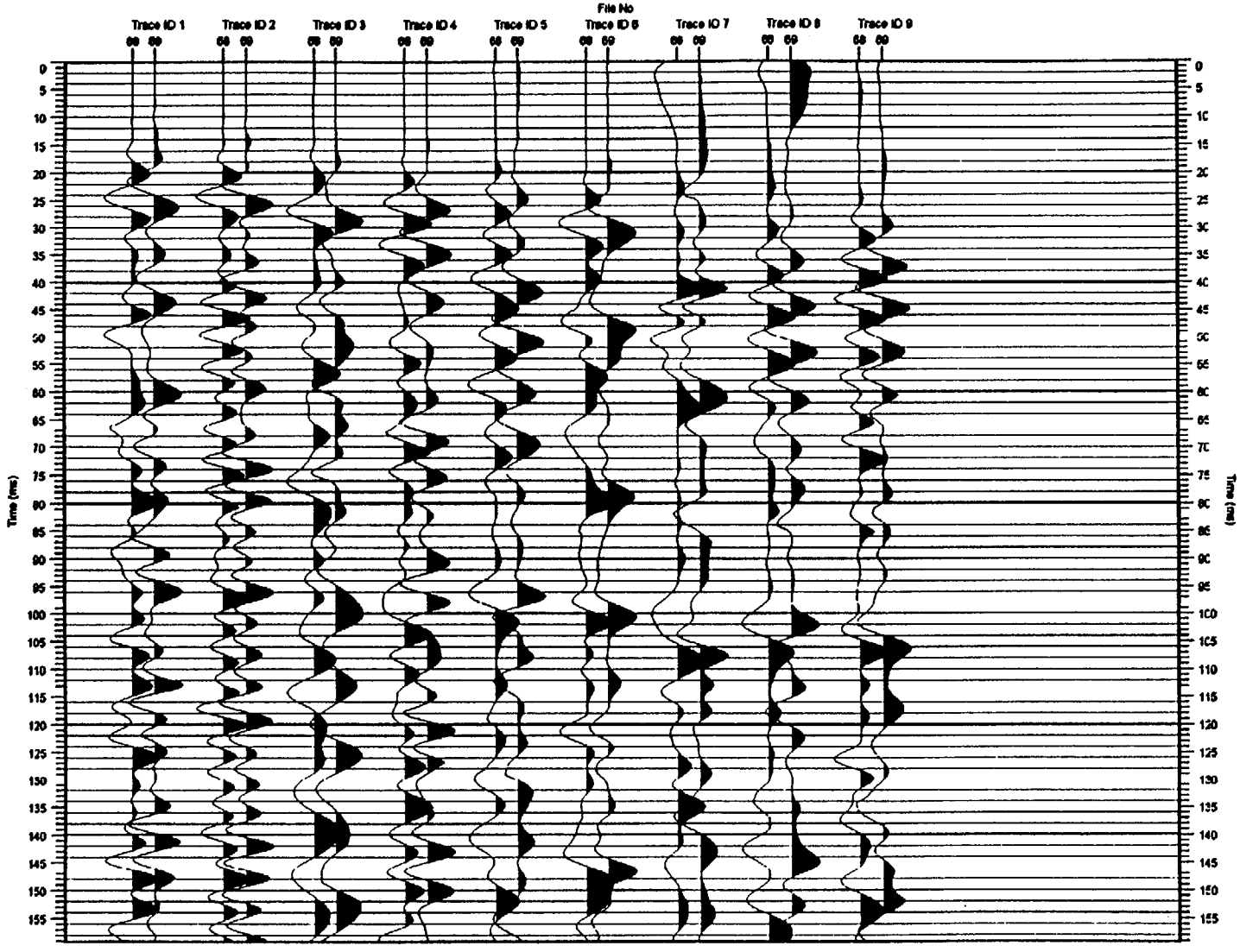

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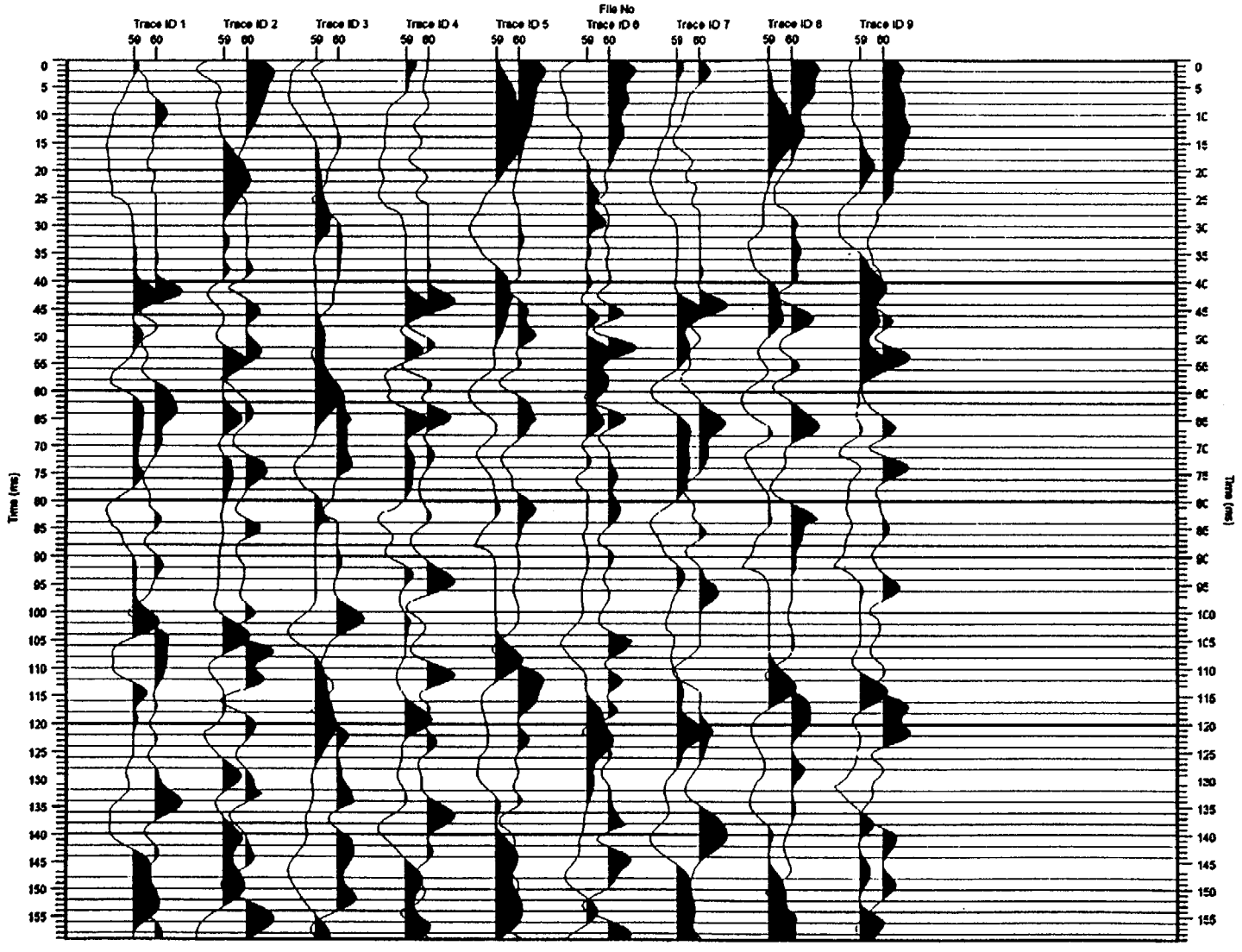

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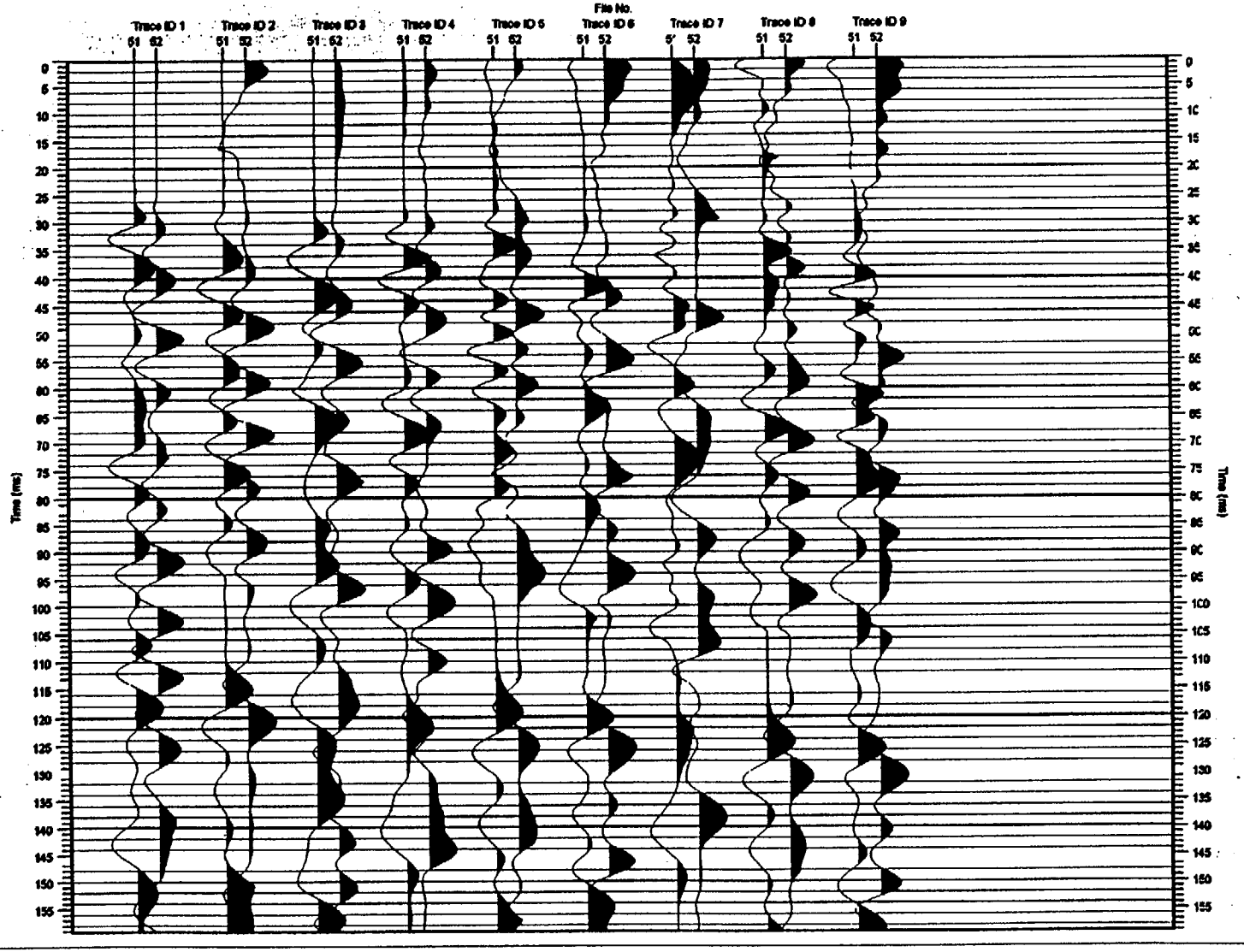
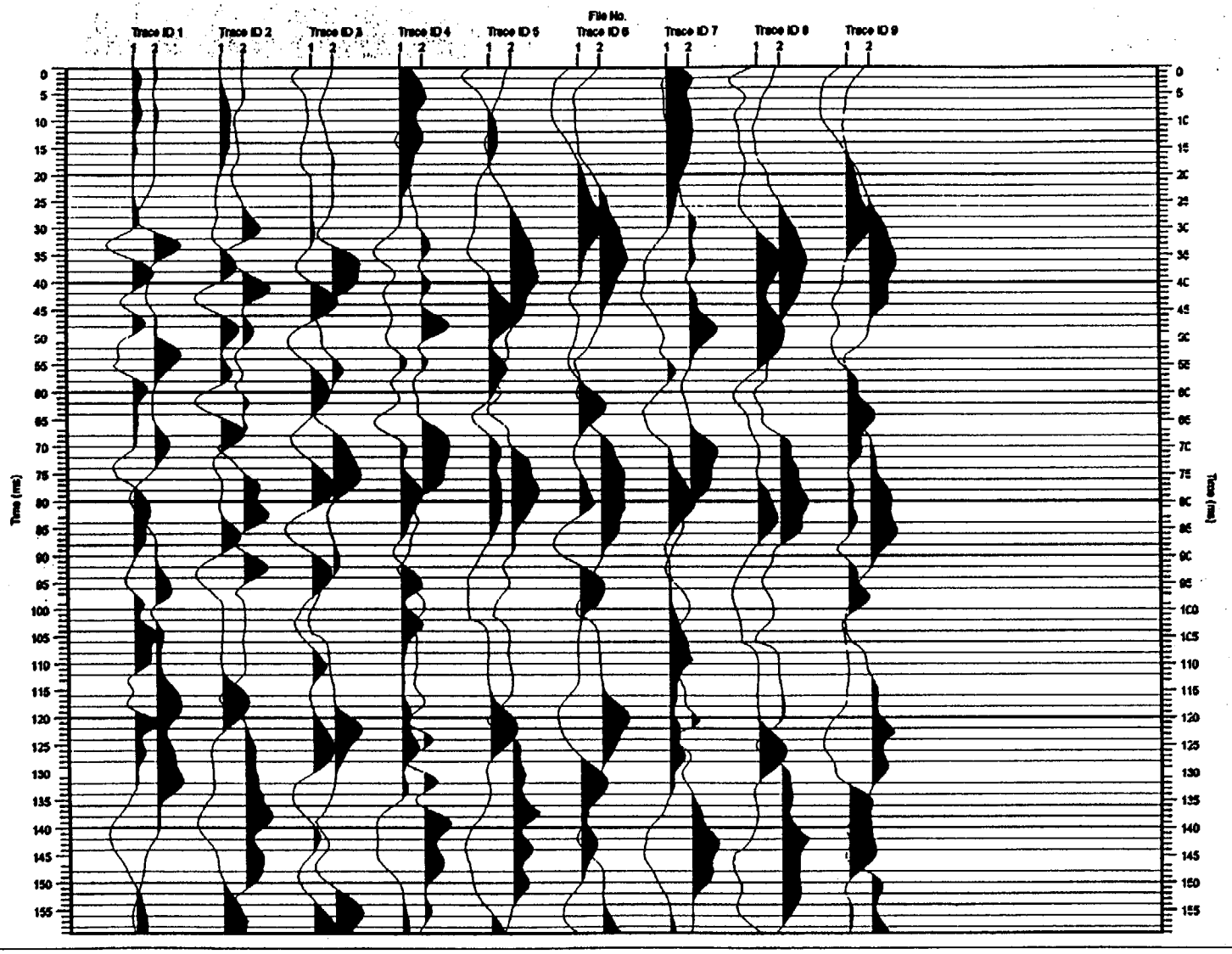


Bh10 EW 42m

Project Number: 00-184
Picked By: EVV
Checked By: RRC

062



Bh10 EW 43m

Project Number: 00-184
Picked By:
Checked By: RRC

Appendix E
Calibration Records

000925XXDES00001

OYO GEOSPACE DAS1 DATA SHEET

Test Page 1 of 3.

INPUT'	LIMITS	AS FOUND	AS LEFT
SEE DATA BELOW	+/- 0.125 mS	0.125 mS	0.125 mS

F1 - ACQUISITION MENU NUM

ACQUISITION PARAMETERS

Total Channels	:	24
Number of Auxes	:	2
Sample Rate	:	0.125
Record Length (ms)	:	4000
TB Offset (ms)	:	0
Stack Parameters		1 STACK
Pre-View Stack	:	No
Correlation Mode		Raw Mode
Noise Editing Para		No Editing
Filter Parameters		Filter
Trigger Level (mV)	:	100
Automatic Re-ARM	:	Manual Arm
Stack Delay (ms)	:	100
Shot Pt Delay(ms)	:	0
(TB) Trigger Type	:	Geo/Blster
Extra One Sample	:	No
Arm Request Para		Arm Req Para

OYO MINIVIB PARAMETERS

Sweep Type	:	Linear Swp
Sweep Length (ms)	:	1000
Taper Length (ms)	:	200
Amplitude (%)	:	10
No. of Freq Zones	:	1
Flip Polarity	:	No Flip
Start Frequency	:	30.0000

Zone	St Freq	End Freq	dB/oct	dB/Hz
1	30.00	100.00	0.01	0.00

000925XXDES00001

OYO GEOSPACE DAS1 DATA SHEET

Test Pg 2 of 3

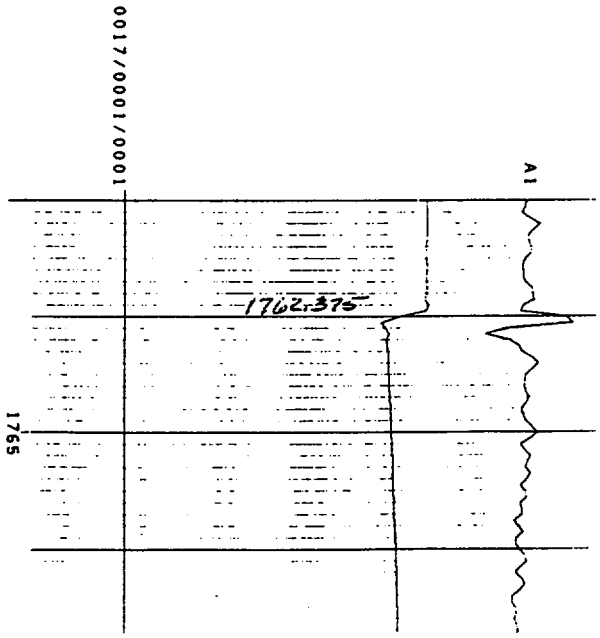
INPUT	LIMITS	AS FOUND	AS LEFT
SEE DATA BELOW	+/- 0.125 mS	0.125 mS	0.125 mS

```
sizworkbuf=1498
filesharing=no
Printsharing=no
autologon=yes
computername=AMIMEUR_DAS
lanroot=D:\GEONET
username=AMIMEUR
workgroup=OYO_SEISMIC
```

RECORDING PARAMETERS	
FILE NUMBER	5
SHOT POINT	-1
ACTIVE SEISMIC CHANNELS	24
NUMBER OF AUXES	2
SAMPLE RATE	0.125 MS
RECORD LENGTH	4000.0 MS
NO. OF STACKS	1
FIXED GAIN	12 dB
LOW CUT FILTER FREQ	3.0 Hz
RECORDED DATE	9/25/ 0
RECORDED TIME	15:44:15
PLAYBACK DATE	9/25/ 0
PLAYBACK TIME	15:51:16

2

TIMING ANNOTATION LINES = 0.250 MSEC

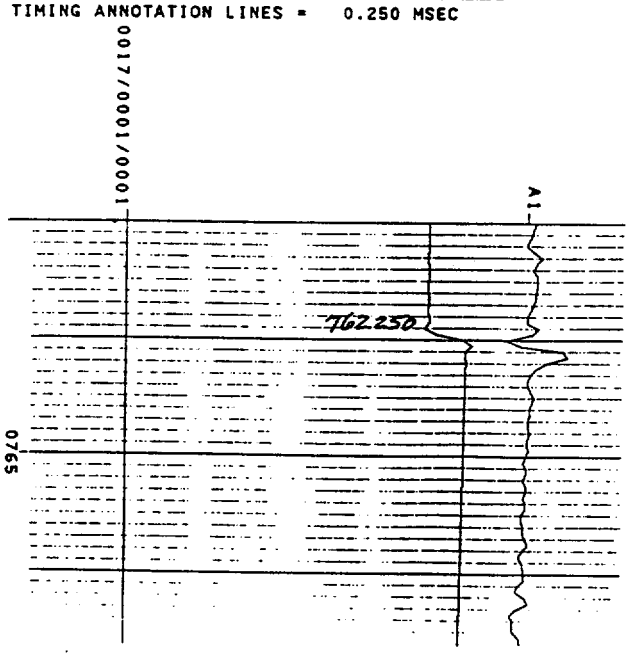



```
sizworkbuf=1498
filesharing=no
Printsharing=no
autologon=yes
computername=AMIMEUR_DAS
lanroot=D:\GEONET
username=AMIMEUR
workgroup=OYO_SEISMIC
```

RECORDING PARAMETERS	
FILE NUMBER	5
SHOT POINT	-1
ACTIVE SEISMIC CHANNELS	24
NUMBER OF AUXES	2
SAMPLE RATE	0.125 MS
RECORD LENGTH	4000.0 MS
NO. OF STACKS	1
FIXED GAIN	12 dB
LOW CUT FILTER FREQ	3.0 Hz
RECORDED DATE	9/25/ 0
RECORDED TIME	15:44:15
PLAYBACK DATE	9/25/ 0
PLAYBACK TIME	15:50:40

1

TIMING ANNOTATION LINES = 0.250 MSEC



Test Page 3 of 3

000925XXDES00001

OYO GEOSPACE DAS1 DATA SHEET

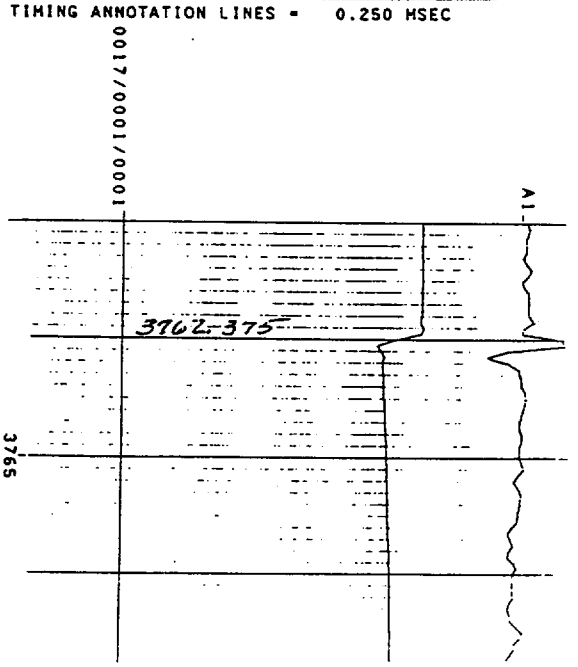
INPUT	LIMITS	AS FOUND	AS LEFT
SEE DATA BELOW	+/- 0.125 mS	0.125 mS	0.125 mS

```
sizworkbuf=1498
filesharing=no
Printsharing=no
autologon=yes
computername=AMINEUR_DAS
lanroot=D:\GEONET
username=AMINEUR
workgroup=OYO_SEISMIC
```

RECORDING PARAMETERS	
FILE NUMBER	5
SHOT POINT	-1
ACTIVE SEISMIC CHANNELS	24
NUMBER OF AUXES	2
SAMPLE RATE	0.125 MS
RECORD LENGTH	4000.0 MS
NO. OF STACKS	1
FIXED GAIN	12 dB
LOW CUT FILTER FREQ	3.0 Hz
RECORDED DATE	9/25/ 0
PLAYBACK DATE	9/25/ 0
PLAYBACK TIME	15:52:18

4

TIMING ANNOTATION LINES = 0.250 MSEC

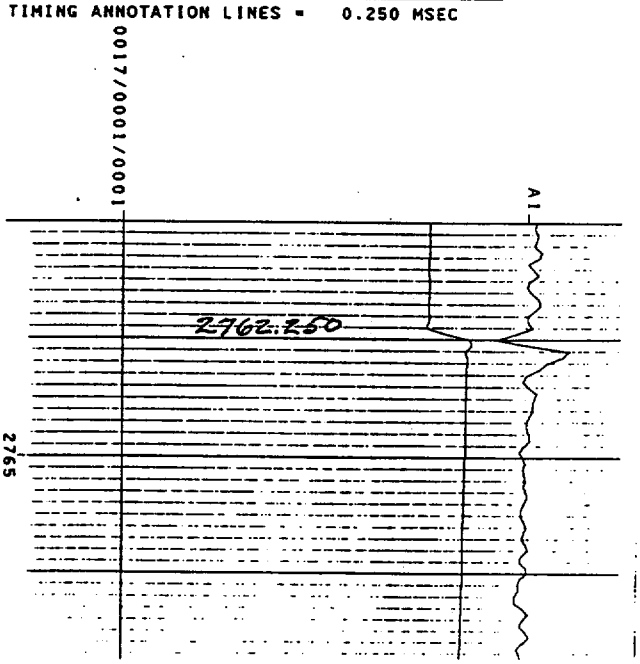



```
sizworkbuf=1498
filesharing=no
Printsharing=no
autologon=yes
computername=AMINEUR_DAS
lanroot=D:\GEONET
username=AMINEUR
workgroup=OYO_SEISMIC
```

RECORDING PARAMETERS	
FILE NUMBER	5
SHOT POINT	-1
ACTIVE SEISMIC CHANNELS	24
NUMBER OF AUXES	2
SAMPLE RATE	0.125 MS
RECORD LENGTH	4000.0 MS
NO. OF STACKS	1
FIXED GAIN	12 dB
LOW CUT FILTER FREQ	3.0 Hz
RECORDED DATE	9/25/ 0
PLAYBACK DATE	9/25/ 0
PLAYBACK TIME	15:51:52

5

TIMING ANNOTATION LINES = 0.250 MSEC



000925XXDES00002

TEST PAGE 1 of 3

OYO GEOSPACE DAS1 DATA SHEET

INPUT	LIMITS	AS FOUND	AS LEFT
SEE DATA BELOW	+/- 0.125 mS	0.000mS	0.000mS

F1 - ACQUISITION MENU NUM

ACQUISITION PARAMETERS

Total Channels :	24
Number of Auxes :	2
Sample Rate :	0.125
Record Length (ms):	4000
TB Offset (ms):	0
Stack Parameters	1 STACK
Pre-View Stack :	No
Correlation Mode	Raw Mode
Noise Editing Para	No Editing
Filter Parameters	Filter
Trigger Level (mV):	100
Automatic Re-ARM :	Automatic
Stack Delay (ms) :	100
Shot Pt Delay(ms) :	0
(TB) Trigger Type :	Geo/Blster
Extra One Sample :	No
Arm Request Para	Arm Req Para

OYO MINIVIB PARAMETERS

Sweep Type :	Linear Swp
Sweep Length (ms) :	1000
Taper Length (ms) :	200
Amplitude (%) :	10
No. of Freq Zones :	1
Flip Polarity :	No Flip
Start Frequency :	30.0000

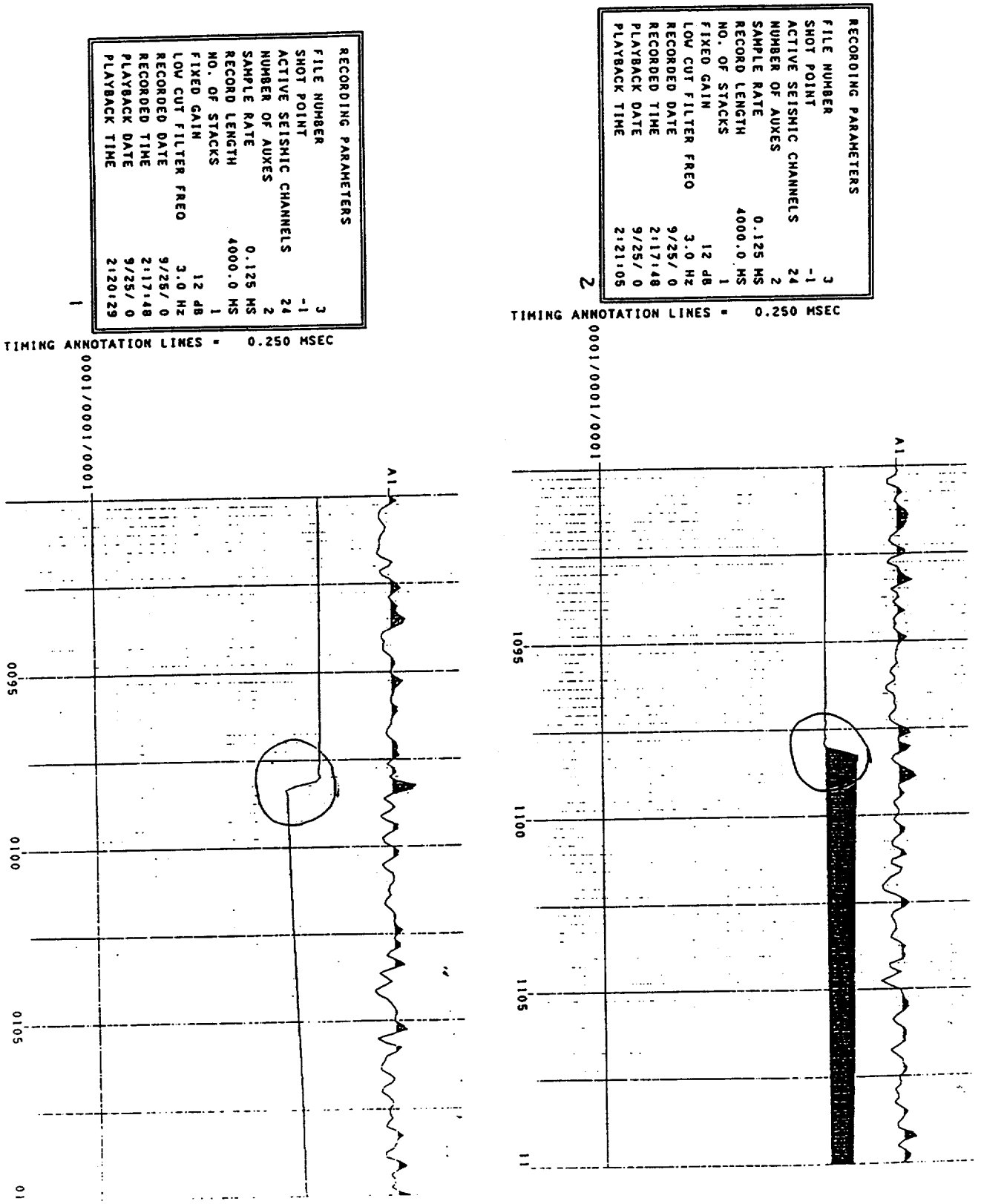
Zone	St Freq	End Freq	dB/oct	dB/Hz
1	30.00	100.00	0.01	0.00

F1-ACQ F2-SPREAD F3-PLOT F4-STORAGE F5-UTIL F6-REPRO F7-DIAG F8-EXIT

00925XXDES00002

OYO GEOSPACE DAS1 DATA SHEET

NPUT	LIMITS	AS FOUND	AS LEFT
EE DATA BELOW	+/- 0.125 mS	0.000mS	0.000mS



000925XXDES00002

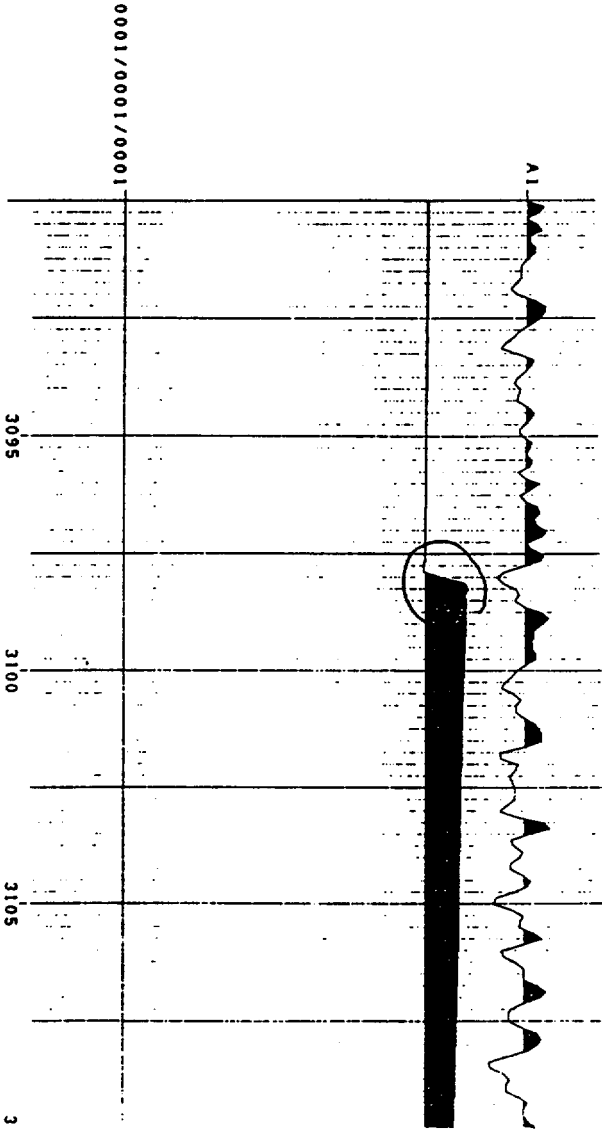
OYO GEOSPACE DAS1 DATA SHEET

INPUT	LIMITS	AS FOUND	AS LEFT
SEE DATA BELOW	+/- 0.125 mS	0.000mS	0.000mS

RECORDING PARAMETERS	
FILE NUMBER	3
SHOT POINT	-1
ACTIVE SEISMIC CHANNELS	24
NUMBER OF AUXES	2
SAMPLE RATE	0.125 MS
RECORD LENGTH	4000.0 MS
NO. OF STACKS	1
FIXED GAIN	12 dB
LOW CUT FILTER FREQ	3.0 Hz
RECORDED DATE	9/25/ 0
RECORDED TIME	2:17:48
PLAYBACK DATE	9/25/ 0
PLAYBACK TIME	2:21:42

3

TIMING ANNOTATION LINES = 0.250 MSEC



RECORDING PARAMETERS	
FILE NUMBER	3
SHOT POINT	-1
ACTIVE SEISMIC CHANNELS	24
NUMBER OF AUXES	2
SAMPLE RATE	0.125 MS
RECORD LENGTH	4000.0 MS
NO. OF STACKS	1
FIXED GAIN	12 dB
LOW CUT FILTER FREQ	3.0 Hz
RECORDED DATE	9/25/ 0
RECORDED TIME	2:17:48
PLAYBACK DATE	9/25/ 0
PLAYBACK TIME	2:22:33

4

TIMING ANNOTATION LINES = 0.250 MSEC

QUALITY LEVEL QL-1A (IROFS) Total Pages 421

ATTACHMENT NUMBER 4

LABORATORY TESTING PROGRAM AND TEST RESULTS

ATTACHMENT NO. 4
LABORATORY TESTING PROGRAM

1. LABORATORY TESTING

Laboratory testing was performed as part of the MFFF site geotechnical investigation in parallel with the field investigation. All testing was performed in accordance with the procedure outlined in DCS document number DCS01-WRS-DS-SPE-G-00003-A. The objective of the laboratory testing program was to characterize the index and engineering properties of the site soils for design purposes. Samples were selected for testing based on a review of the boring and CPT data performed during the MFFF site investigation. Revisions to the testing program were made as necessary, based on observations made in the laboratory. Testing conducted (and procedures used) included:

- Visual classification (ASTM D2487-98, ASTM D2488-93);
- Moisture content (ASTM D2216-98);
- Unit weight (DCS01-WRS-DS-SPE-G-00003-A);
- Specific gravity (ASTM D854-98);
- Particle-size analysis (ASTM D422-63R98, ASTM D1140-97);
- Plasticity (ASTM D4318-98);
- Static shear strength (ASTM D4767-95);
- Consolidation parameters (ASTM D2435-96); and
- Dynamic properties (ASTM D3999-91, ASTM D4015-92).

The laboratory testing was performed by the LAWGIBB Group in their soil testing laboratory located in Atlanta, Georgia.

The laboratory test results are presented in this Attachment. The laboratory test results for each test category are presented individually for each boring location and are separated into following test categories:

- Atterberg Limits;
- Sieve and Hydrometer Analysis;
- One-Dimensional Consolidation Tests; and
- Resonant Column and Cyclic Triaxial Tests.

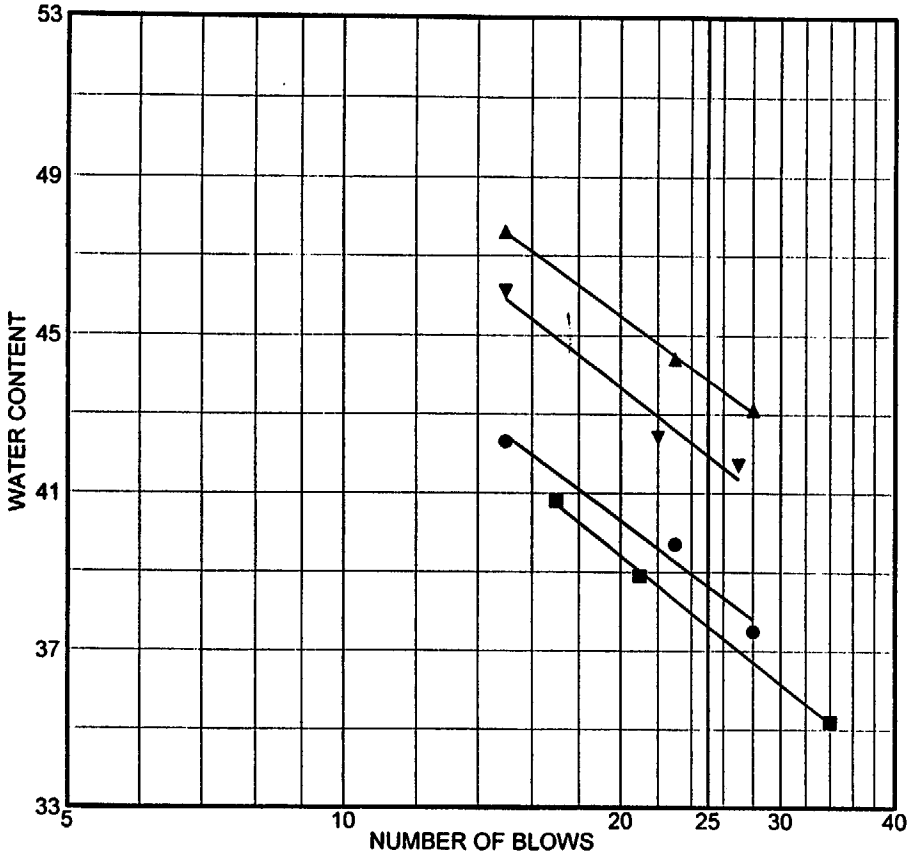
2. LABORATORY QUALITY ASSURANCE

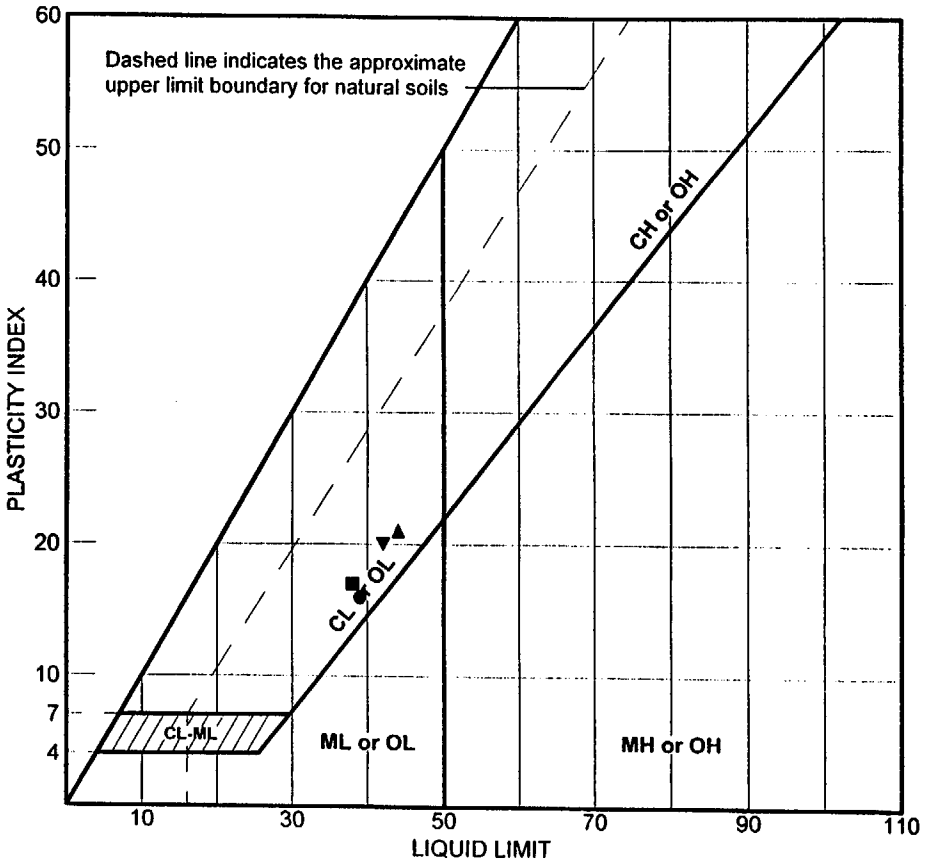
The LAWGIBB Quality Assurance Manager was responsible for ensuring that the QA procedures outlined in DCS document number DCS01-WRS-DS-SPE-G-00003-A were followed. An audit of the LAWGIBB testing laboratory was conducted by DCS QA personnel prior to the beginning of sample testing to ensure that the testing facilities and procedures conformed to the DCS QA requirements. Throughout the time period over which the testing was conducted, the DCS lead and/or field geotechnical engineers periodically visited the laboratory to review the testing program and procedures, and provide guidance as necessary.

ATTERBERG

LIMITS

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-1	2	8-9.5'	8/22/00		Brown		39	16
■	Boring BH-1	4	18-19'	8/22/00		Brown		38	17
▲	Boring BH-1	7A	33-33.9'	8/22/00	SC	Tan Brown Clayey sand	22.5	44	21
◆	Boring BH-1	8	38-38.6'	8/18/00		Brown		NV	NP
▼	Boring BH-1	18-2	93.4-94.5	8/22/00	SC	Tan Brown Clayey sand	34.0	42	20

Client Duke Cogema Stone & Webster (DCS)

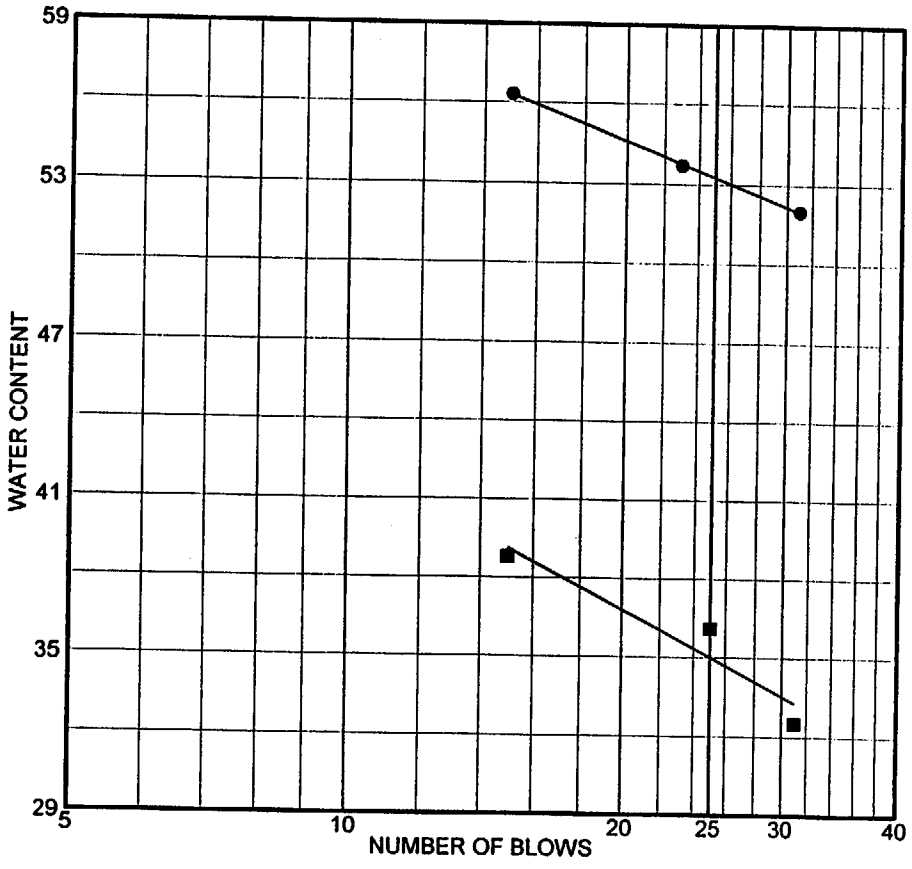
Project MOX Fuel Fabrication Facility

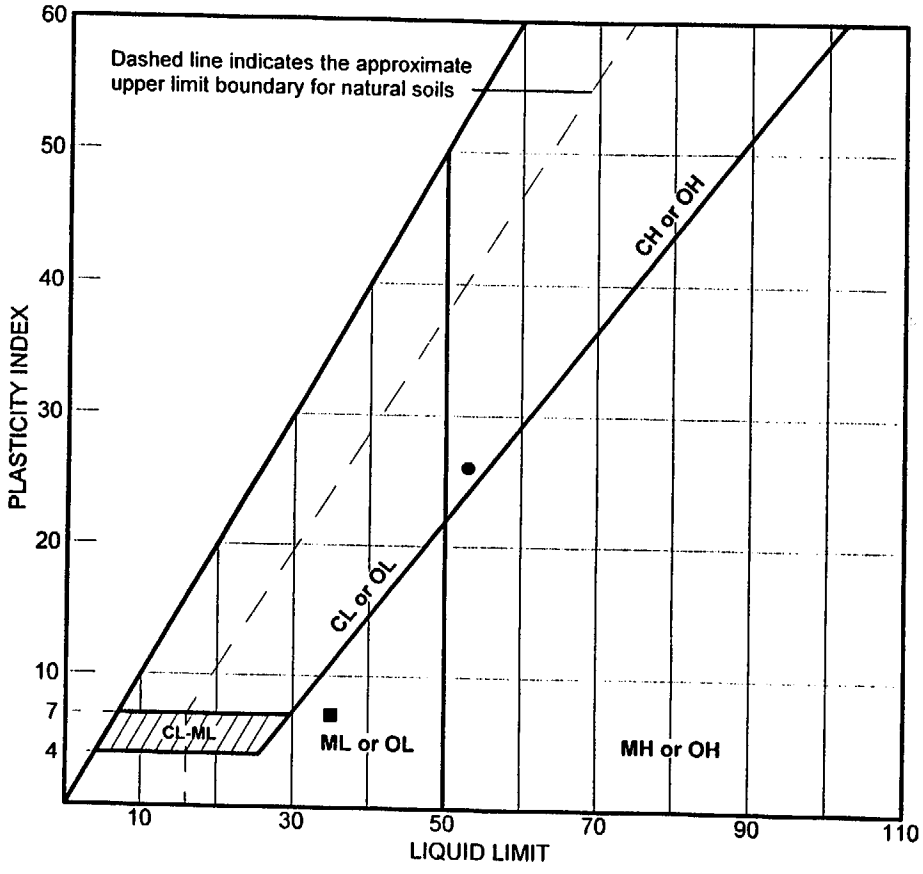
Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

- ● Tested by:SC/CS Reviewed by HJ
- ■ Tested by: SC/CS Reviewed by: HJ
- ▲ Tested by:WFL/SC Reviewed by: HJ
- ◆ Tested by: SC Reviewed by: HJ
- ▼ Tested by: SC/JTM Reviewed by: HJ

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-1	23A	118-118.8'	8/30/00	SC	Red Brown Clayey sand	33.0	53	26
■	Boring BH-1	25	128-129.5'	8/22/00	SM	Brown Silty sand	32.8	35	7

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

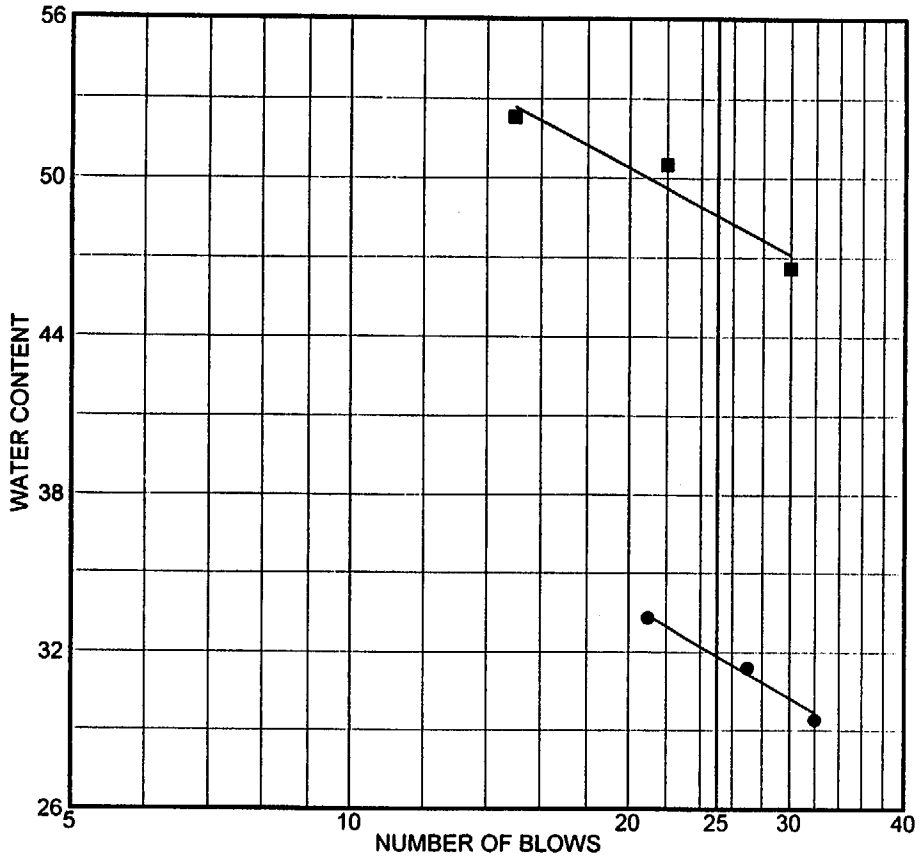
Project No. 50160-0-3963 | Plate

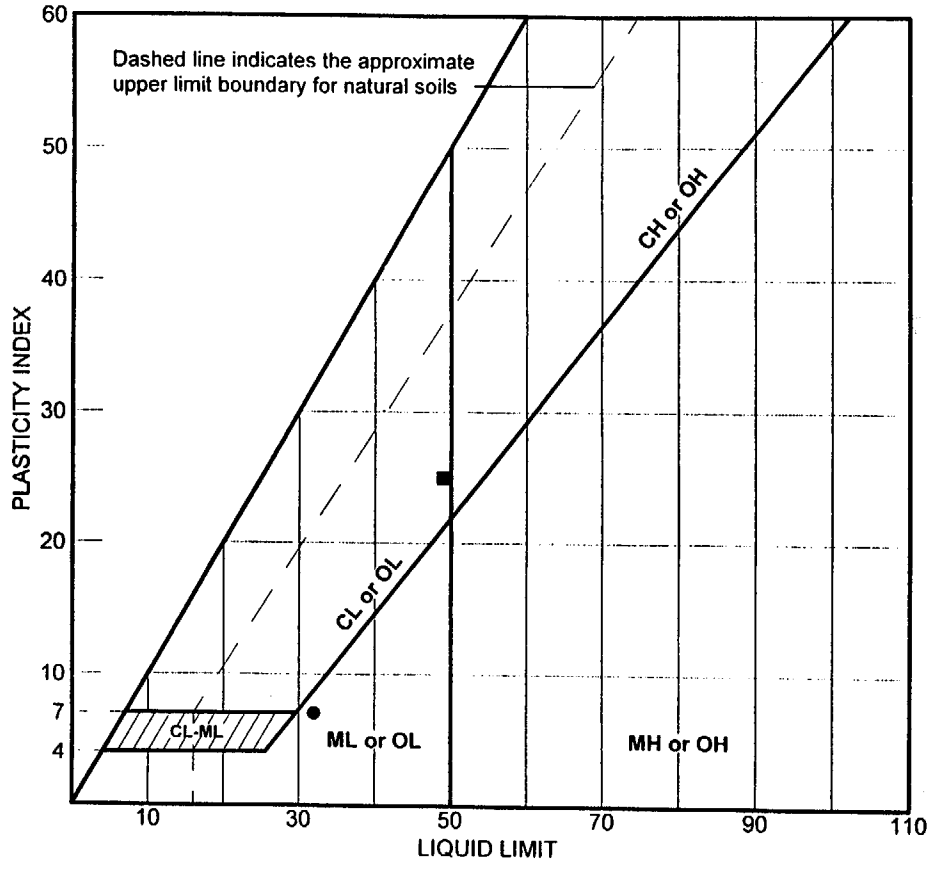
LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

● Tested by: SC/WFL Reviewed by: HJ

■ Tested by: JTM/SC Reviewed by: HJ

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-2	14	68.5-69'	9/1/00		Tan Brown Silty sand	35.7	32	7
■	Boring BH-2	22	103.5-104'	8/23/00	SC	Tan Brown Clayey sand	31.4	49	25

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

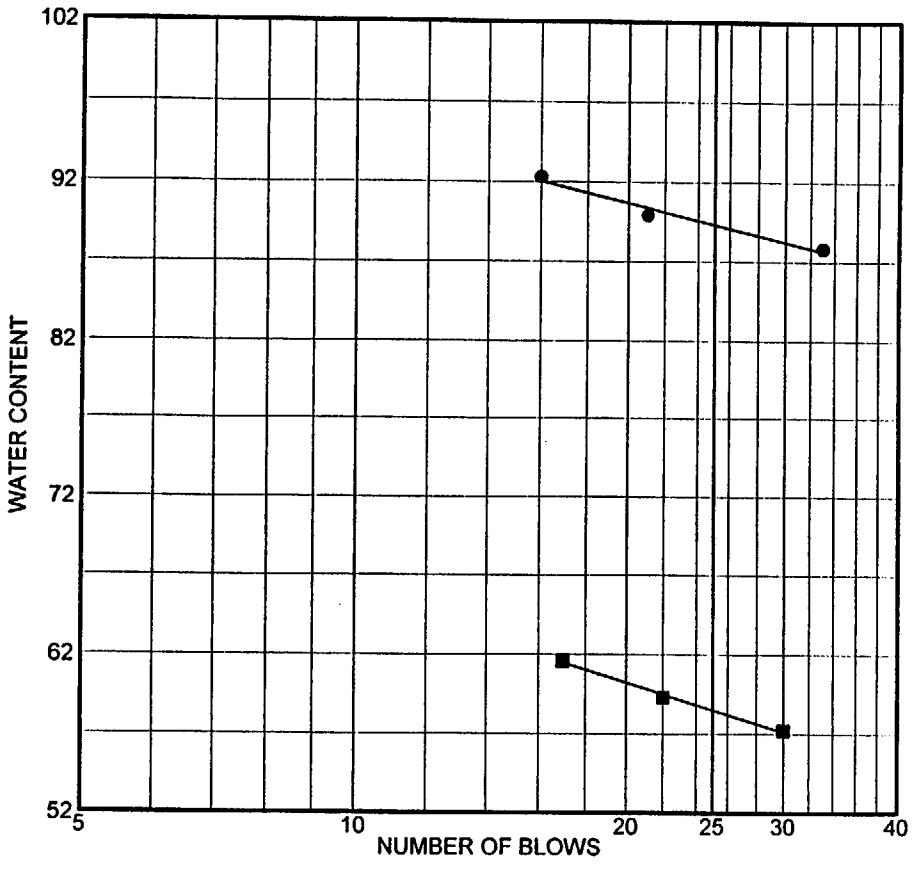
Project No. 50160-0-3963 | Plate

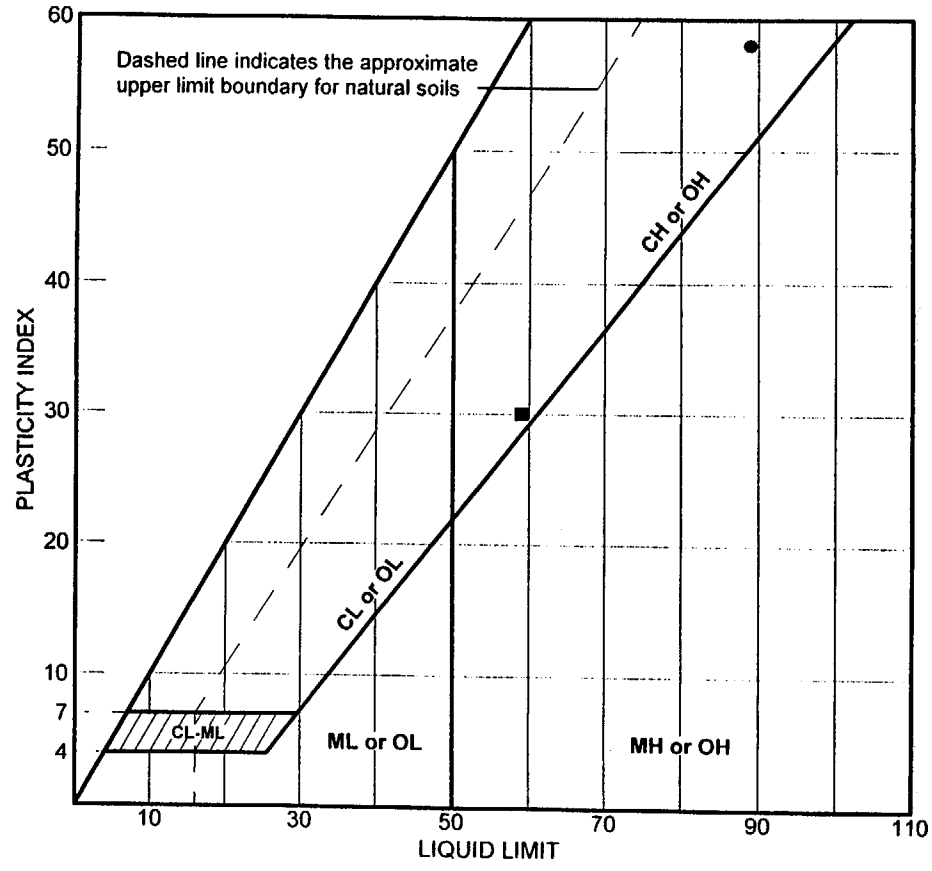
LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

● Tested by:SC/WFL Reviewed by: HJ

■ Tested by: WFL/SC/JTM Reviewed by: HJ

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-2	15	70-72'	9/13/00	SC	Tan Brown Clayey sand		89	58
■	Boring BH-2	21 (top)	96-98'	9/25/00	SC	Tan Clayey sand		59	30

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 5016003963 | Plate

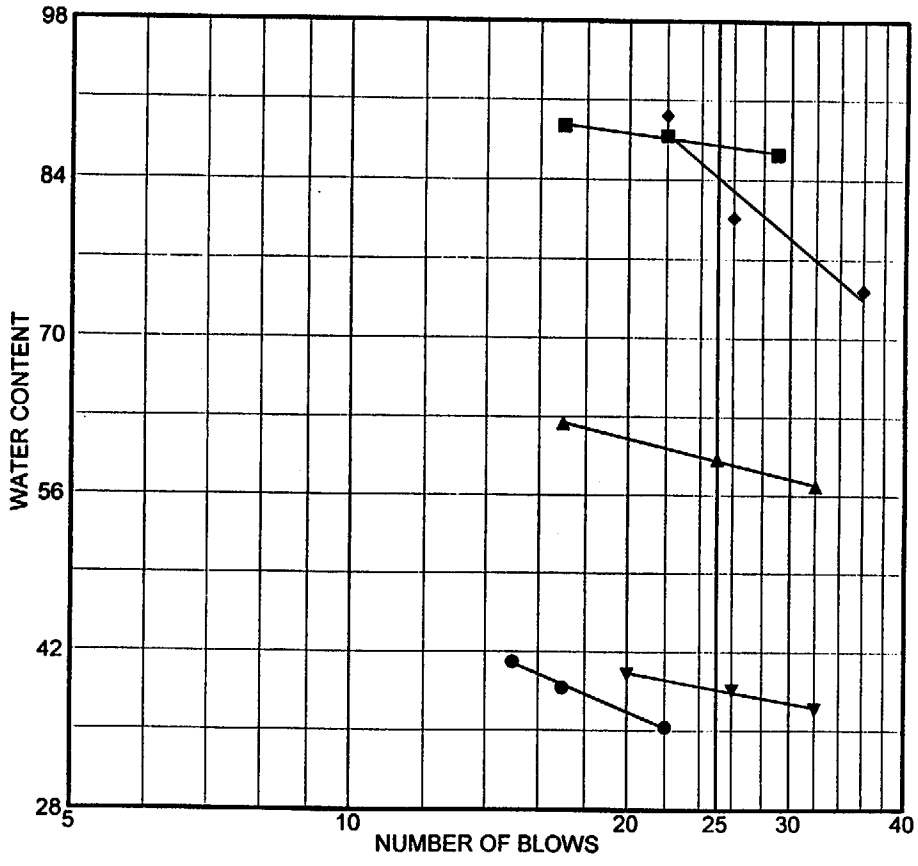
LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

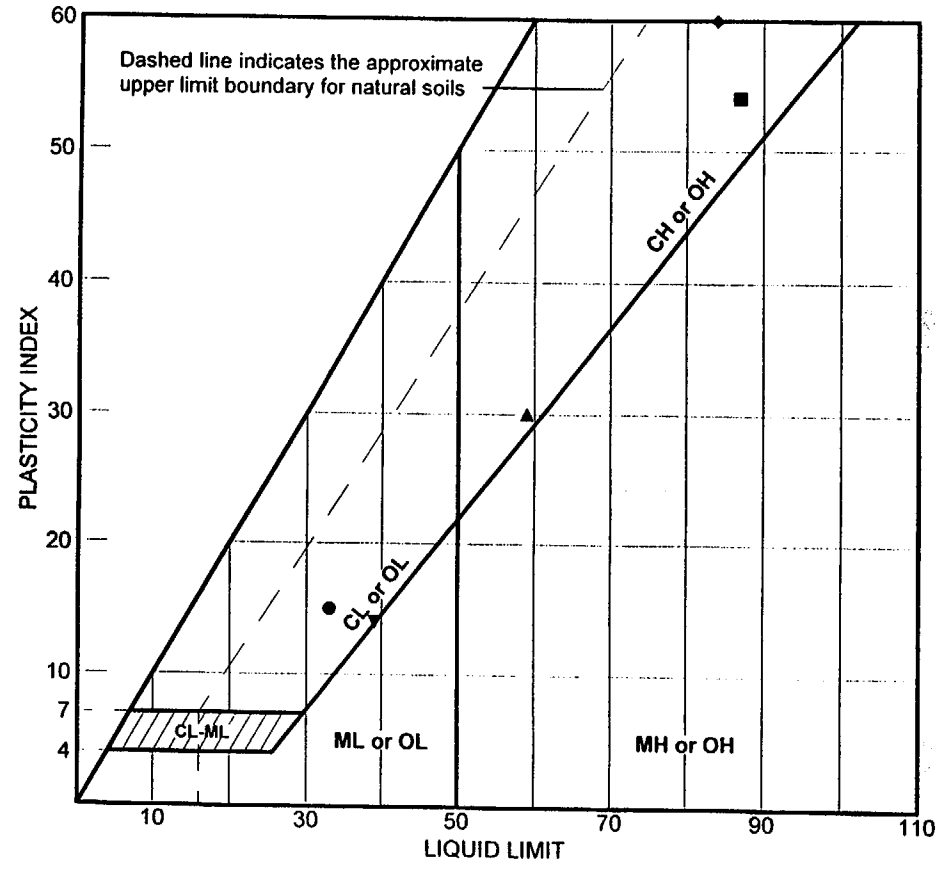
● Tested by: SC/WFL Reviewed by: HJ

■ Tested by: WFL/SC Reviewed by: HJ

007

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-3	10A-1	48.5-49'	9/1/00	SC	Brown Clayey sand	28.3	33	15
■	Boring BH-3	10A-2	49-49.5'	8/22/00	SC	Brown Clayey sand	31.5	87	54
▲	Boring BH-3	11-1	53-53.5'	8/23/00	SC	Brown Clayey sand	34.9	59	30
◆	Boring BH-3	11-2	54-54.5'	8/23/00	SP-SC	Brown Poorly graded sand with clay	24.7	84	60
▼	Boring BH-3	14	68-69.5'	9/1/00	SP-SC	Tan Brown Poorly graded sand with clay	25.7	39	14

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

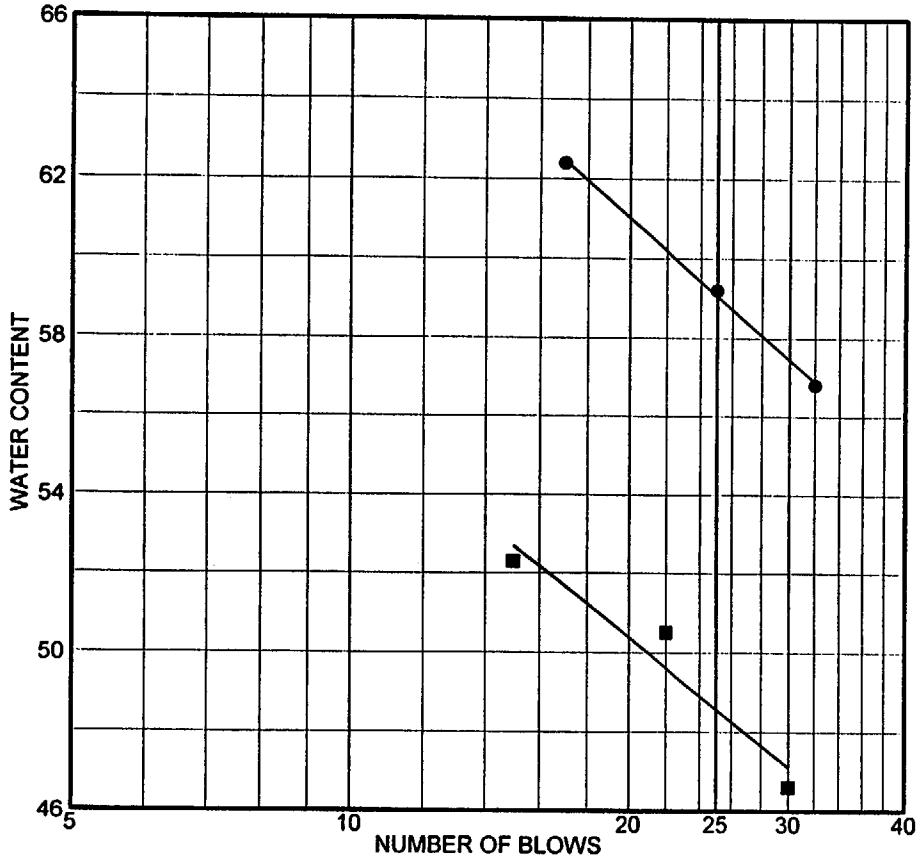
Project No. 50160-0-3963 | Plate

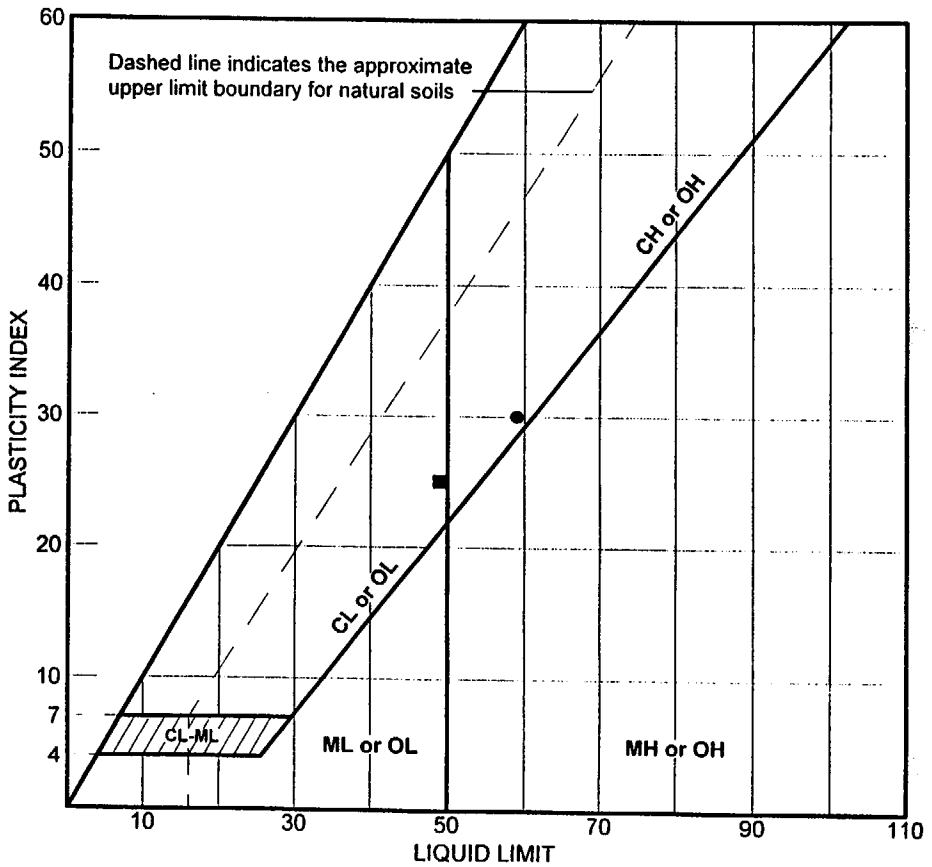
LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

● Tested by: SC/WFL Reviewed by: HJ
■ Tested by: JTM/SC Reviewed by: HJ
▲ Tested by: WFL/SC/JTM Reviewed by: HJ
◆ Tested by: JTM/SC/WFL Reviewed by: HJ
▼ Tested by: SC/WFL Reviewed by: HJ

800

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-3	11-1	53-53.5'	8/23/00	SC	Brown Clayey sand	34.9	59	30
■	Boring BH-2	22	103.5-104'	8/23/00	SC	Tan Brown Clayey sand	31.4	49	25

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

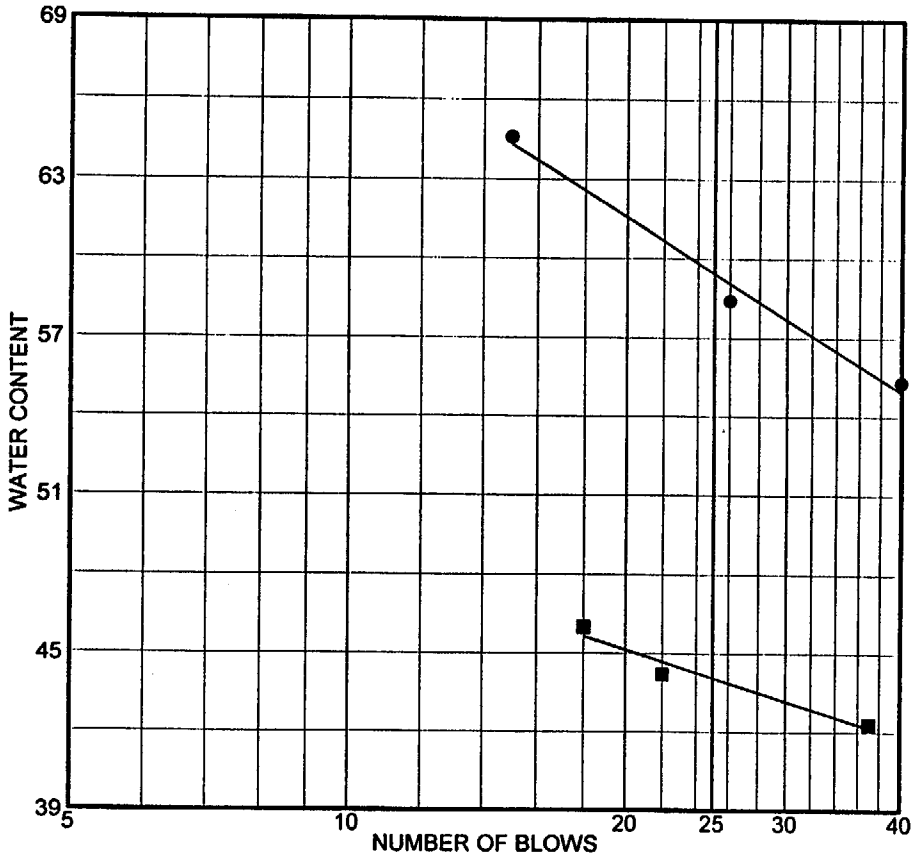
LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

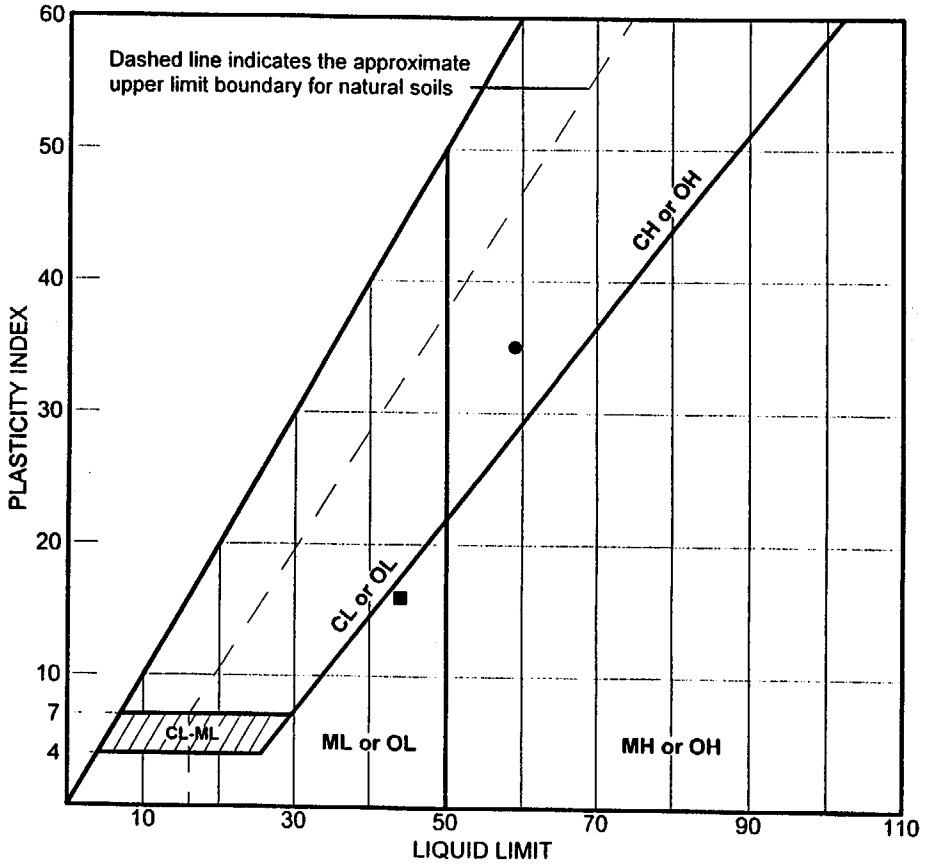
● Tested by: WFL/SC/JTM Reviewed by: HJ

■ Tested by: WFL/SC/JTM Reviewed by: HJ

600

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-3	17A-1	86-87.5'	8/23/00	SC	Tan & Black Clayey sand	37.7%	59	35
■	Boring BH-3	21 (Composite)	111.5-112.5'	8/31/00	SM	Brown Silty sand	33.5	44	16

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

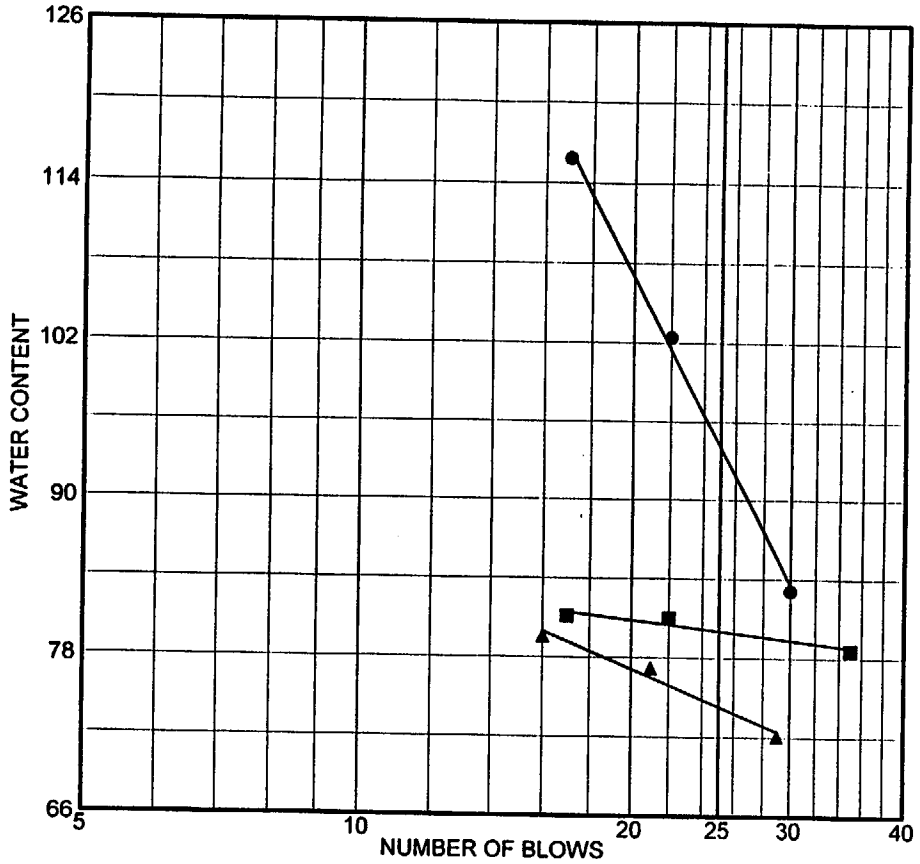
Project No. 50160-0-3963 | Plate

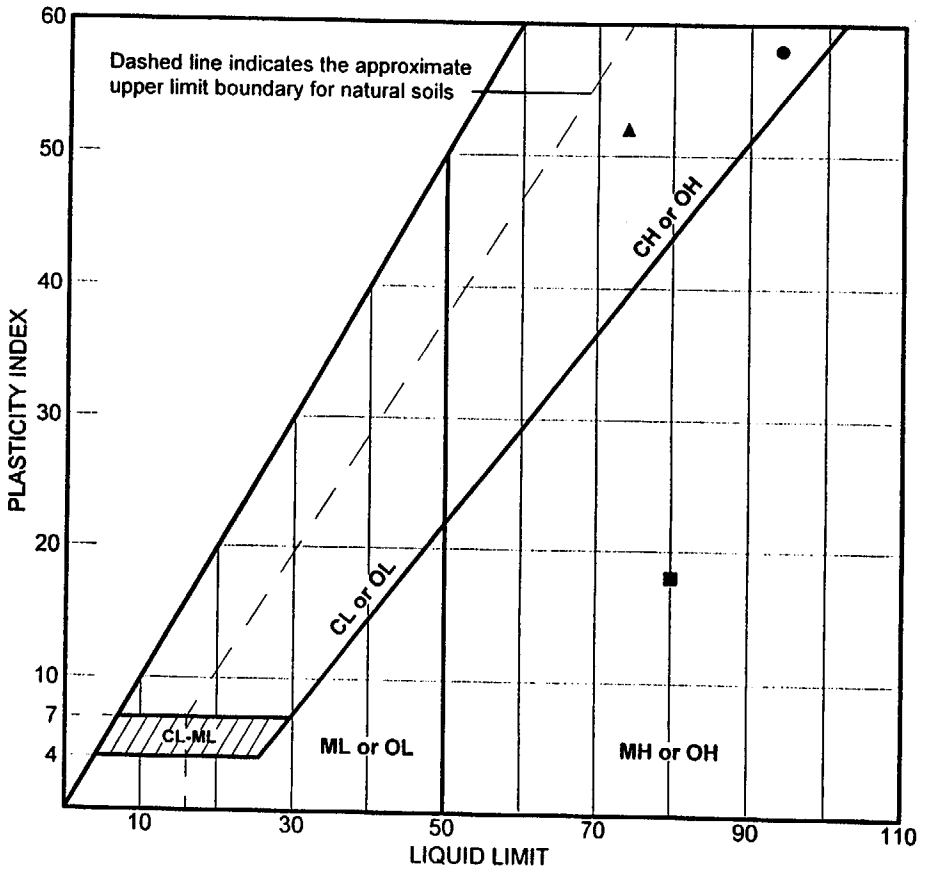
LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

● Tested by: SC/JTM/WFL Reviewed by: HJ
■ Tested by: WFL/SC Reviewed by: HJ

010

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-4	14	91-92.5'	8/22/00	SC	Tan Brown Clayey sand	26.3	94	58
■	Boring BH-4	15	97-97.5'	8/22/00	MH	Gray Brown Sandy elastic silt	67.0	80	18
▲	Boring BH-4	20	121.5-122.5'	8/22/00	SC	Brown Clayey sand	34.4	74	52
		(composite)							

Client Duke Cogema Stone & Webster (DCS)

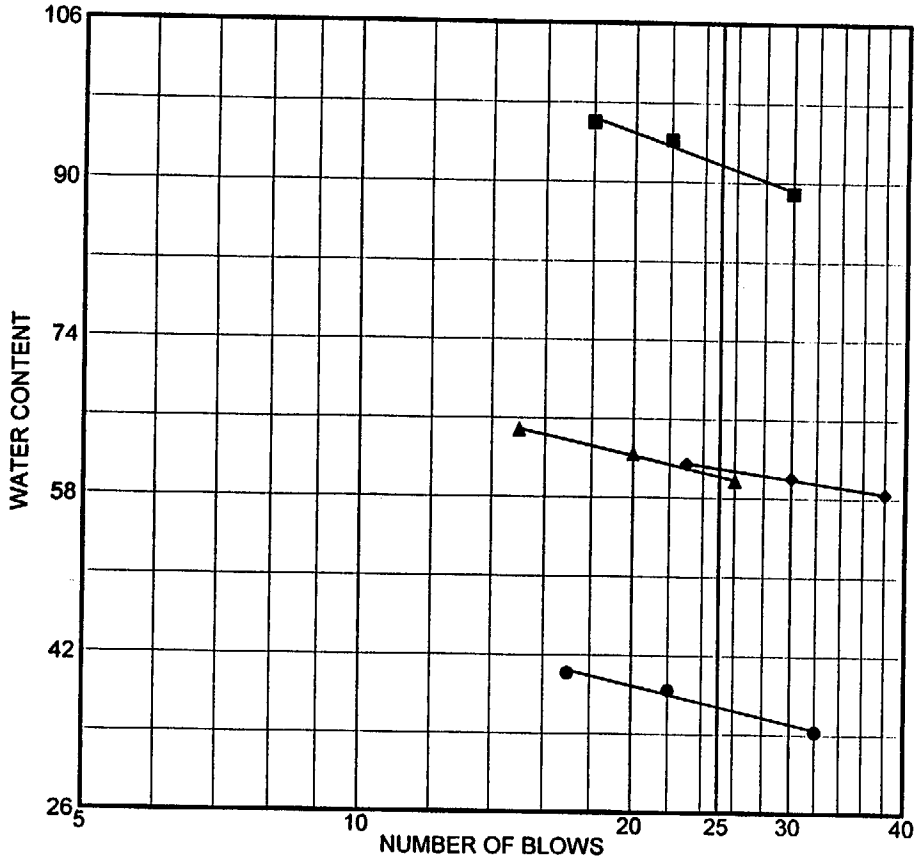
Project MOX Fuel Fabrication Facility

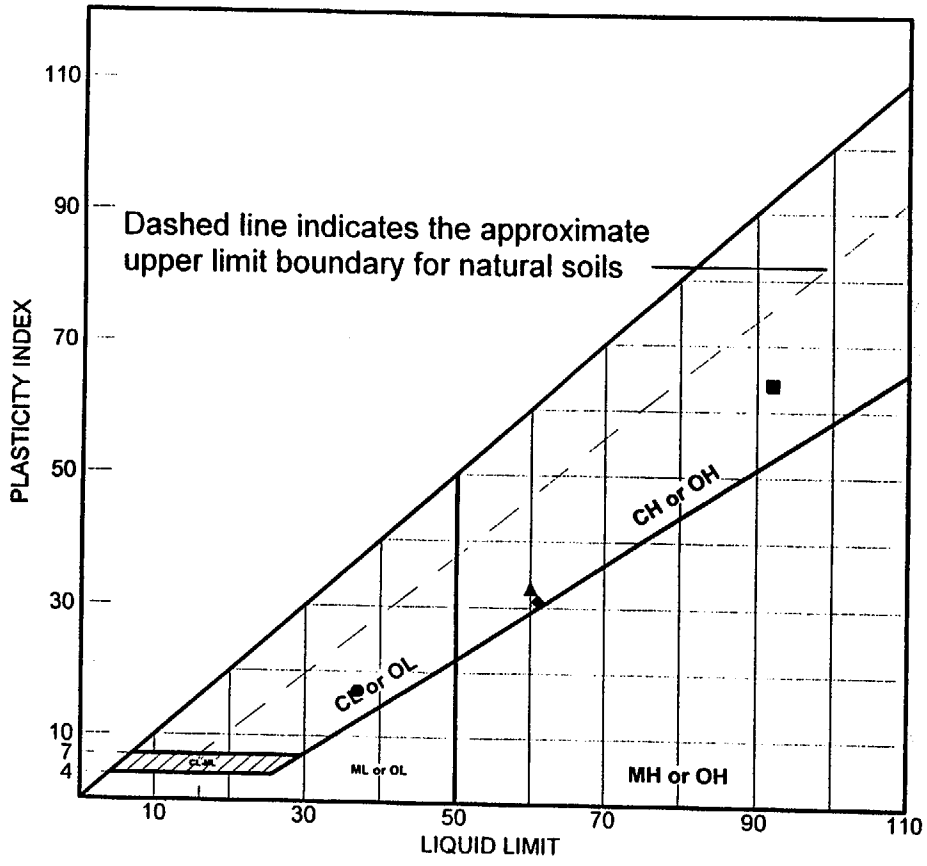
Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

● Tested by: JTM/SC Reviewed by: HJ
■ Tested by: SC/WFL Reviewed by: HJ
▲ Tested by: SC/WFL Reviewed by: HJ

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-5	5	23-23.7'	8/22/00	SC	Tan & Red Brown Clayey sand	15.4	37	17
■	Boring BH-5	13	63.25-63.75	8/22/00	CH	Red Brown Sandy fat clay	41.4	92	64
▲	Boring BH-5	20	93.5-94'	8/23/00	SC	Tan Brown Clayey sand	31.2	60	33
◆	Boring BH-5	27	123.5-124.'	8/22/00	SC	Tan Brown Clayey sand	34.6	61	31

Client Duke Cogema Stone & Webster (DCS)

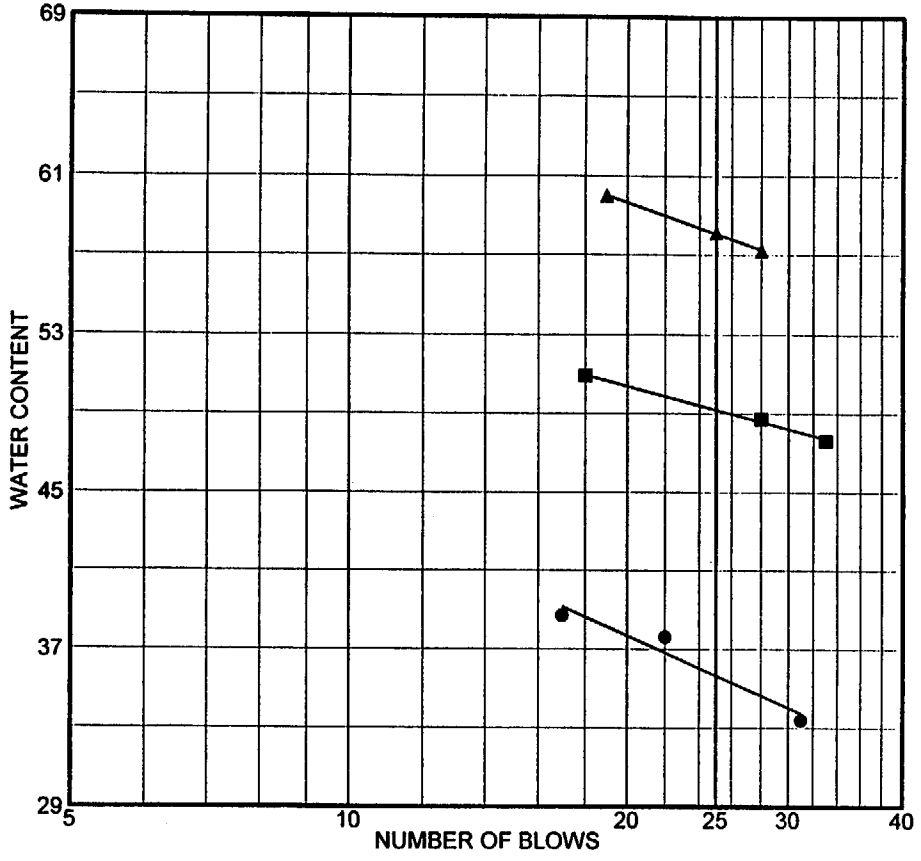
Project MOX Fuel Fabrication Facility

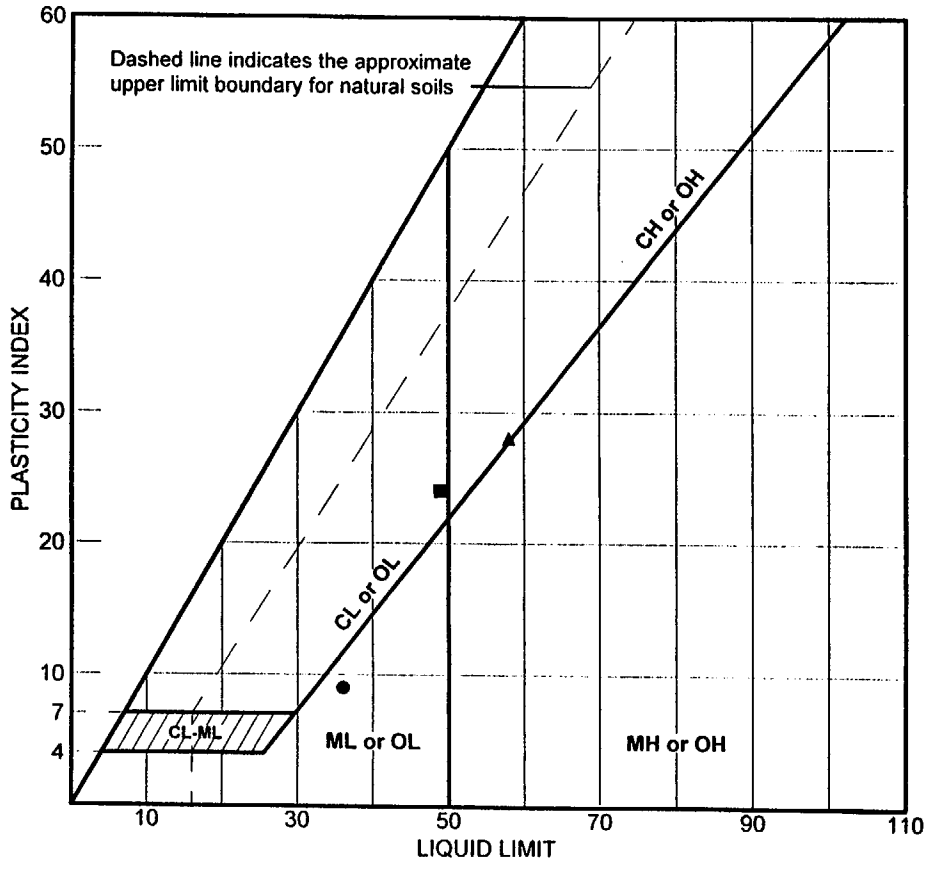
Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

● Tested by: WFL/SC Reviewed by: HJ
■ Tested by: WFL/SC Revierwed by: HJ
▲ Tested by: WFL/SC/JTM Reviewed by: HJ
◆ Tested by: SC/JTM Reviewed by: HJ

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-6	13A-1	76.5-77.0'	8/22/00	SM	Brown Silty sand	37.6	36	9
■	Boring BH-6	18A	100.5-102.0'	8/23/00	SC	Tan Brown Clayey sand	39.7	49	24
▲	Boring BH-6	19	106.5-107.5'	8/23/00	CH	Tan Brown Sandy fat clay	34.6	58	28

Client Duke Cogema Stone & Webster (DCS)

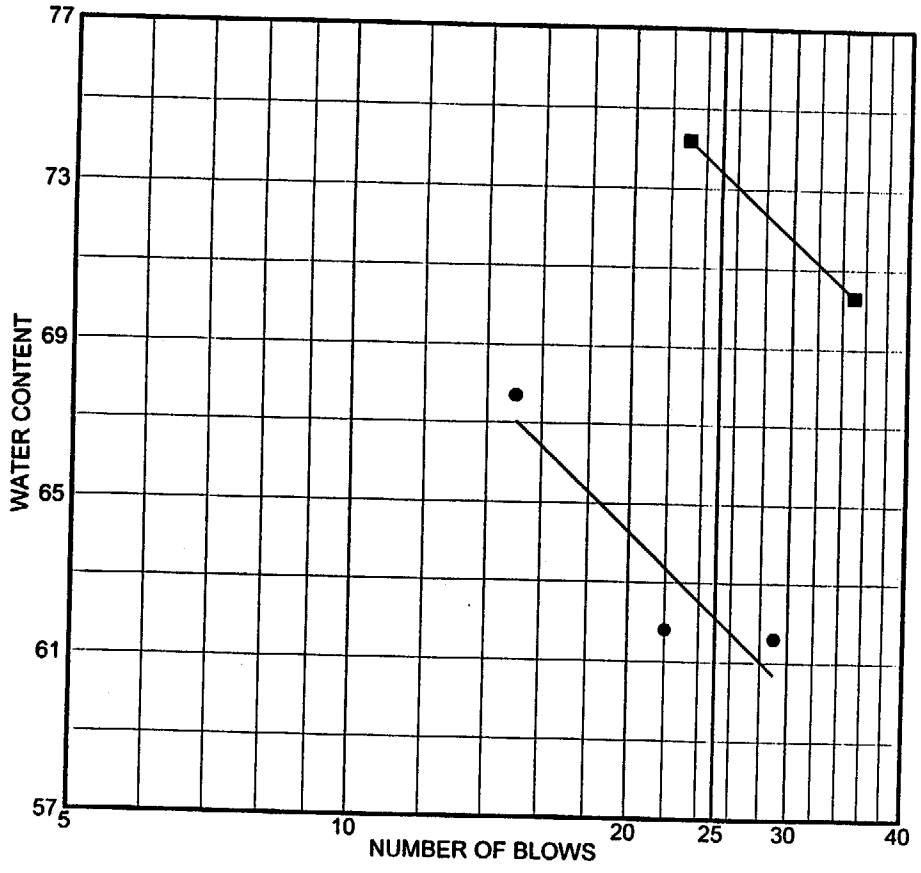
Project MOX Fuel Fabrication Facility

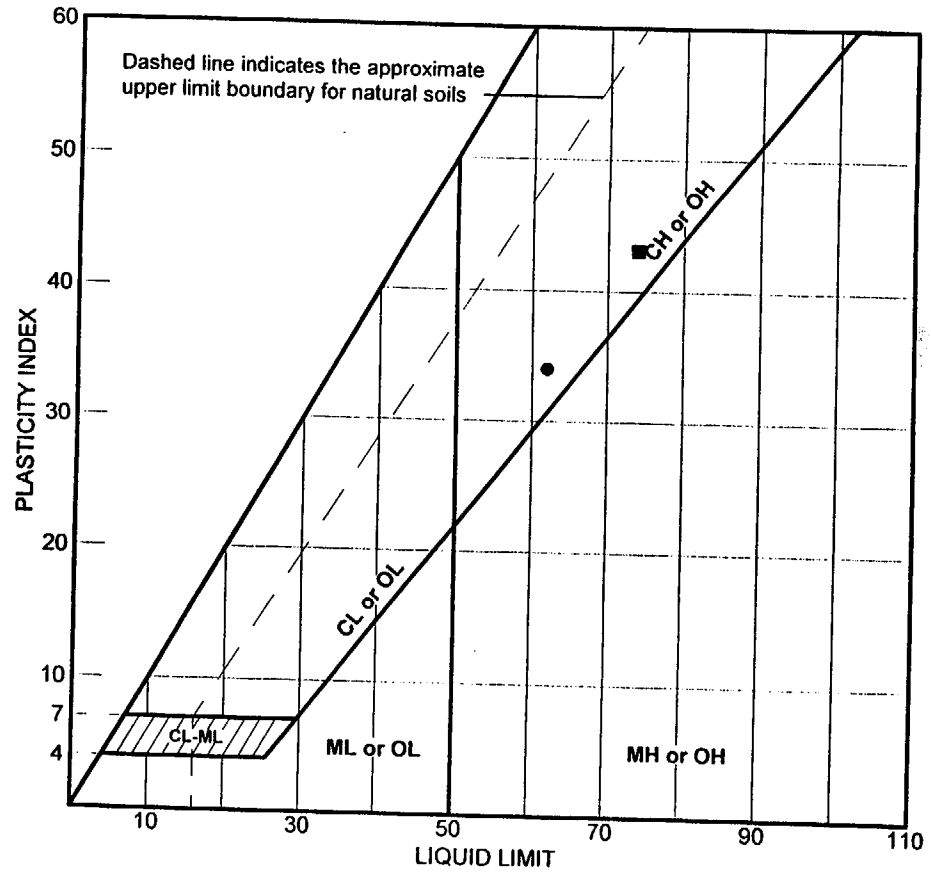
Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

● Tested by: WFL/SC Reviewed by: HJ
■ Tested by: WFL/JTM/SC Reviewed by: HJ
▲ Tested by: JTM/WFL Reviewed by: HJ

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-7	17	83-84.4'	8/22/00	SC	Tan Brown Clayey sand	32.5	62	34
■	Boring BH-7	21	103-104.5'	8/29/00	SC	Tan Brown Clayey sand	30.1	74	43

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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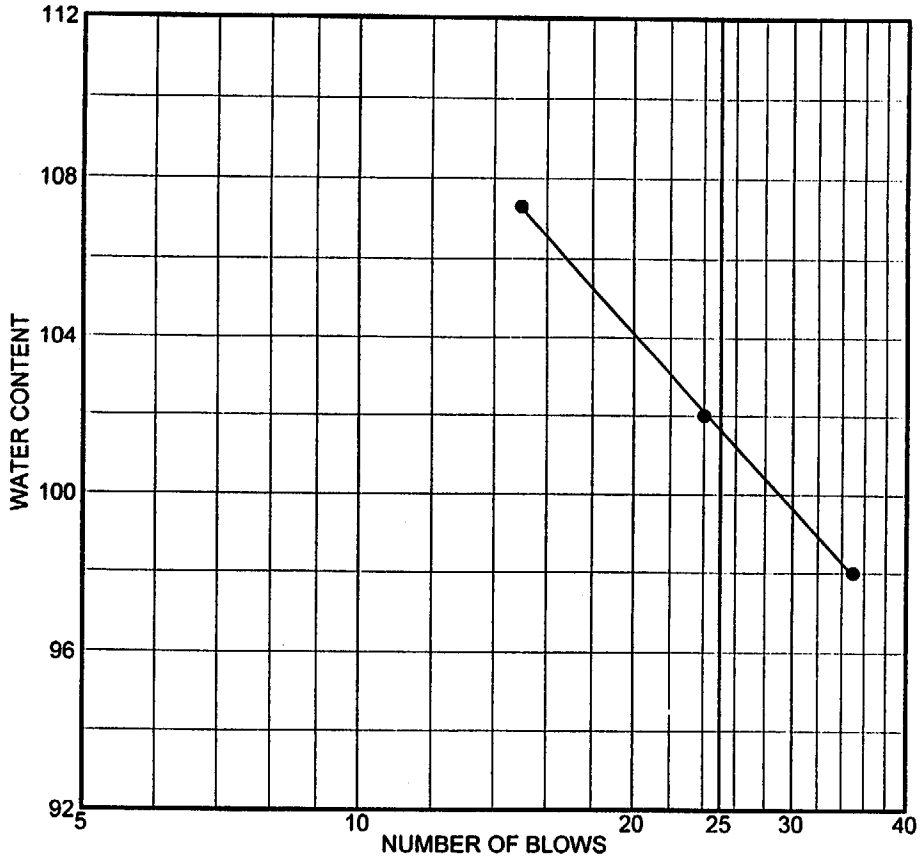
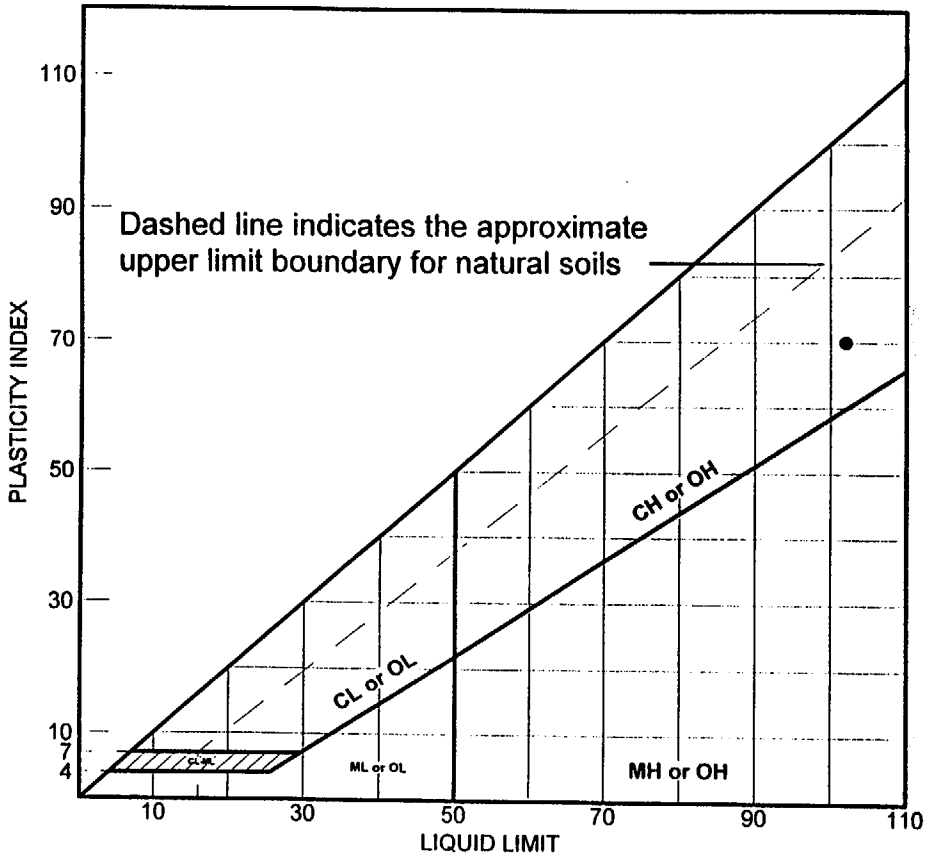
■ Tested by: WFL/SC Reviewed by: HJ

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-8	21 (composite)	106.3-107.5	8/22/00	SC	Tan Brown Clayey sand	37.3	102	70

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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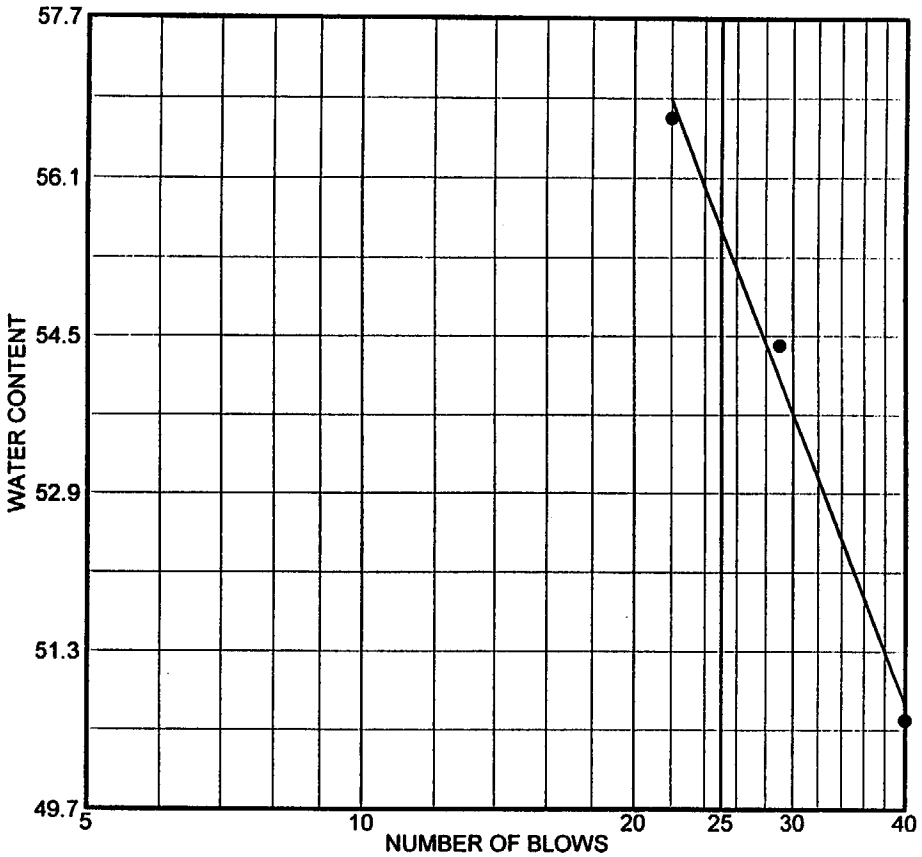
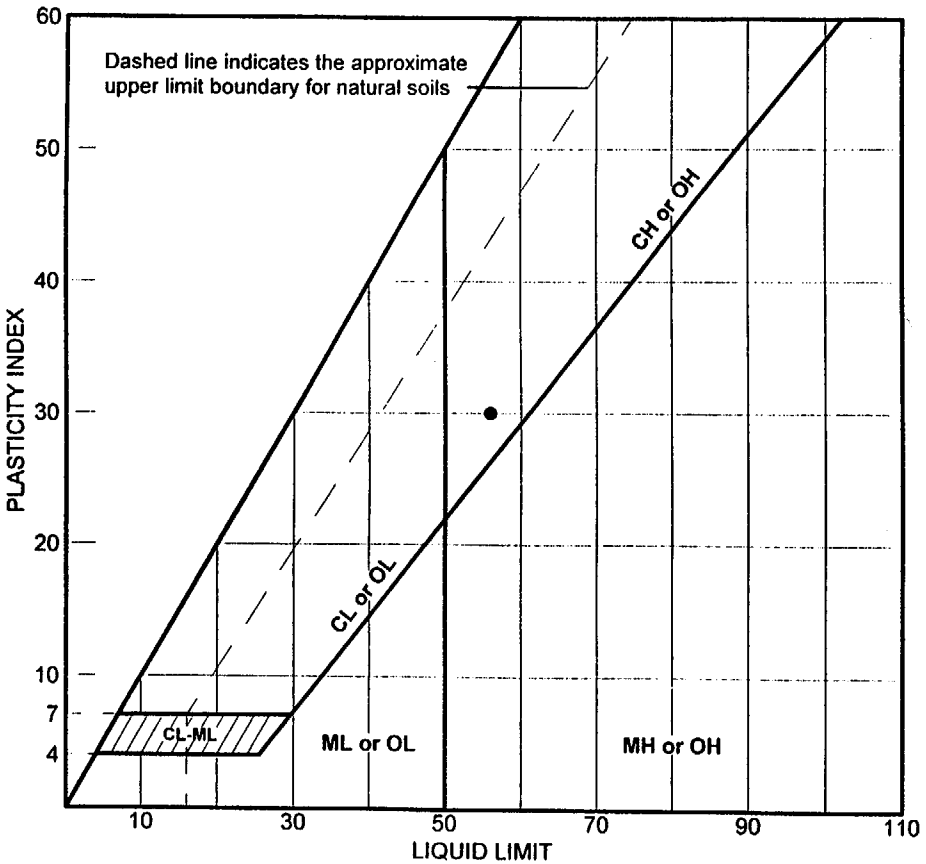
LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-8	27	136-137.5	8/17/00	SC	Brown Clayey sand	35.4	56	30

Client Duke Cogema Stone & Webster (DCS)

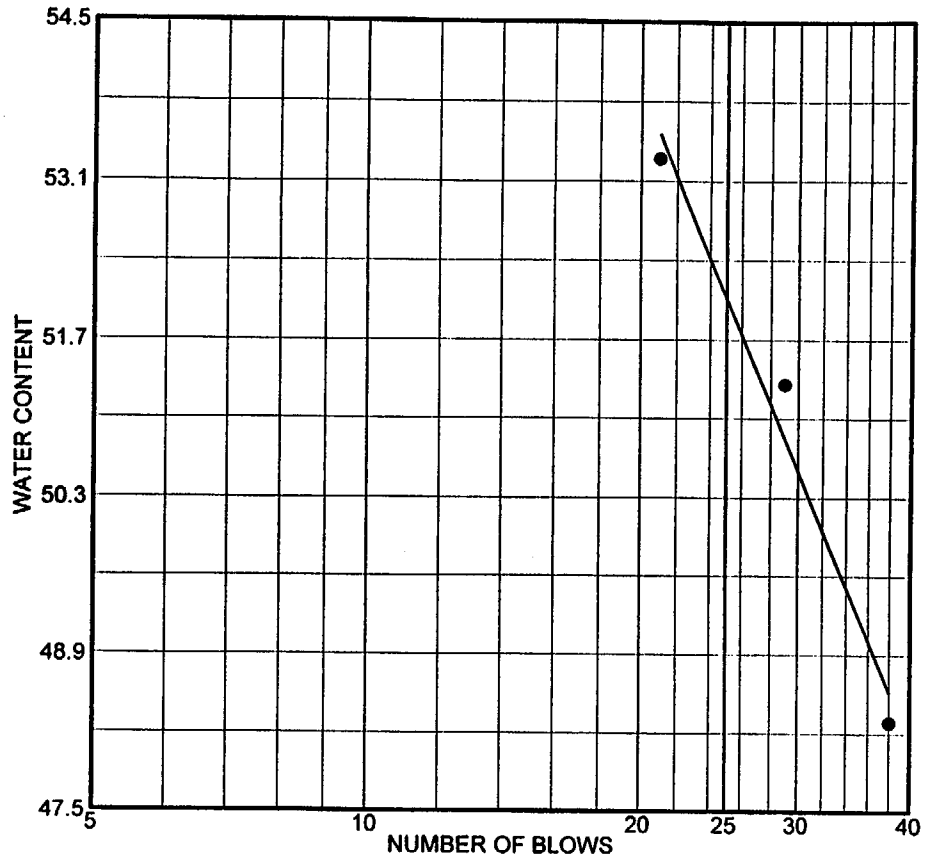
Project MOX Fuel Fabrication Facility

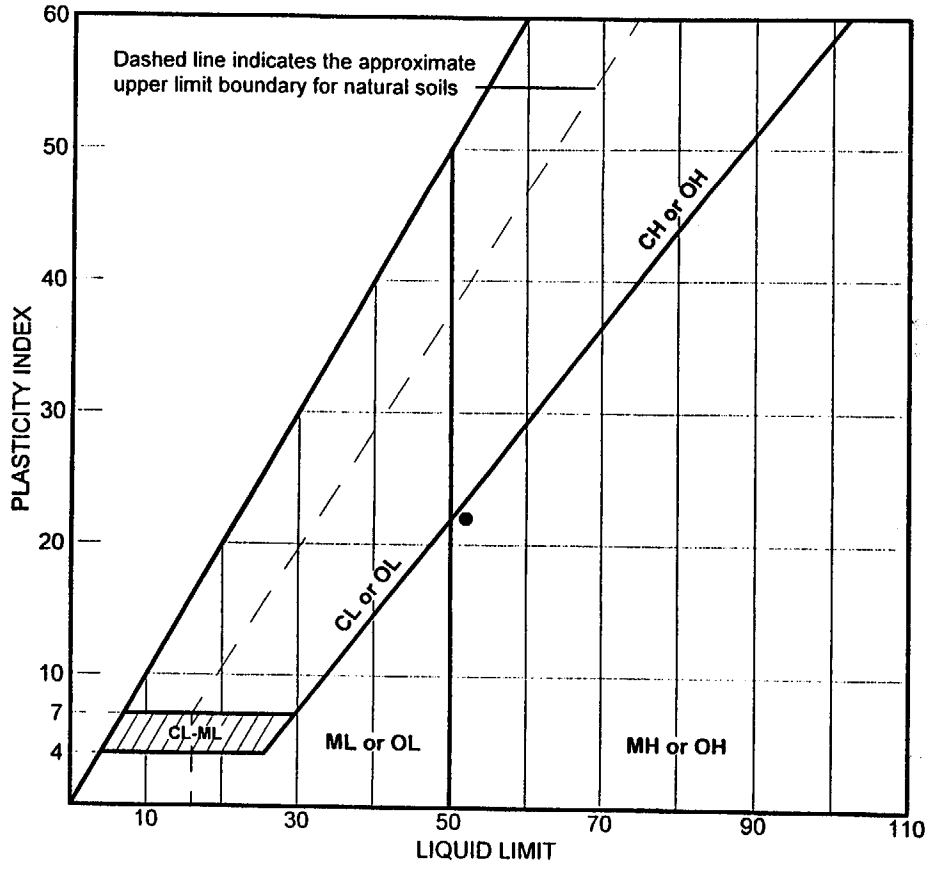
Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

● Tested by: SC Reviewed by: HJ

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-9	14	71.5-72.5'	8/22/00	SM	Brown Silty sand	29.2	52	22

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Project MOX Fuel Fabrication Facility

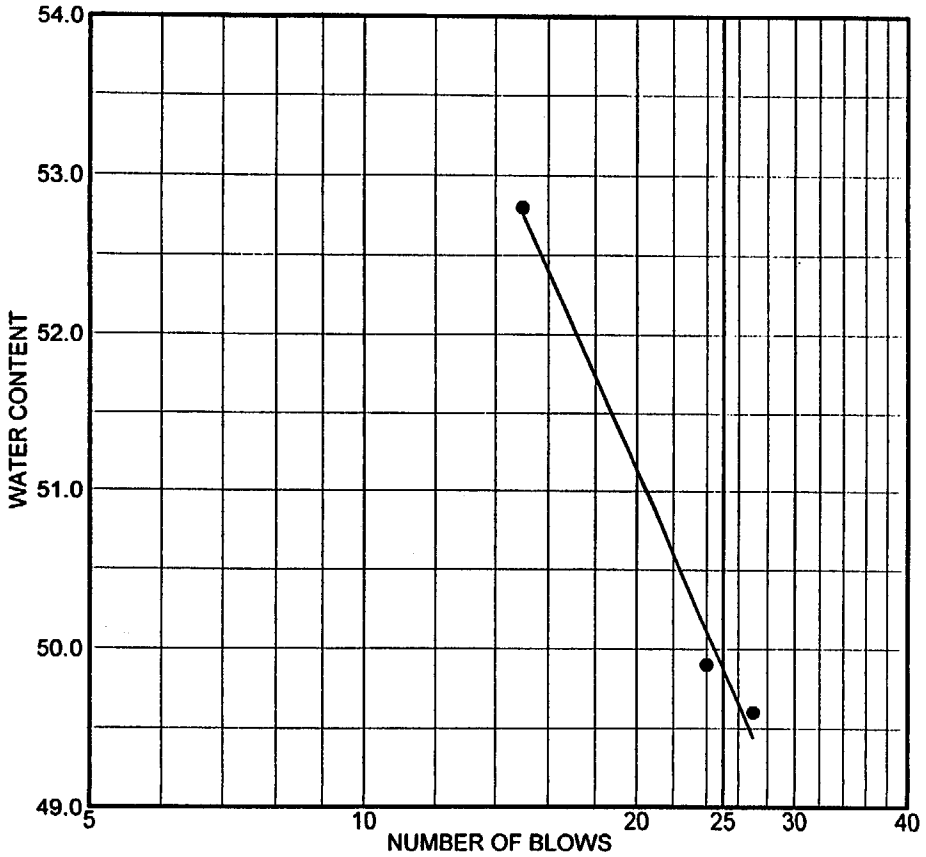
Project No. 50160-0-3963 | Plate

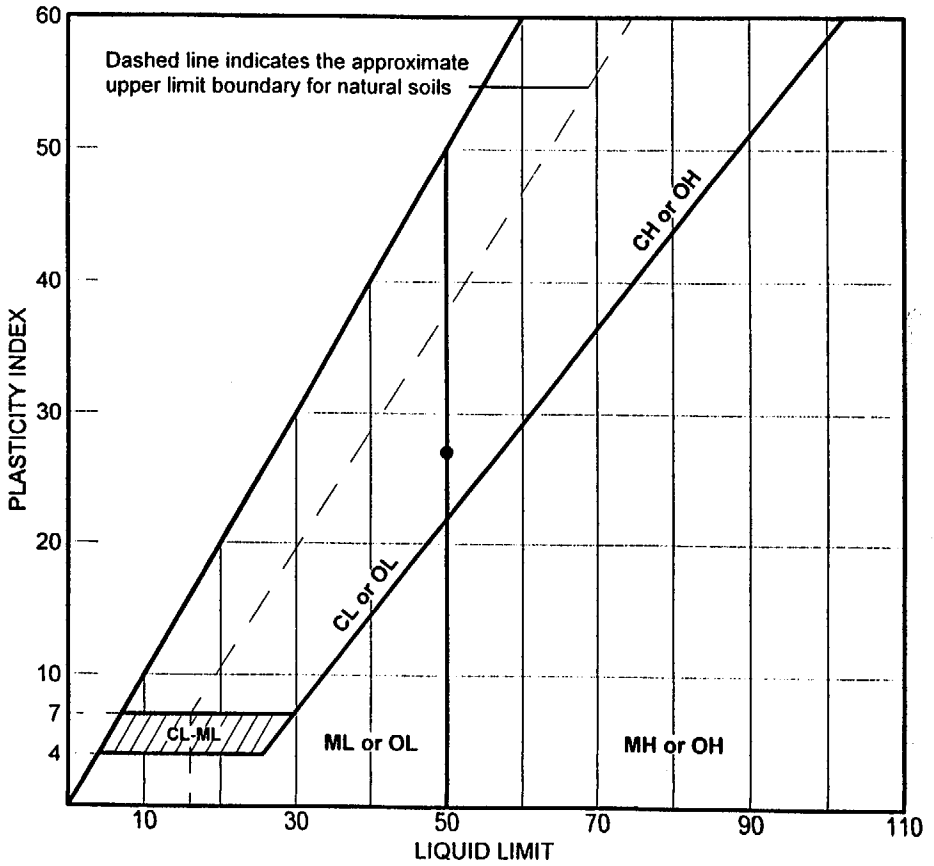
LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

● Tested by: WFL/JTM Reviewed by: HJ

017

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-9	25	126-127.5'	8/17/00	SC	Tan Brown Clayey sand		50	27

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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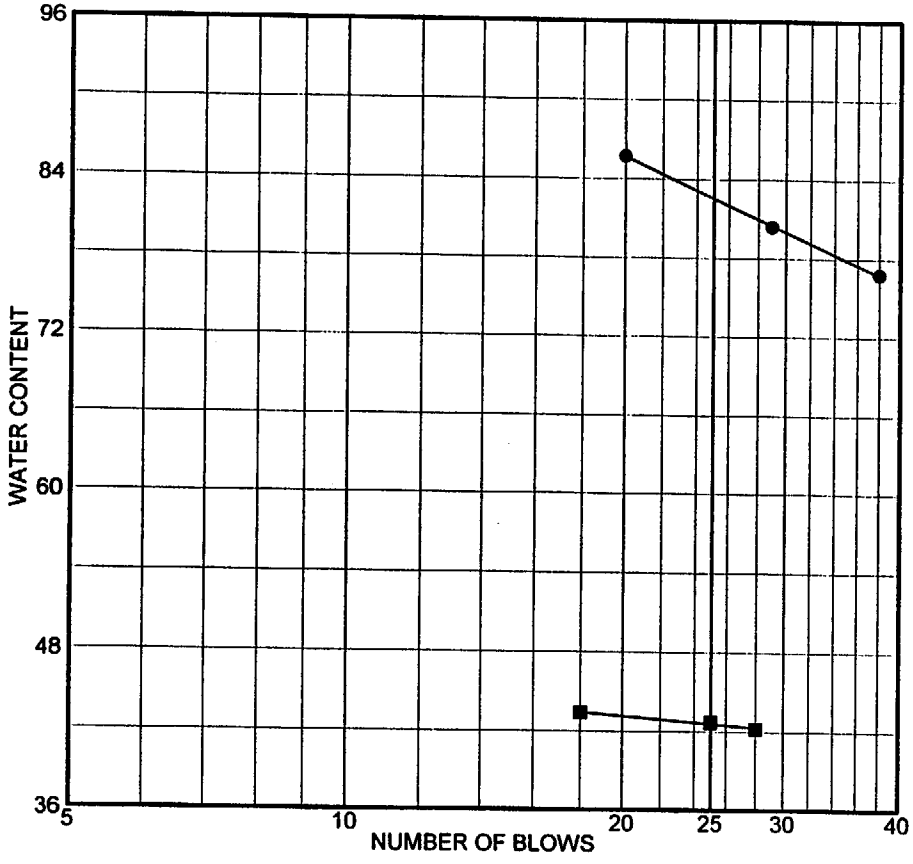
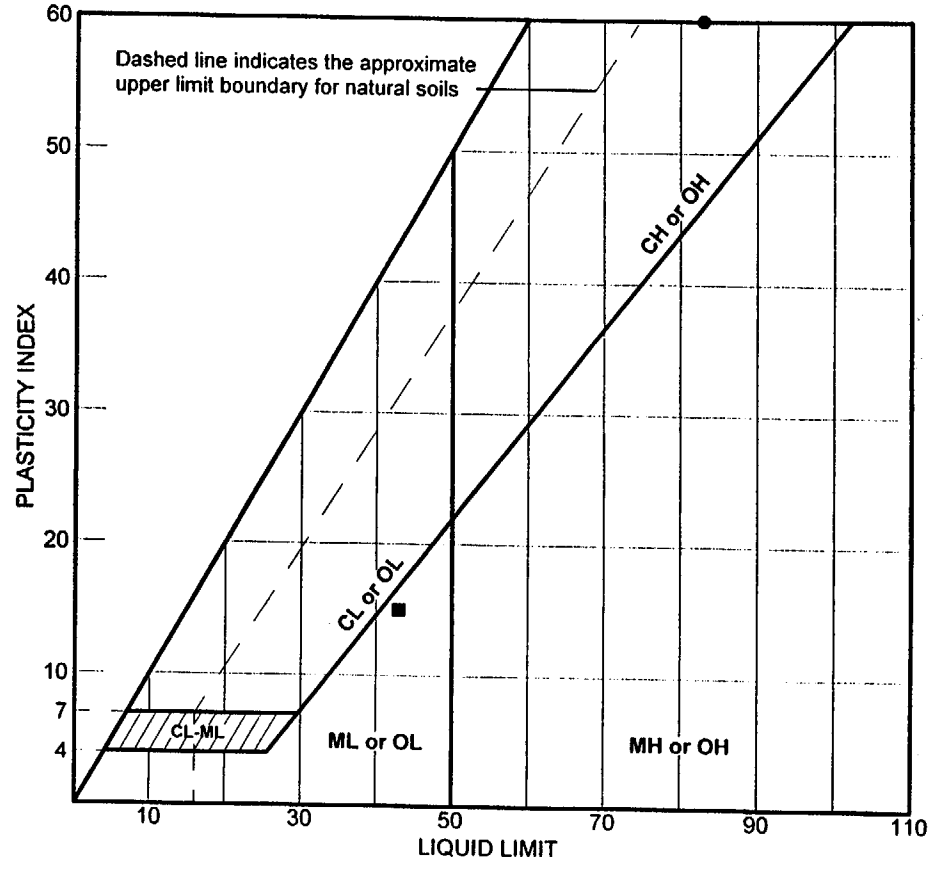
LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-10	19	98-99.5'	8/31/00	SC	Brown Clayey sand	28.5	83	60
■	Boring BH-10	24	124.5-125'	8/22/00	SM	Tan Silty sand	32.8	43	15

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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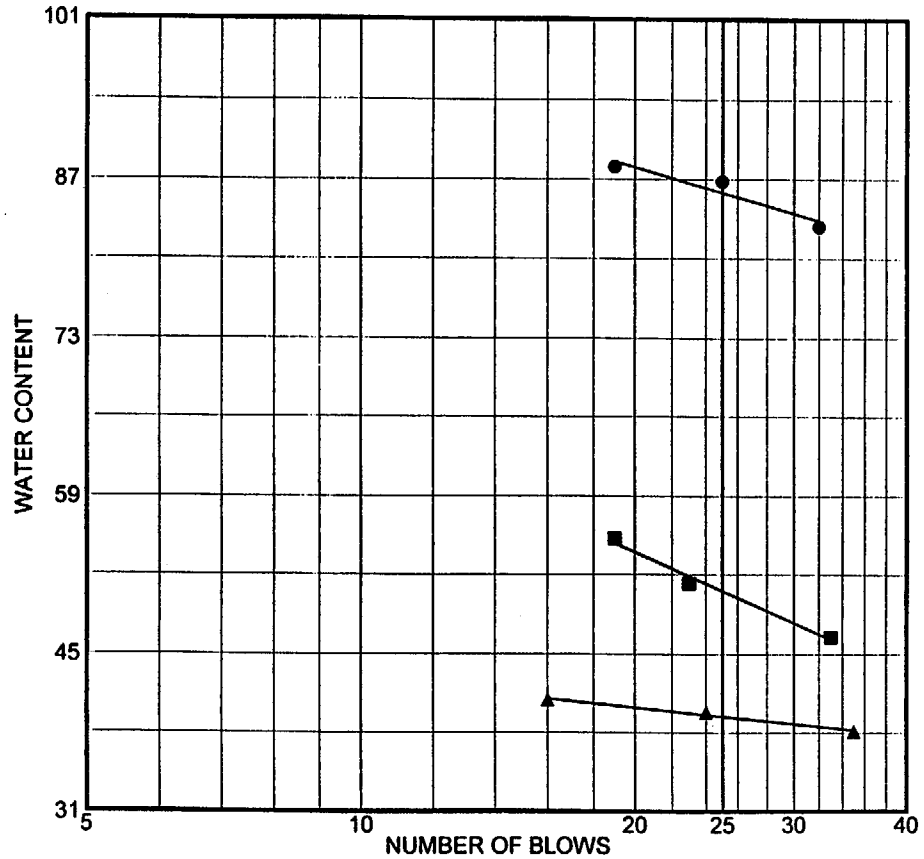
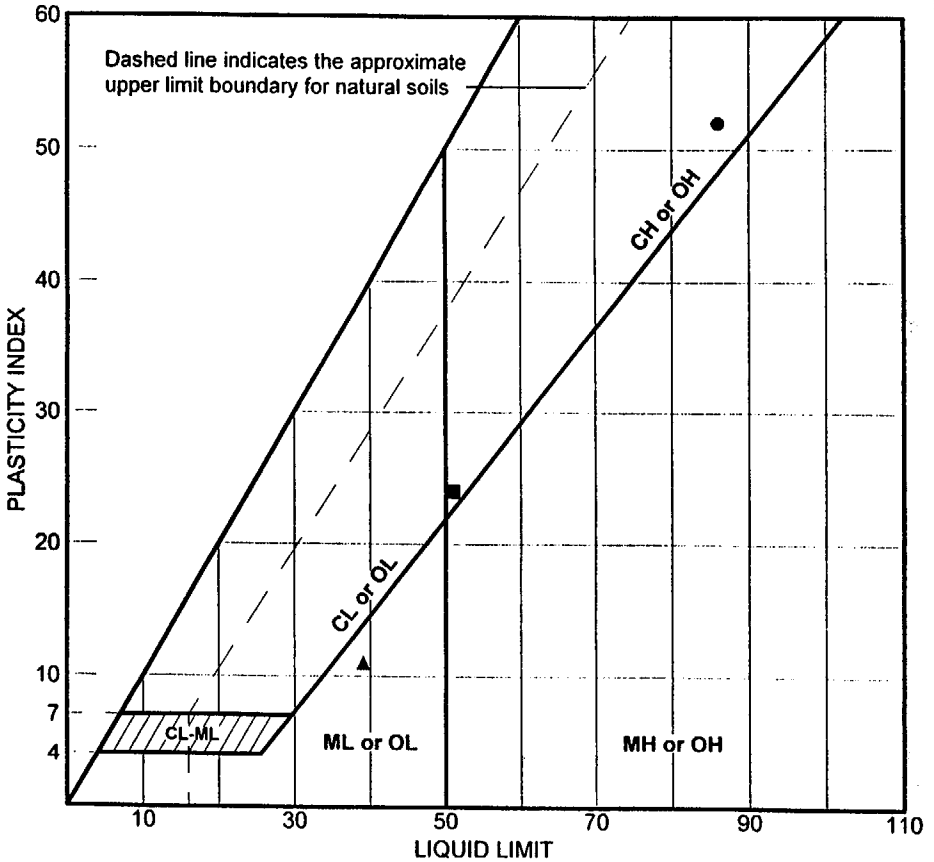
LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-11	10	98-99.5'	8/29/00	SC	Tan Clayey sand	37.6	86	52
■	Boring BH-11	19	143-144.5'	8/23/00	SC	Brown Clayey sand	31.7	51	24
▲	Boring BH-11	21A	153-154.5'	8/29/00	ML	Tan Sandy silt	32.7	39	11

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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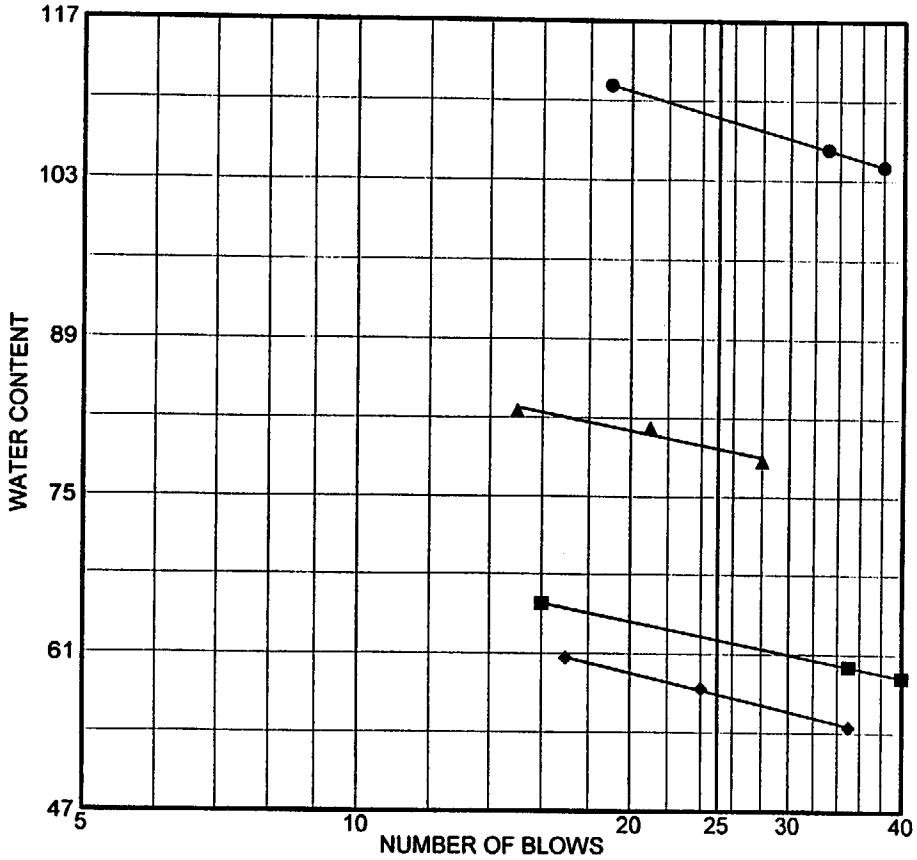
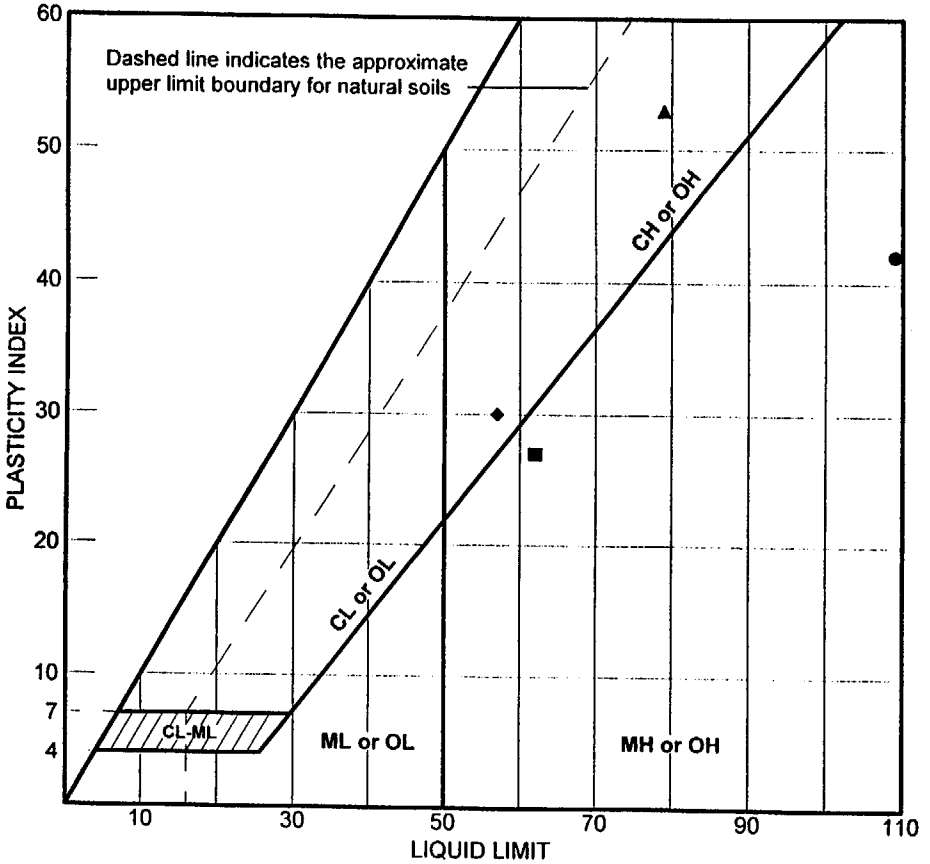
020

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-12	12A	103.5-104'	8/23/00	SM	Tan Silty sand	39.5	109	42
■	Boring BH-12	13	108-109.5'	8/23/00	SM	Tan Silty sand	31.0	62	27
▲	Boring BH-12	14	113-115'	8/25/00	CH	Tan Brown Sandy fat clay	45.3	79	53
◆	Boring BH-12	20	144-144.5'	8/22/00	CH	Brown Sandy fat clay	34.8	57	30

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

● Tested by: JTM/WFL Reviewed by: HJ
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▲ Tested by: JTM/SC Reviewed by: HJ
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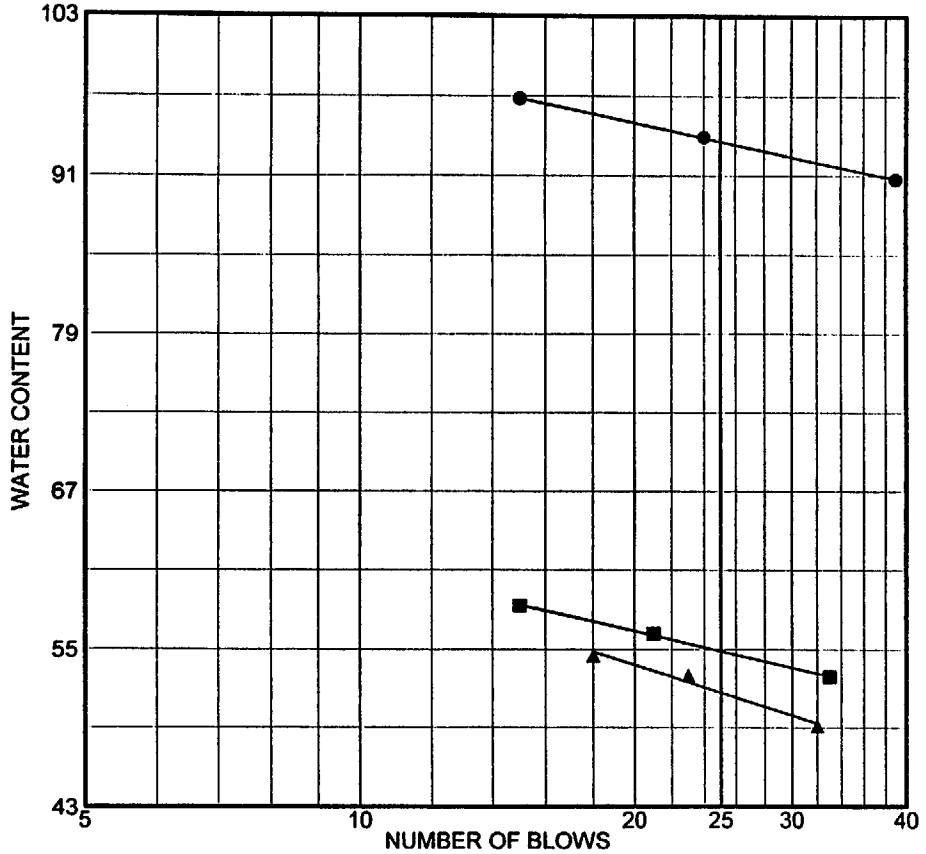
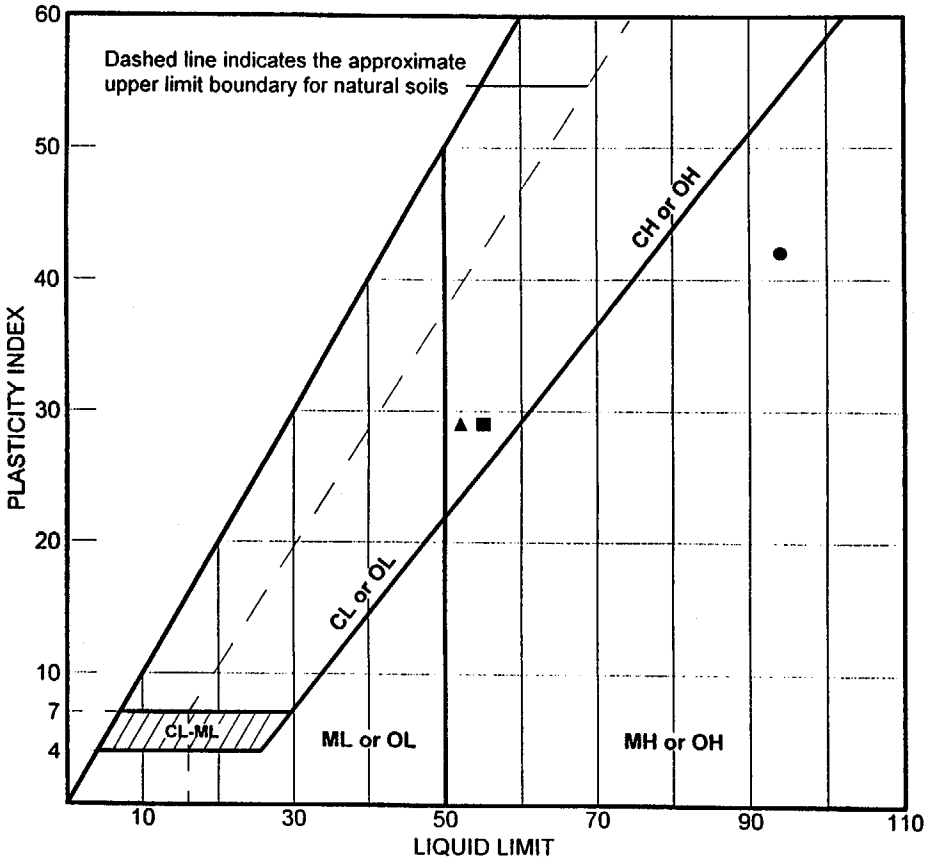
021

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Boring BH-13	15A	83-84.5'	8/22/00	SM	Tan Silty sand	42.8	94	42
■	Boring BH-13	23A	123.5-124'	8/22/00	SC	Tan Brown Clayey sand	35.5	55	29
▲	Boring BH-13	25	133.5-134'	8/23/00	CH	Brown Sandy fat clay	27.1	52	29

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

● Tested by: JTM/SC Reviewed by: HJ
■ Tested by: SC/WFL/JTM Reviewed by: HJ
▲ Tested by: WFL/SC Reviewed by: Hj

022

SIEVE AND

HYDROMETER ANALYSIS

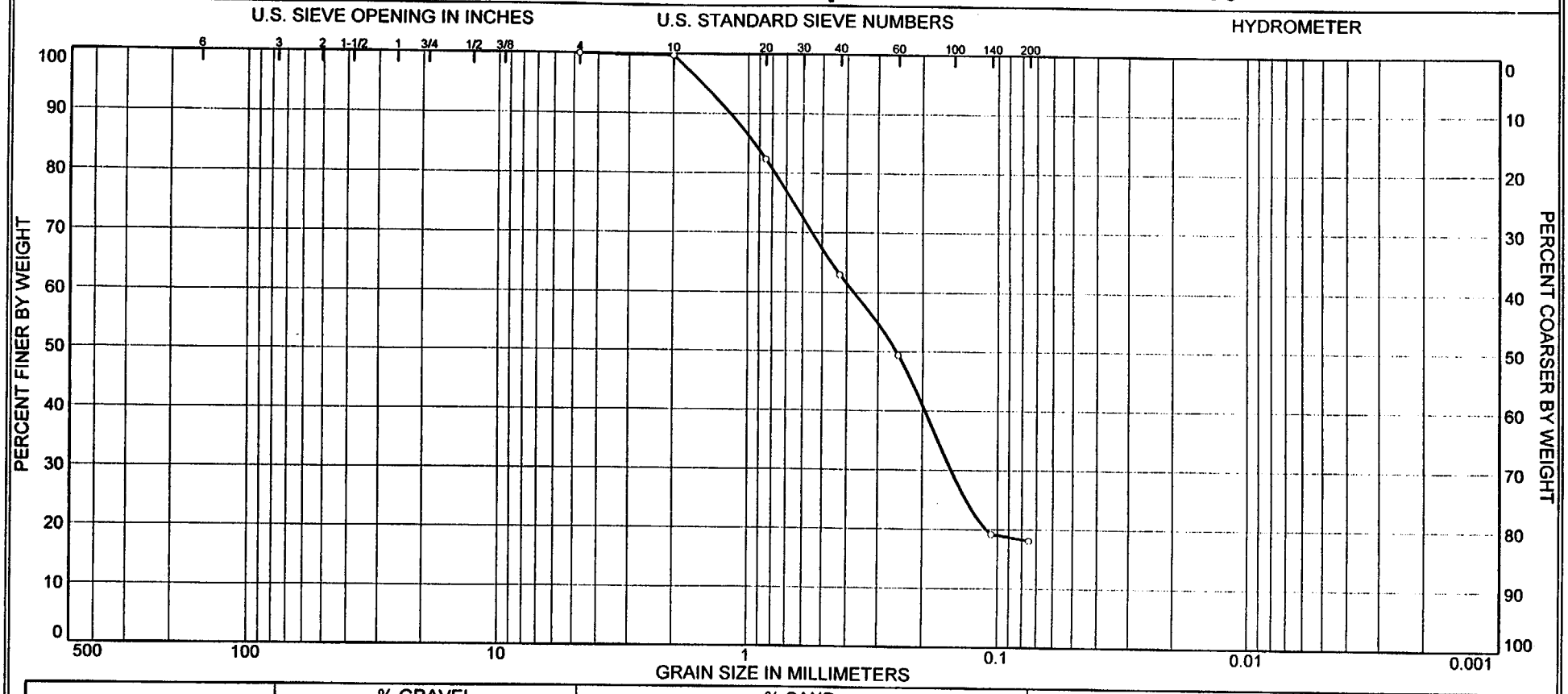
Grain Size & Atterb Limits Summary

Project: MOX Fuel Fabrication Facility **LAW Project No:** 50160-0-3963

Source of Sample	Sample No.	Depth	Material Description	Sand (%)	Silt (%)	Clay (%)	Fines (%)	Natural Moisture (%)	LL	PL	PI
Boring BH-1											
	2	8-9.5'	Brown						39	23	16
	4	18-19'	Brown						38	21	17
	8	38-38.6'	Brown						NV	NP	NP
	7A	33-33.9'	Tan Brown Clayey sand	81.9			18.1	22.5	44	23	21
	12B (consol method B)	62-64'	Tan Silty sand (consol method B)	81.4	6.1	12.5	18.6		43	20	
	12B (Ud) (consol method A)	62-64'	Brown Clayey sand	75.5	7.1	17.4	24.5		43	20	23
	12B (Ud)	62-64'	Brown Clayey sand	75.5	7.1	17.4	24.5	22.5	43	20	23
	14	73-74 Ft.	Brown Silty sand	86.2			13.8	28.5			
	17A	88-89 Ft.	Tan Silty sand	65.7	14.6	19.7	34.3	36.1			
	17B (consol sample)	90-92'	Tan Silty sand with gravel	60.7	6.3	8.7	15				
	17B (Ud)	90-92'	Tan Brown Silty sand	82.4	5.2	11.2	16.4		86	52	34
	18-2	93.4-94.5	Tan Brown Clayey sand	73.6	3.1	23.3	26.4	34	42	22	20
	23A	118-118.8'	Red Brown Clayey sand	78.4			21.6	33	53	27	26
	25	128-129.5'	Brown Silty sand	56.5	31.9	11.6	43.5	32.8	35	28	7

024

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.3	36.7	44.9	18.1	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-1	7A	33-33.9'	8/22/00	SC	Tan Brown Clayey sand	22.5	44	23

Client Duke Cogema Stone & Webster (DCS)

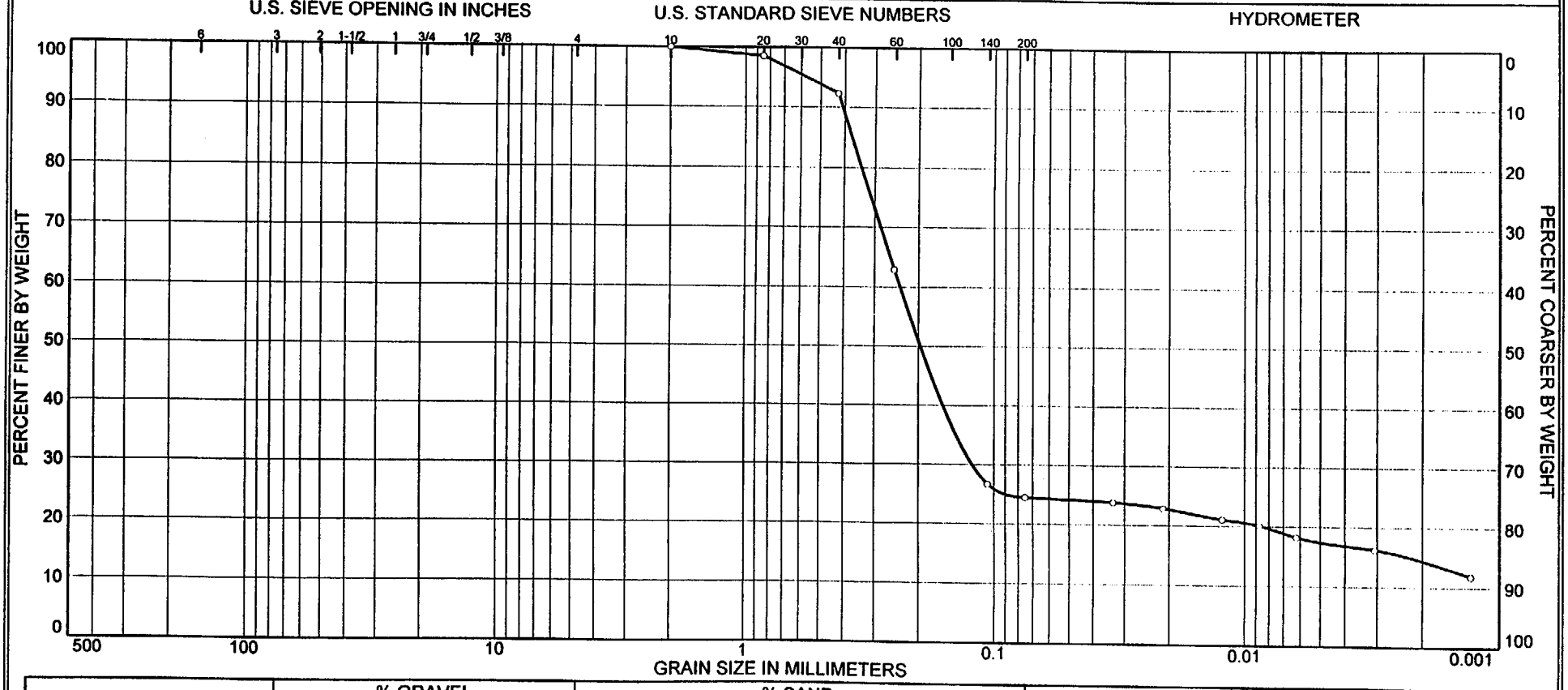
Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL/SC Reviewed by: HJ

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	7.7	67.8	7.1	17.4

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-1	12B (Ud)	62-64'	9/26/00	SC	Brown Clayey sand	22.5	43	20

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 5016003963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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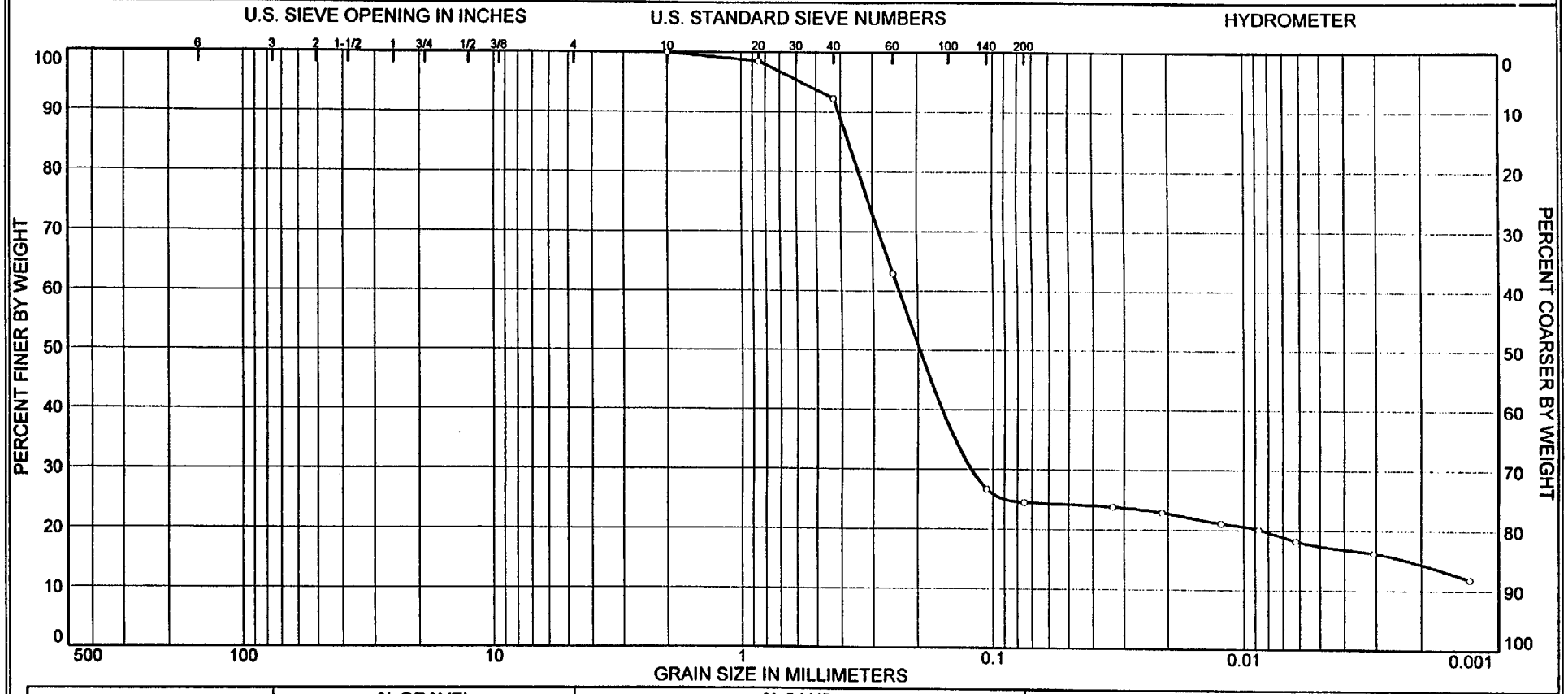
026

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	7.7	67.8	7.1	17.4

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-1	12B (Ud) (consol method A)	62-64'	9/13/00	SC	Brown Clayey sand		43	20

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

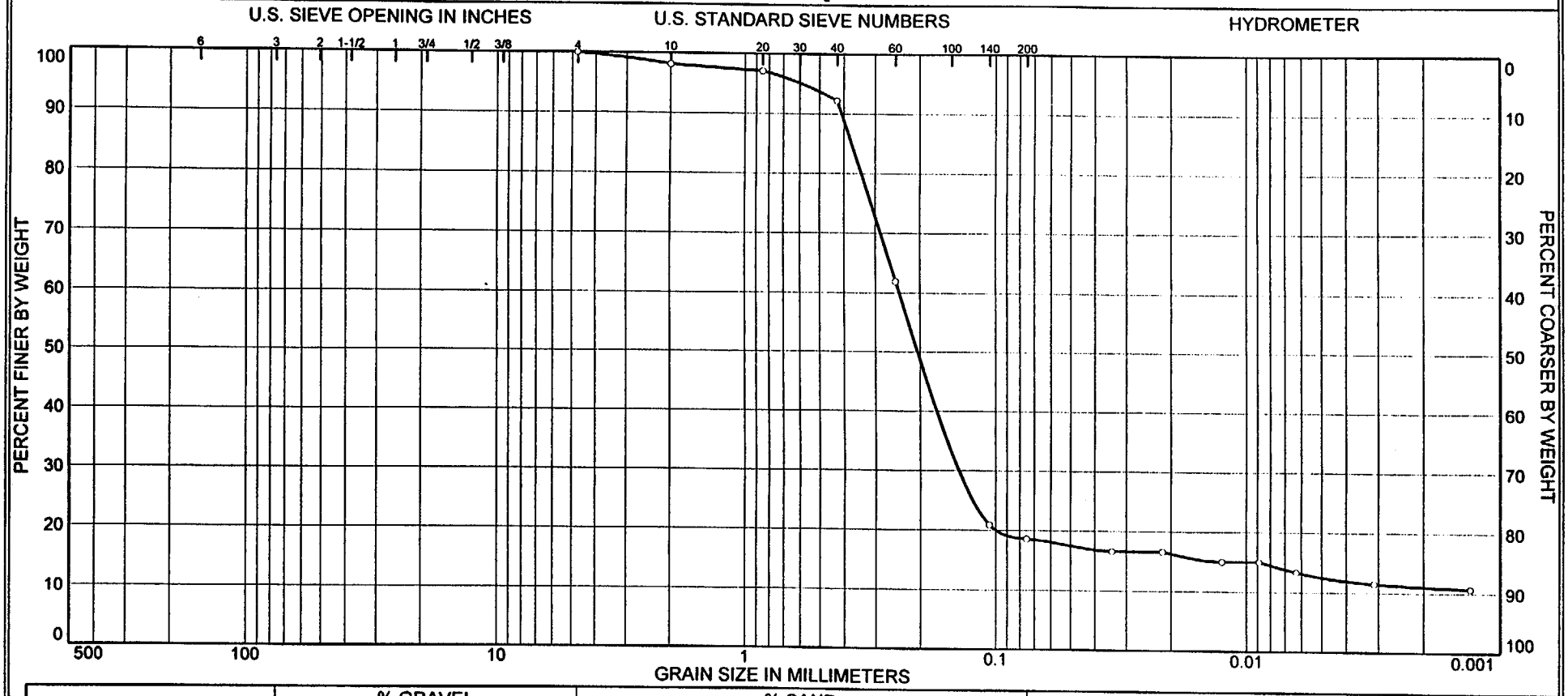
Project No. 5016003963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC/WFL Reviewed by: HJ

027

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.9	5.9	73.6	6.1	12.5

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-1	12B (consol method B)	62-64'	9/25/00	SC	Tan Silty sand (consol meth b)		43	20

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

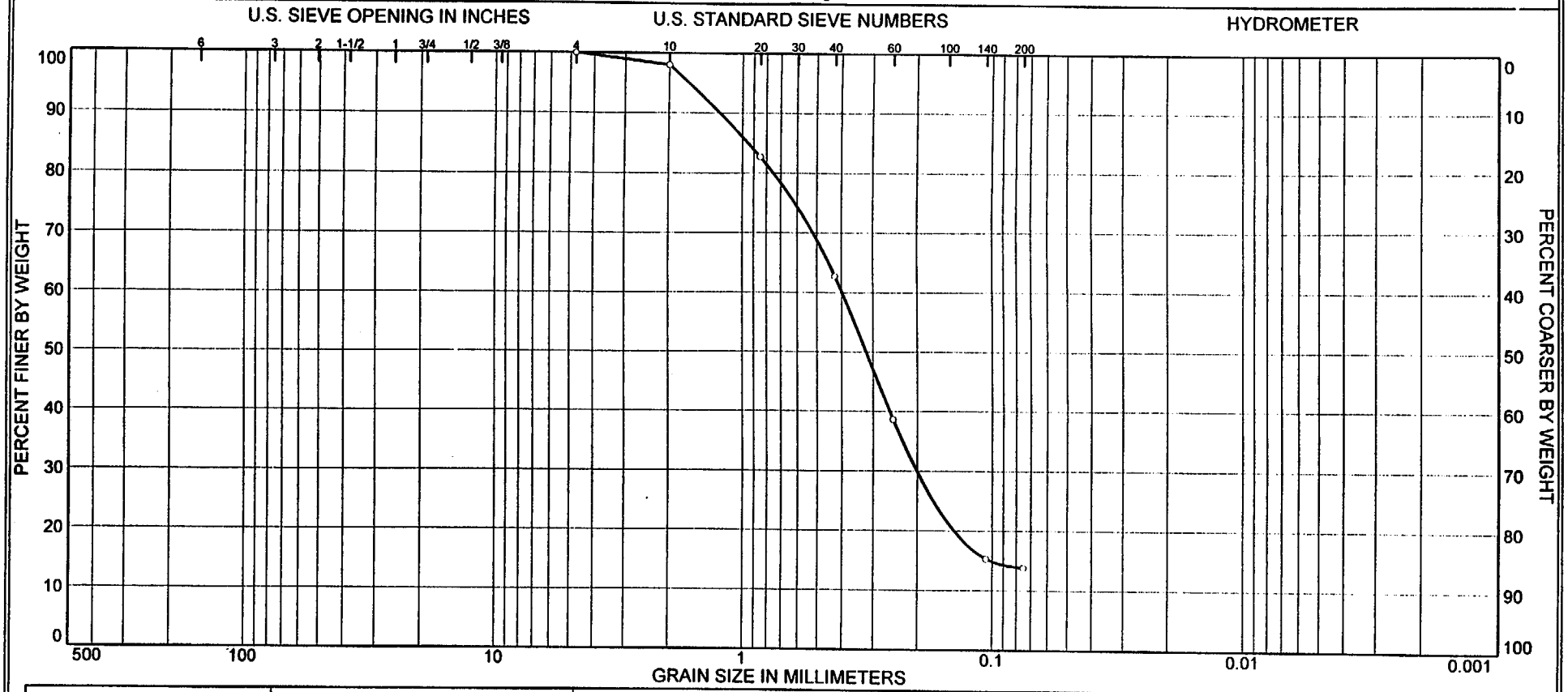
Project No. 5016003963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC Reviewed by: HJ

028

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	2.0	35.3	48.9	13.8	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-1	14	73-74 Ft.	8/17/00		Brown Silty sand	28.5		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

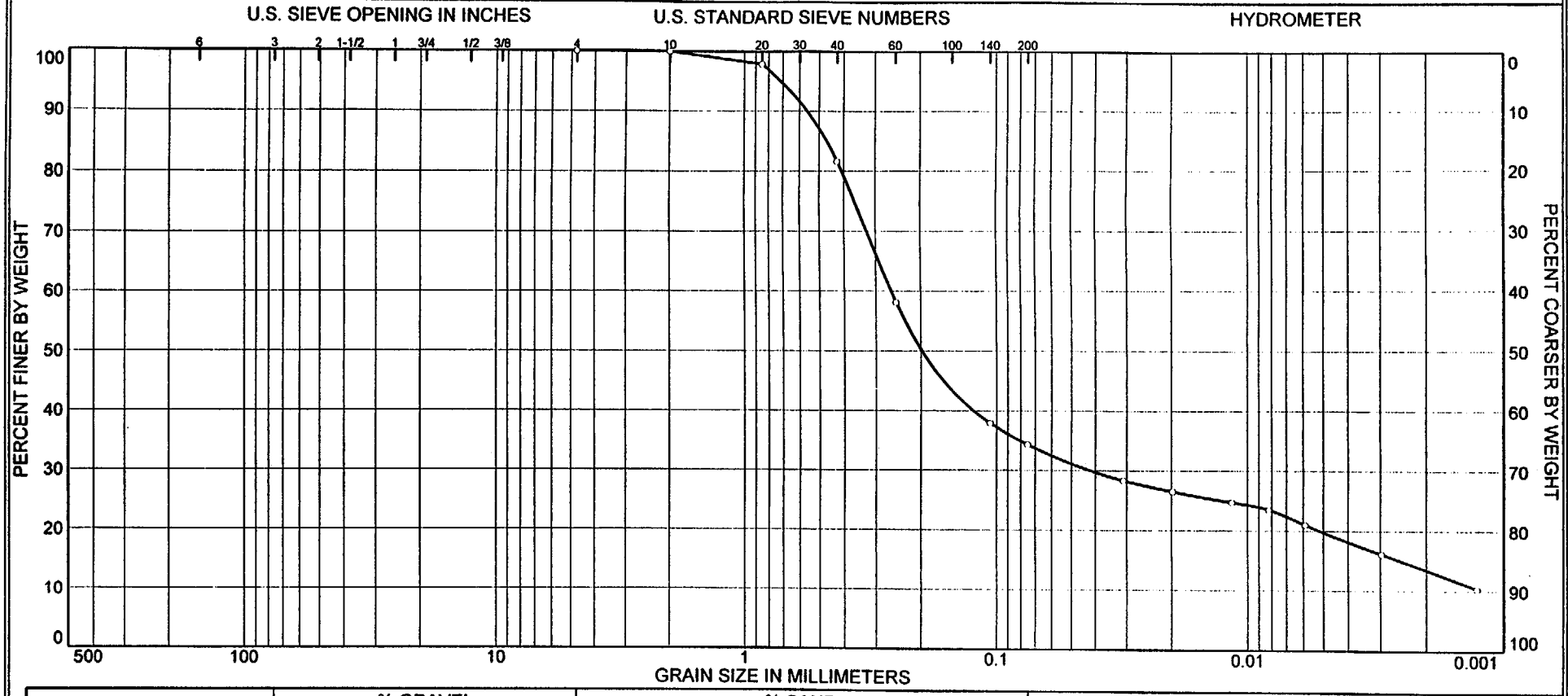
Project No. 50160-0-3963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL Reviewed by: HJ

029

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	18.4	47.3	14.6	19.7

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-1	17A	88-89 Ft.	8/17/00		Tan Silty sand	36.1		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

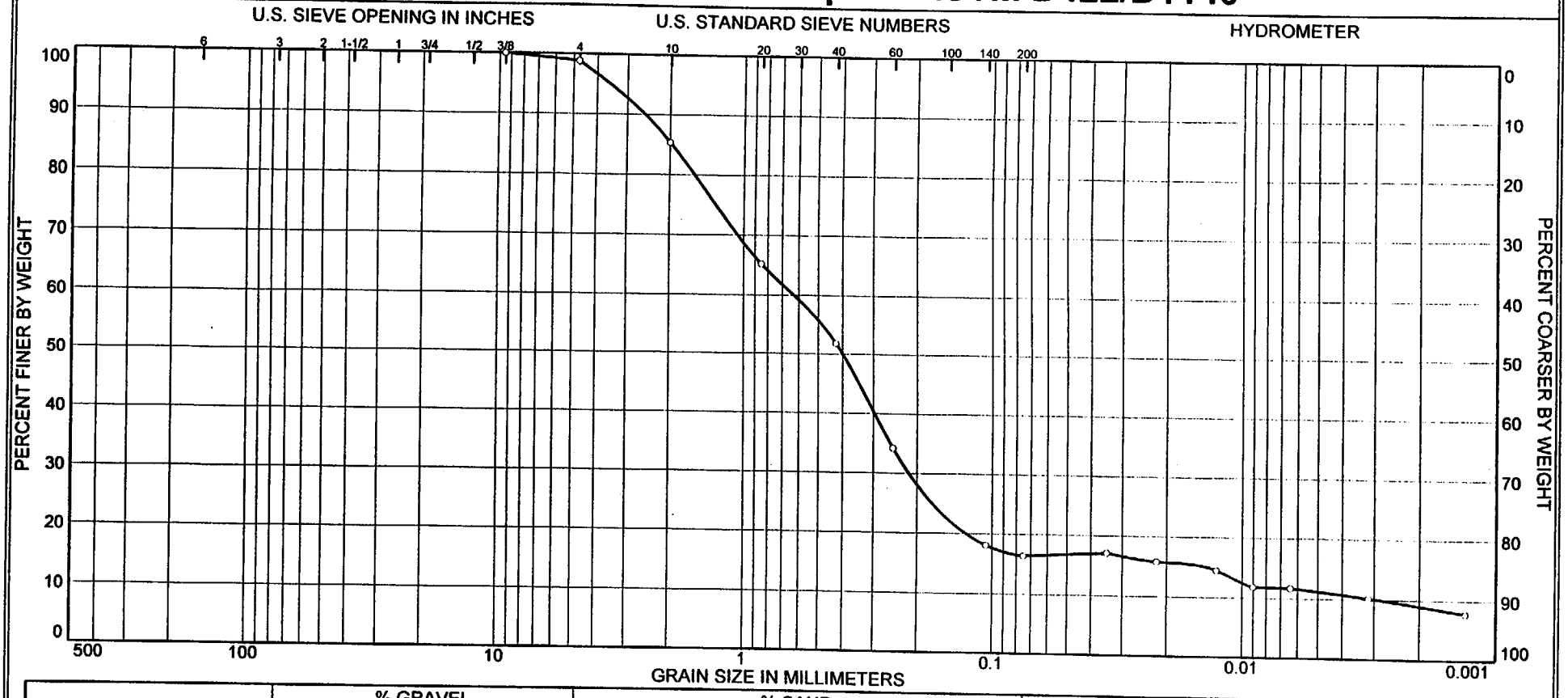
Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC/WFL Reviewed by: HJ

020

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	1.2	13.4	33.6	35.4	5.2	11.2

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-1	17B (Ud)	90-92'	9/12/00	SM	Tan Brown Silty sand		86	52

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 5016003963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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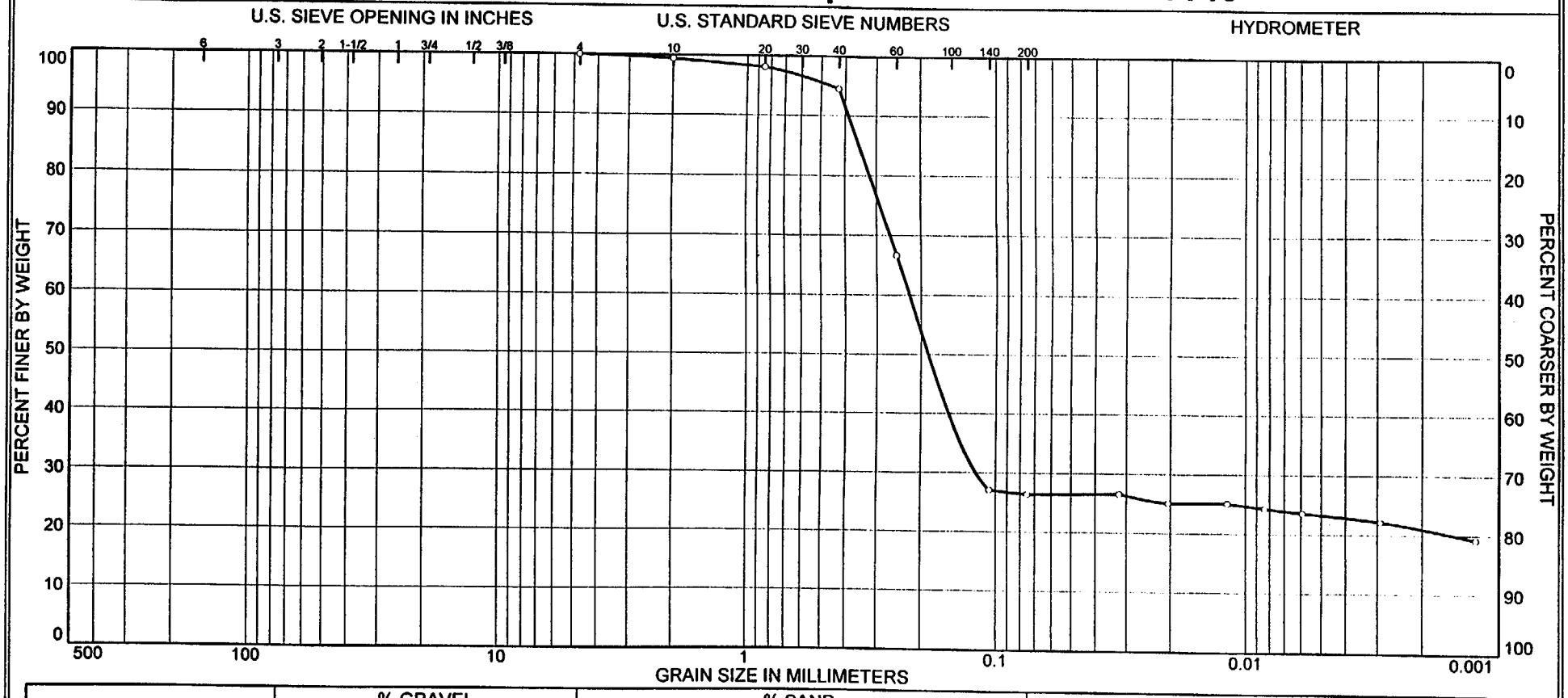
Particle Size Distribution Report ASTM D422/D1140



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.6	4.9	68.1	3.1	23.3

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-1	18-2	93.4-94.5	8/22/00	SC	Tan Brown Clayey sand	34.0	42	22

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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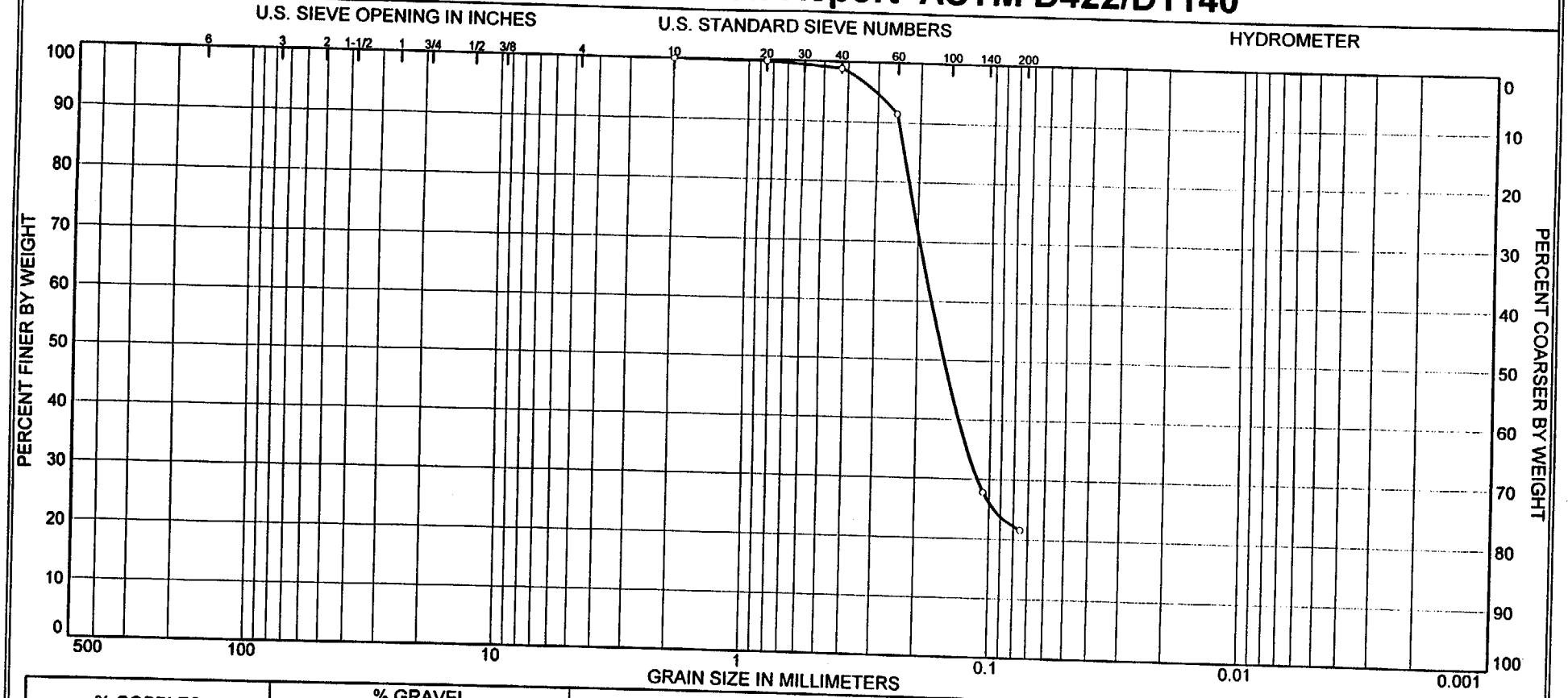
Particle Size Distribution Report ASTM D422/D1140



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	1.1	77.3	21.6	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-1	23A	118-118.8'	8/30/00	SC	Red Brown Clayey sand	33.0	53	27

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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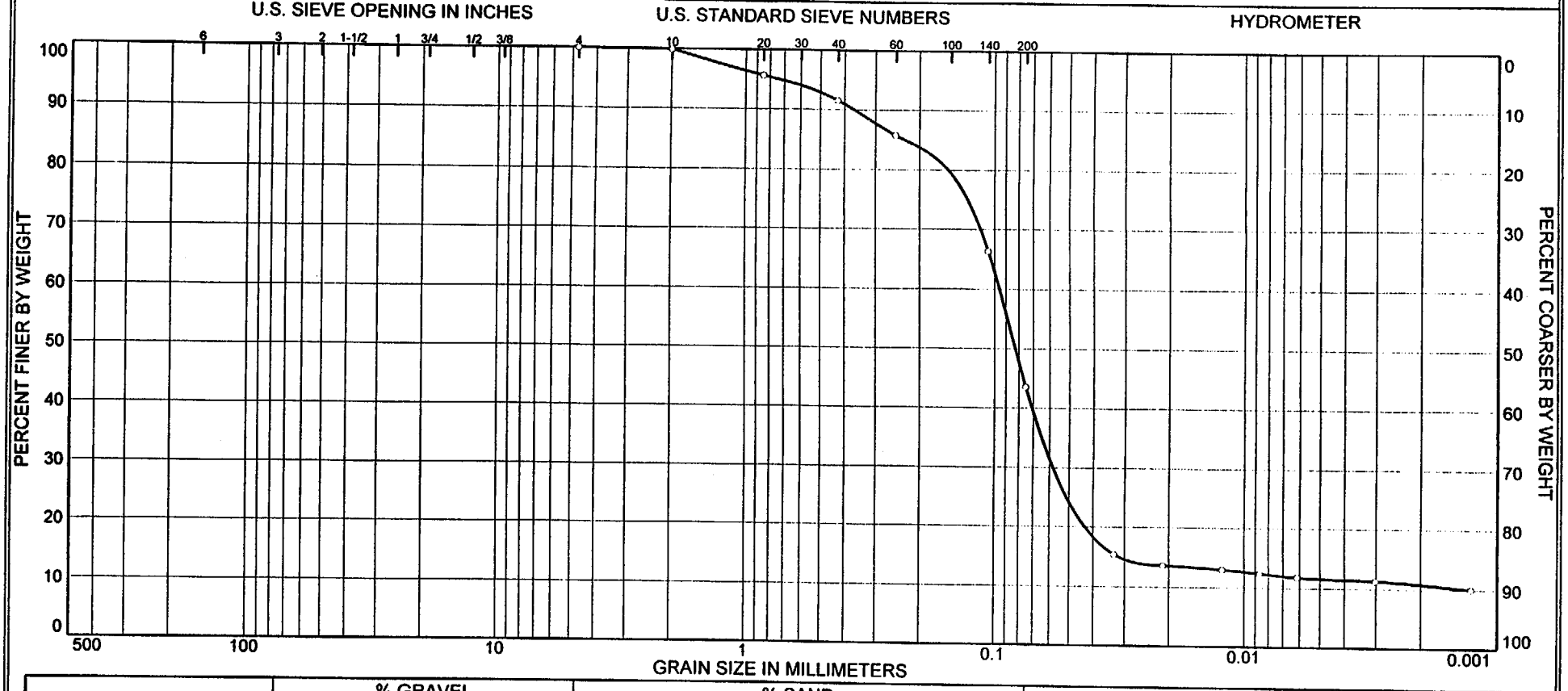
033

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	8.4	48.0	31.9	11.6

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-1	25	128-129.5'	8/22/00	SM	Brown Silty sand	32.8	35	28

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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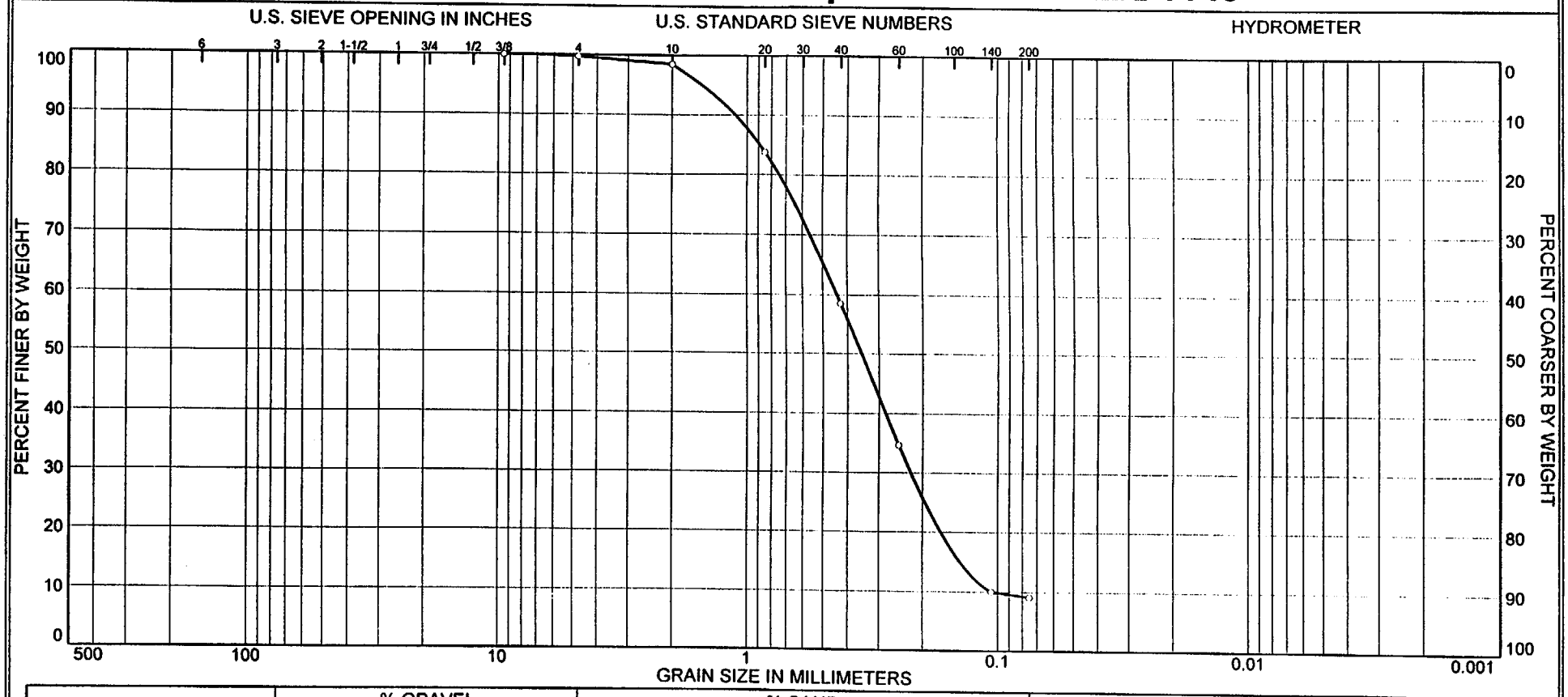
034

Grain Size & Atter[illegible]g Limits Summary

Project: MOX Fuel Fabrication Facility **LAW Project No:** 50160-0-3963

Source of Sample	Sample No.	Depth	Material Description	Sand (%)	Silt (%)	Clay (%)	Fines (%)	Natural Moisture (%)	LL	PL	PI
Boring BH-2	3	13.5-14 Ft.	Red Brown Poorly graded sand with silt	90.6			9.1	6.9			
	5A	28-29.5 Ft.	Brown Poorly graded sand with silt	86.5			11				
	6	33-34 Ft.	Brown Poorly graded sand with silt	88.9			11.1				
	8	43'-43'10"	Tan Brown Silty sand	87.5			12.5				
	12	58-58'10"	Brown Poorly graded sand with silt	92			8	24.3			
	14	68.5-69'	Tan Brown Silty sand	84.2	3.5	12.3	15.8	35.7	32	25	7
	15	70-72'	Tan Brown Clayey sand	81.5	4.9	13.6	18.5		89	31	58
	15 (consol sample)	70-72'	Tan Brown Silty sand (consol sample)	81.3	6	10.7	16.7				
	16A	73-73.5 Ft.	Tan Silty sand	79.3			20.7				
	16B	73'10"-74'4	Brown Silty sand	73			27				
	18	83.5-84.0	Tan Brown Poorly graded sand with silt	94			6				
	20	93.5-94.0	Red Brown Poorly graded sand with silt	93.2			6.8				
	21	96-98'	Brown Clayey Sand	77.8	4.1	18.1	22.2				
	21 (top)	96-98'	Tan Clayey sand	77.1	6.2	16.7	22.9		59	29	30
	22	103.5-104'	Tan Brown Clayey sand	58.2	20.3	21.5	41.8	31.4	49	24	25
	25	118-118.5'	Tan Brown Well-graded sand with silt	90.7			7.8				

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.3	1.2	40.0	49.4	9.1	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	3	13.5-14 Ft.	8/17/00		Red Brown Poorly graded sand with silt	6.9		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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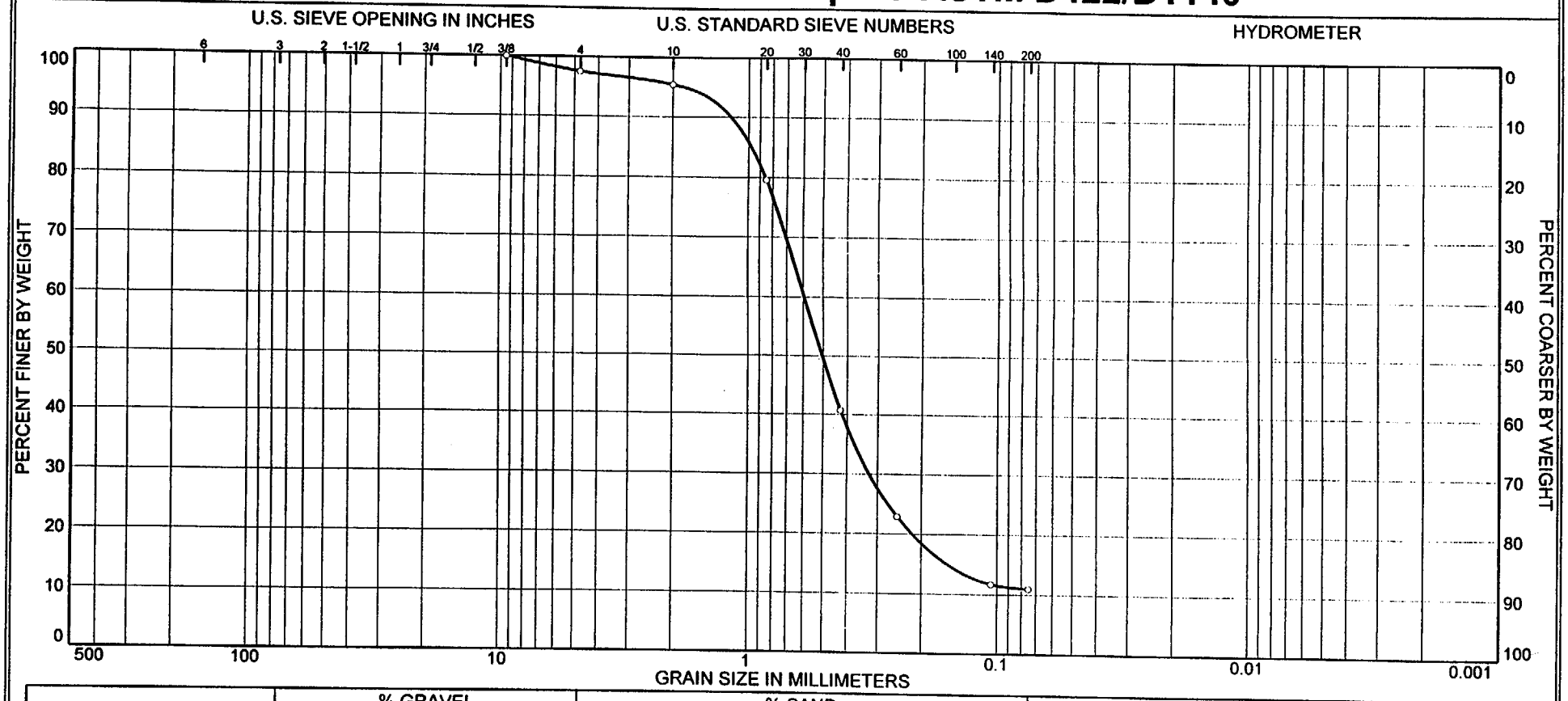
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	2.5	2.1	54.7	29.7	11.0	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	5A	28-29.5 Ft.	8/17/00		Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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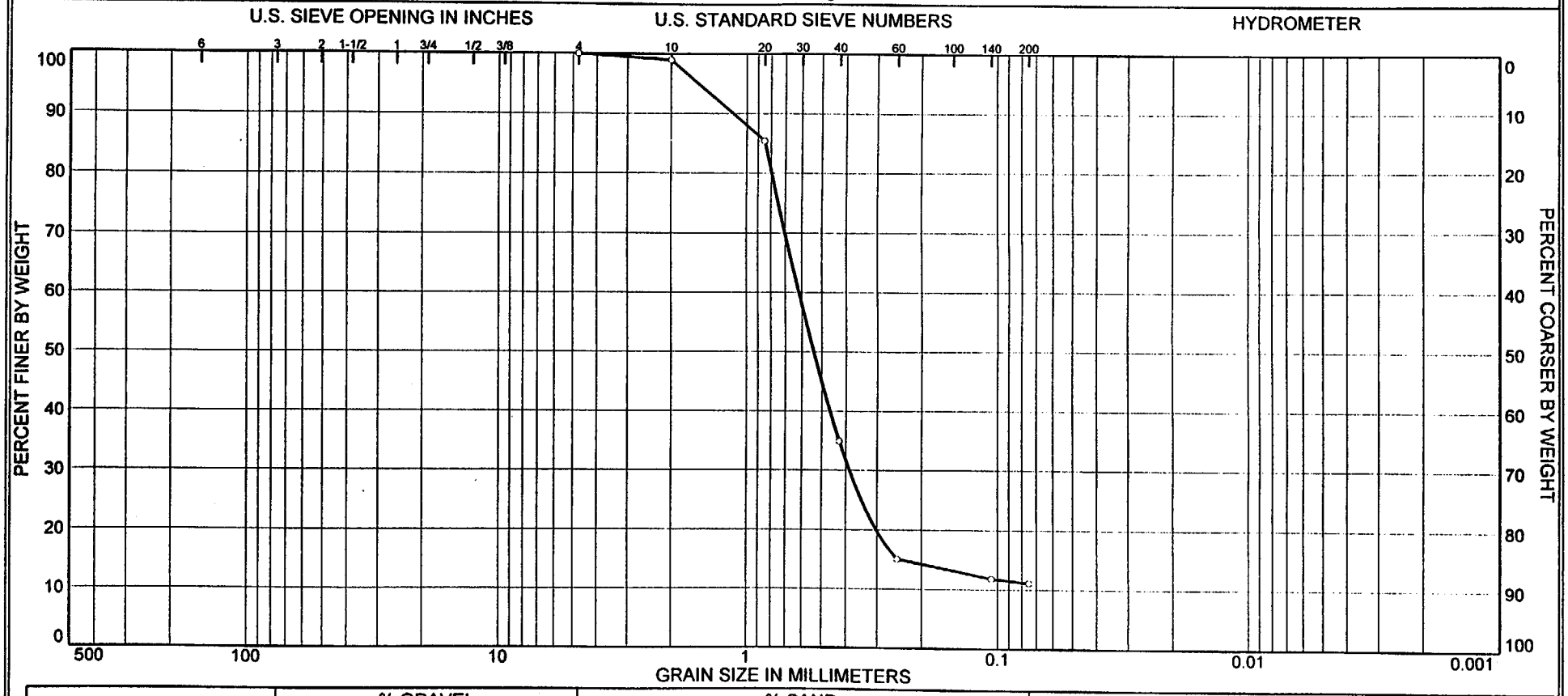
037

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.0	64.1	23.8	11.1	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	6	33-34 Ft.	8/17/00		Brown Poorly graded sand with silt			

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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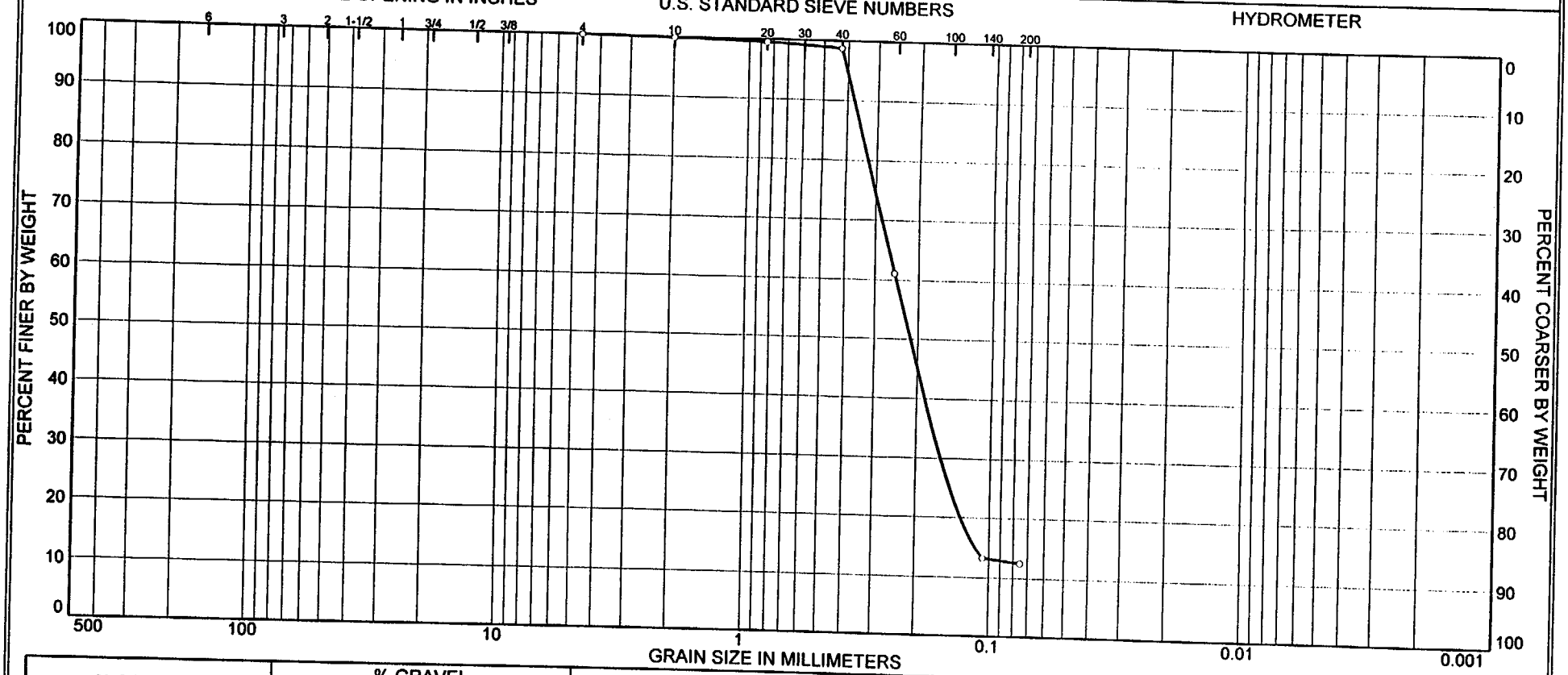
Particle Size Distribution Report ASTM D422/D1140



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.1	1.2	86.2	12.5	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-2	8	43'-43'10"	8/17/00		Tan Brown Silty sand			

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 Plate

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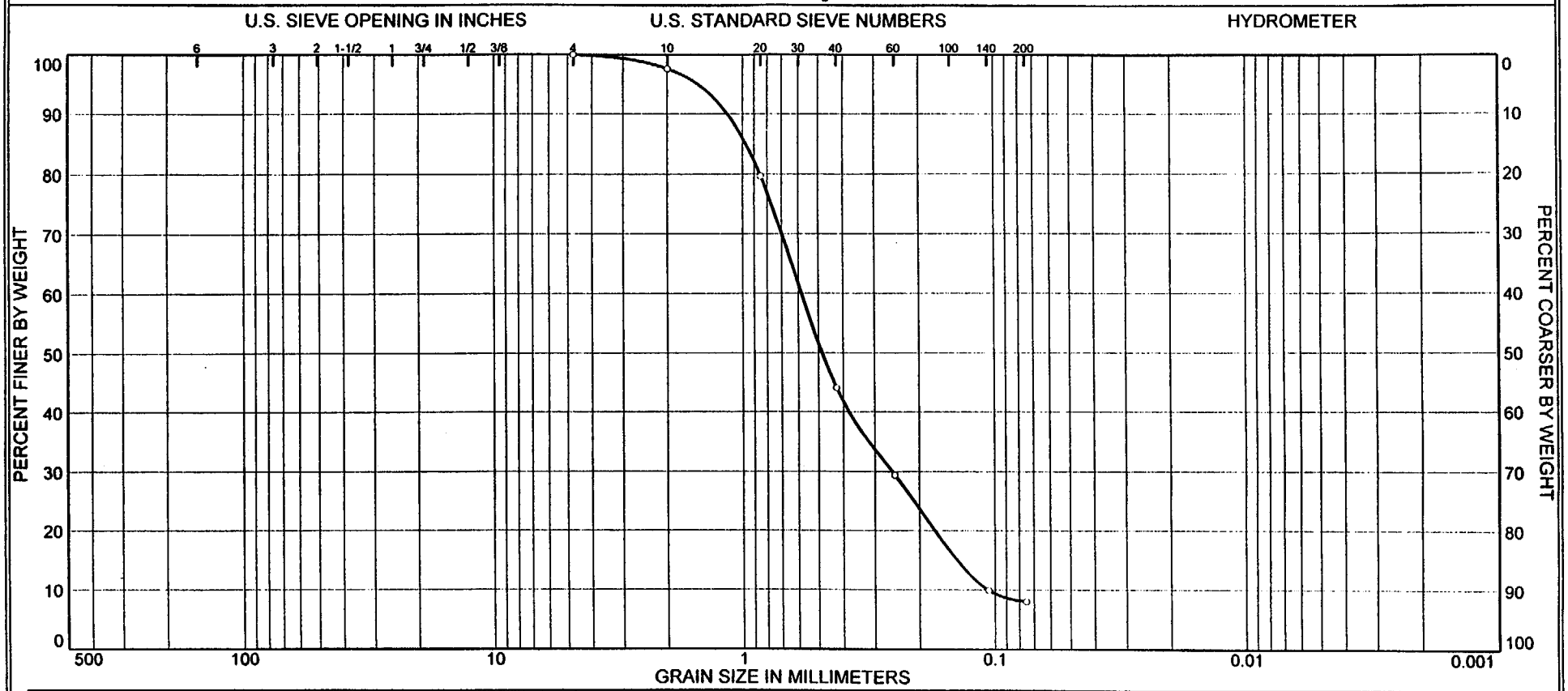
039

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	2.4	53.5	36.1	8.0	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	12	58-58'10"	8/17/00		Brown Poorly graded sand with silt	24.3		

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 Plate

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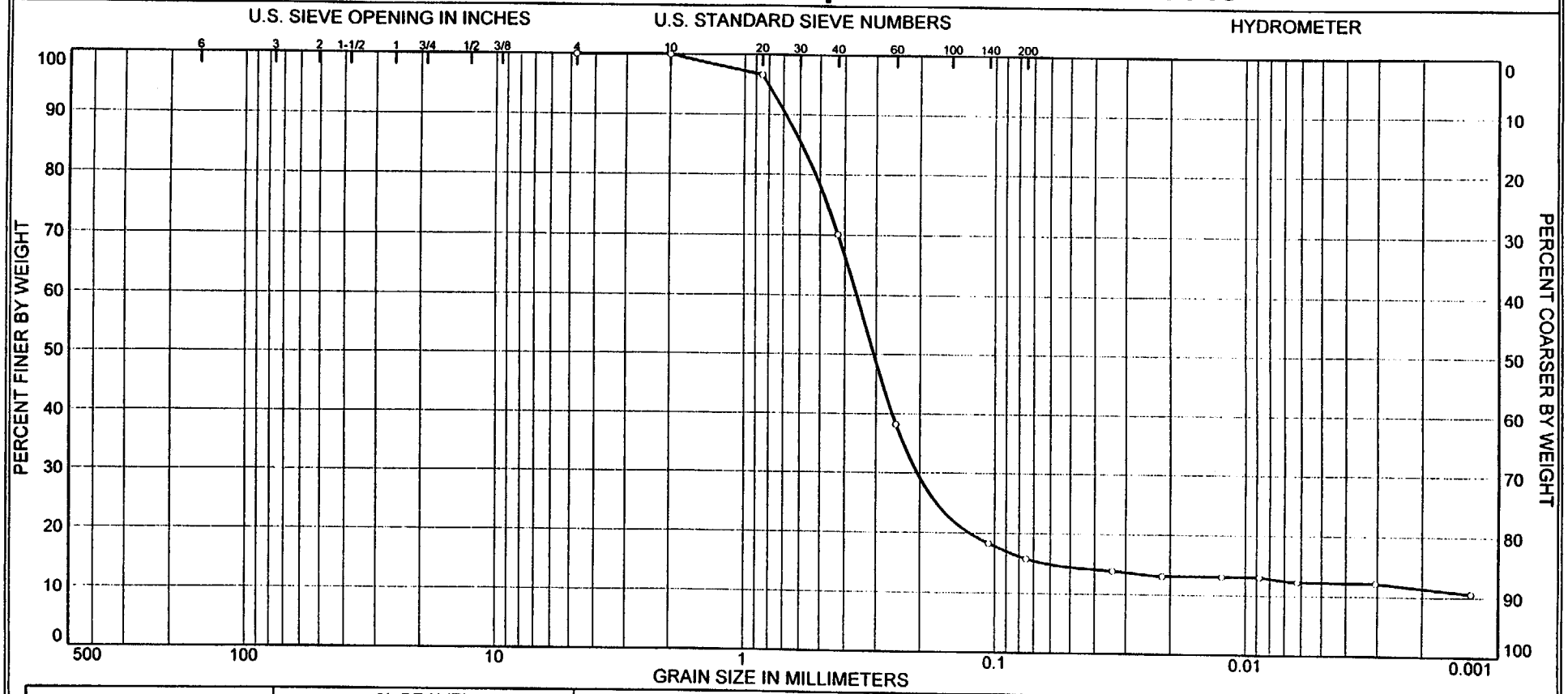
○ Tested by: WFL Reviewed by: HJ

040

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	29.9	54.3	3.5	12.3

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	14	68.5-69'	9/1/00		Tan Brown Silty sand	35.7	32	25

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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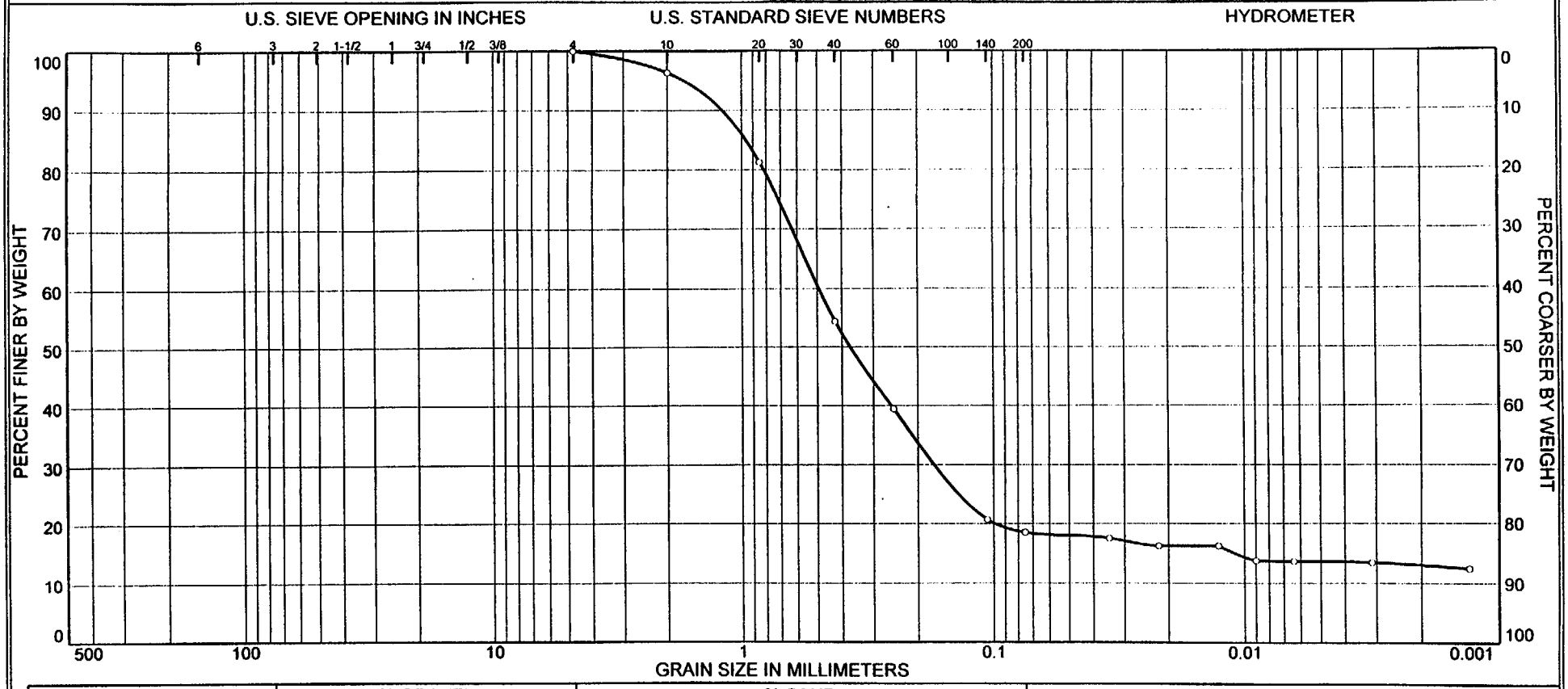
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	3.7	41.9	35.9	4.9	13.6

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	15	70-72'	9/13/00	SC	Tan Brown Clayey sand		89	31

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

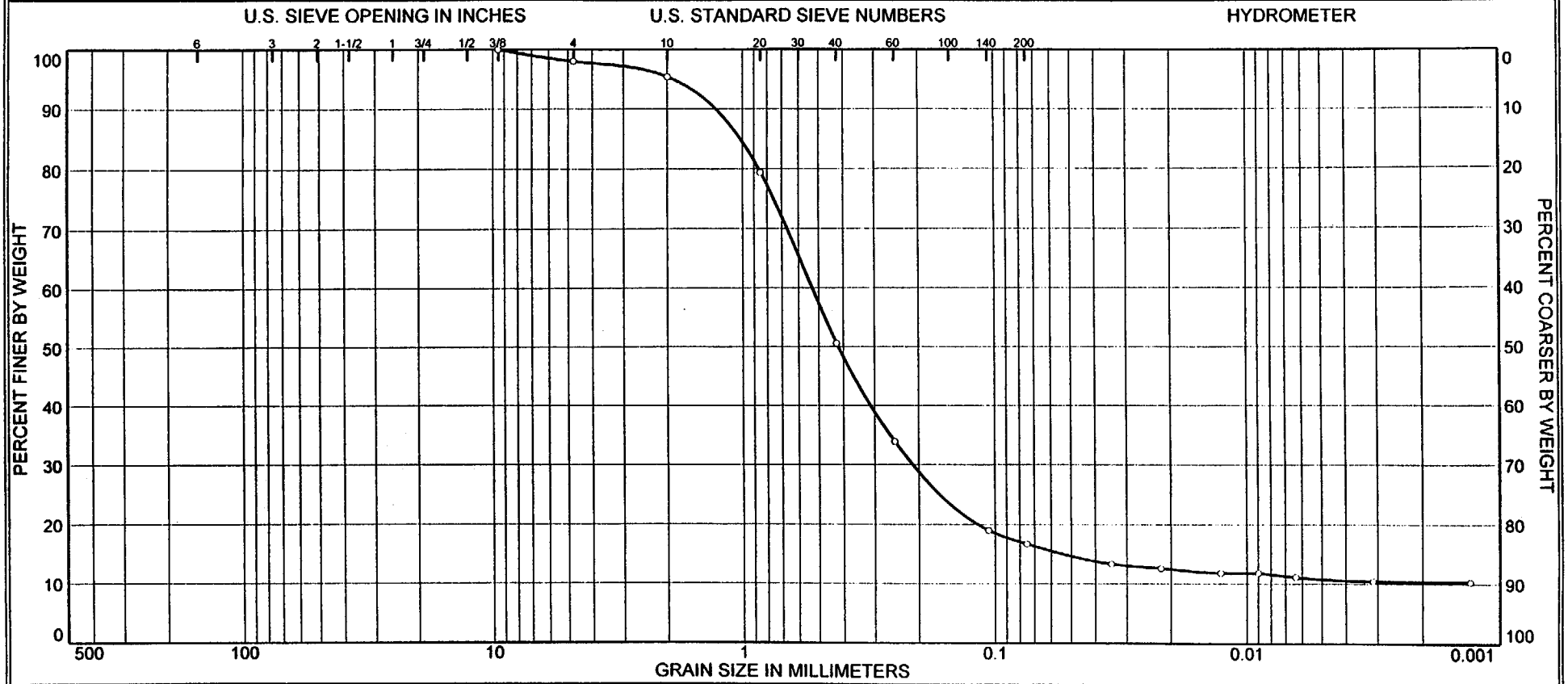
Project No. 5016003963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC/WFL Reviewed by: HJ

042

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	2.0	2.6	44.8	33.9	6.0	10.7

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	15 (consol sample)	70-72'	9/25/00		Tan Brown Silty sand (consol sample)			

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Project MOX Fuel Fabrication Facility

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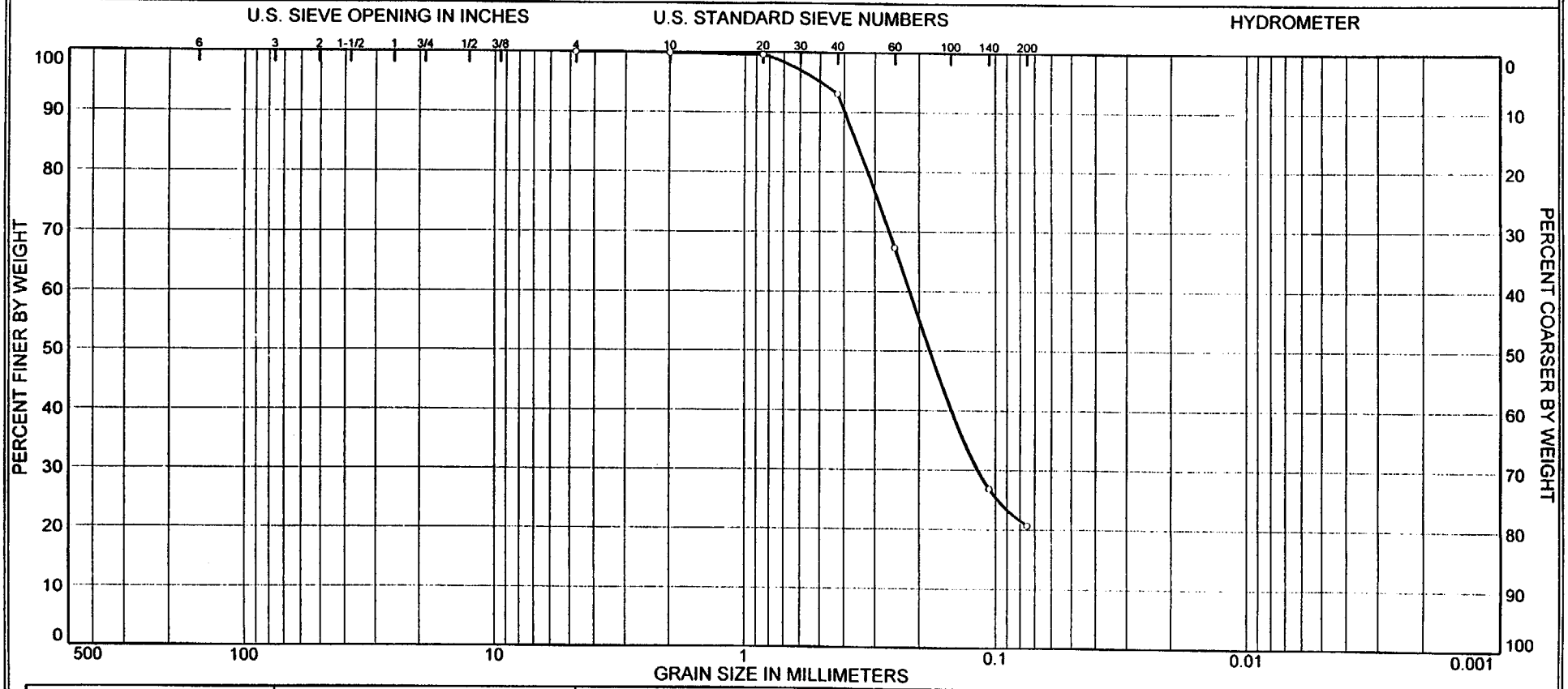
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	6.8	72.4	20.7	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	16A	73-73.5 Ft.	8/17/00		Tan Silty sand			

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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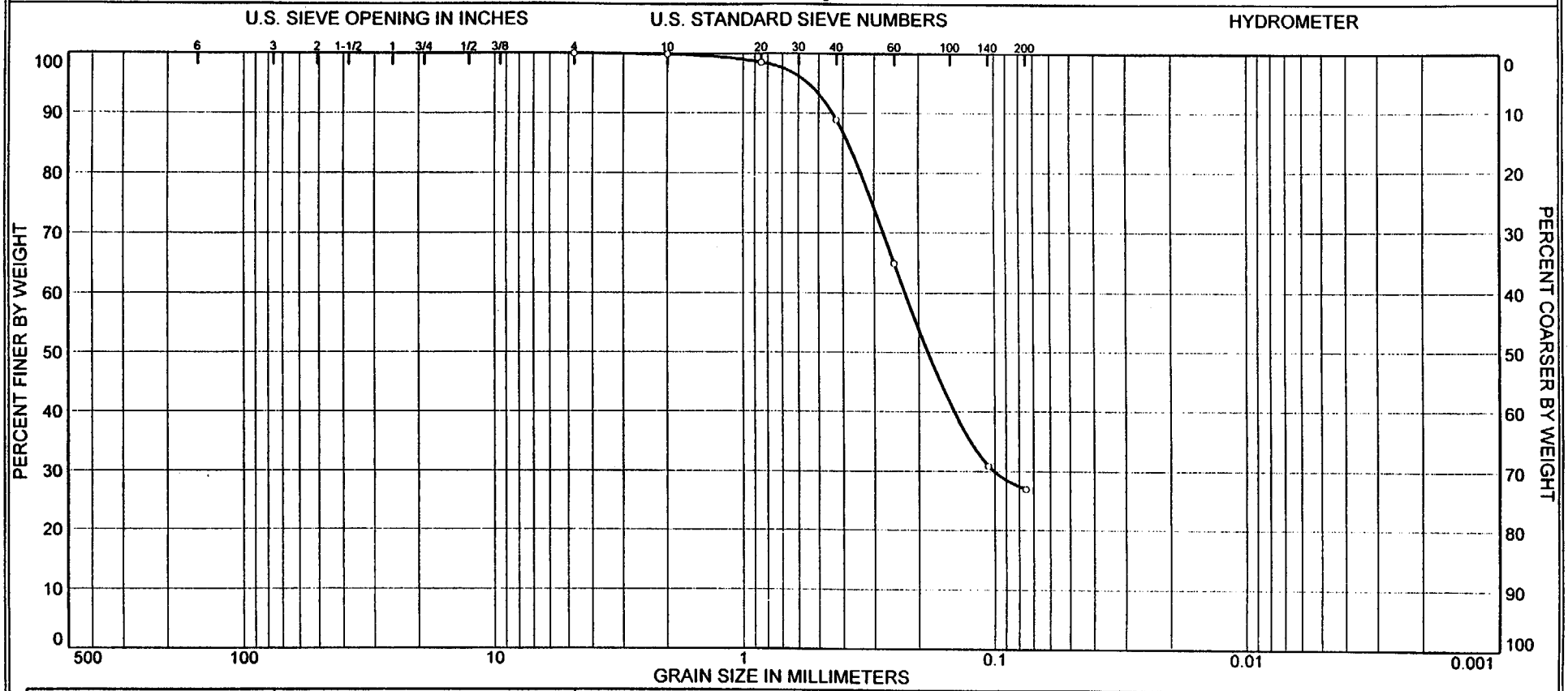
044

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	11.0	61.9	27.0	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	16B	73'10"-74'4	8/17/00		Brown Silty sand			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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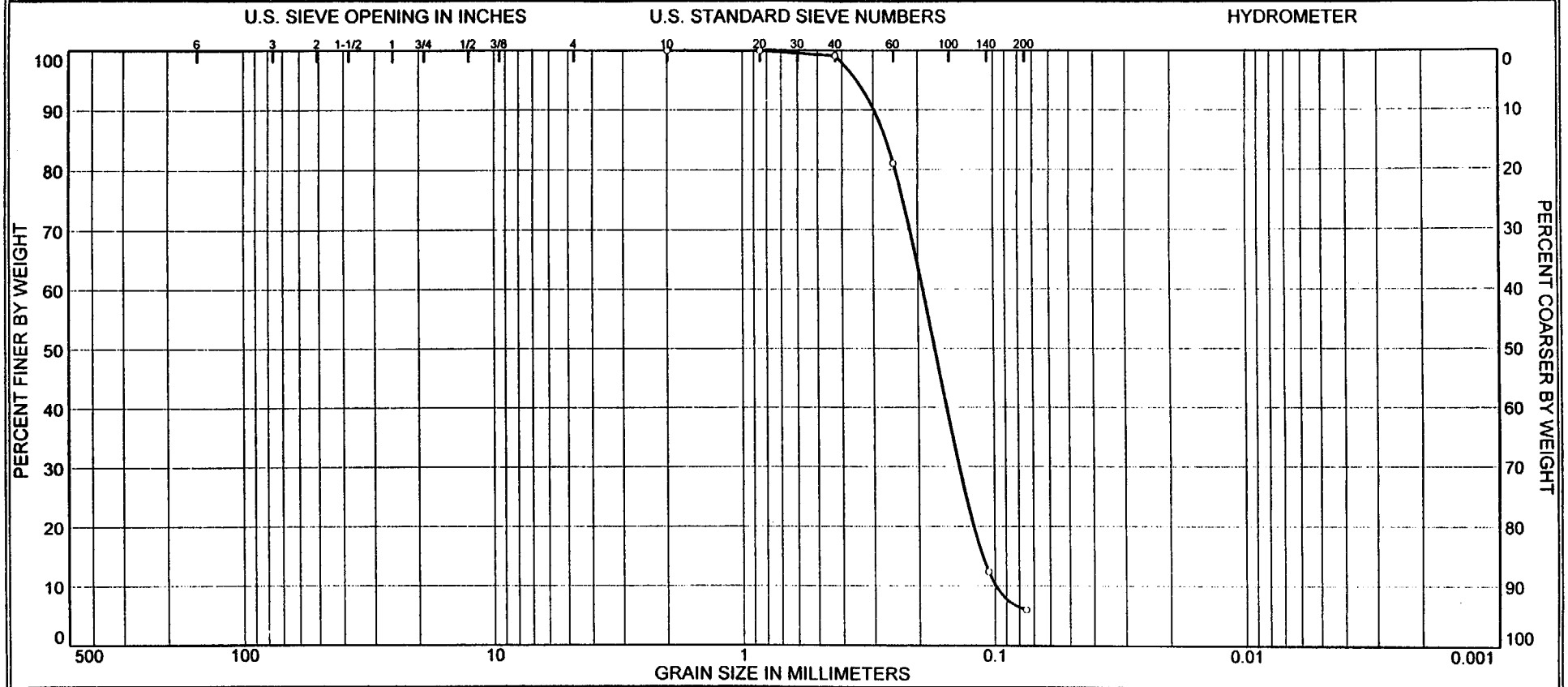
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	0.9	93.1	6.0	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	18	83.5-84.0	8/17/00		Tan Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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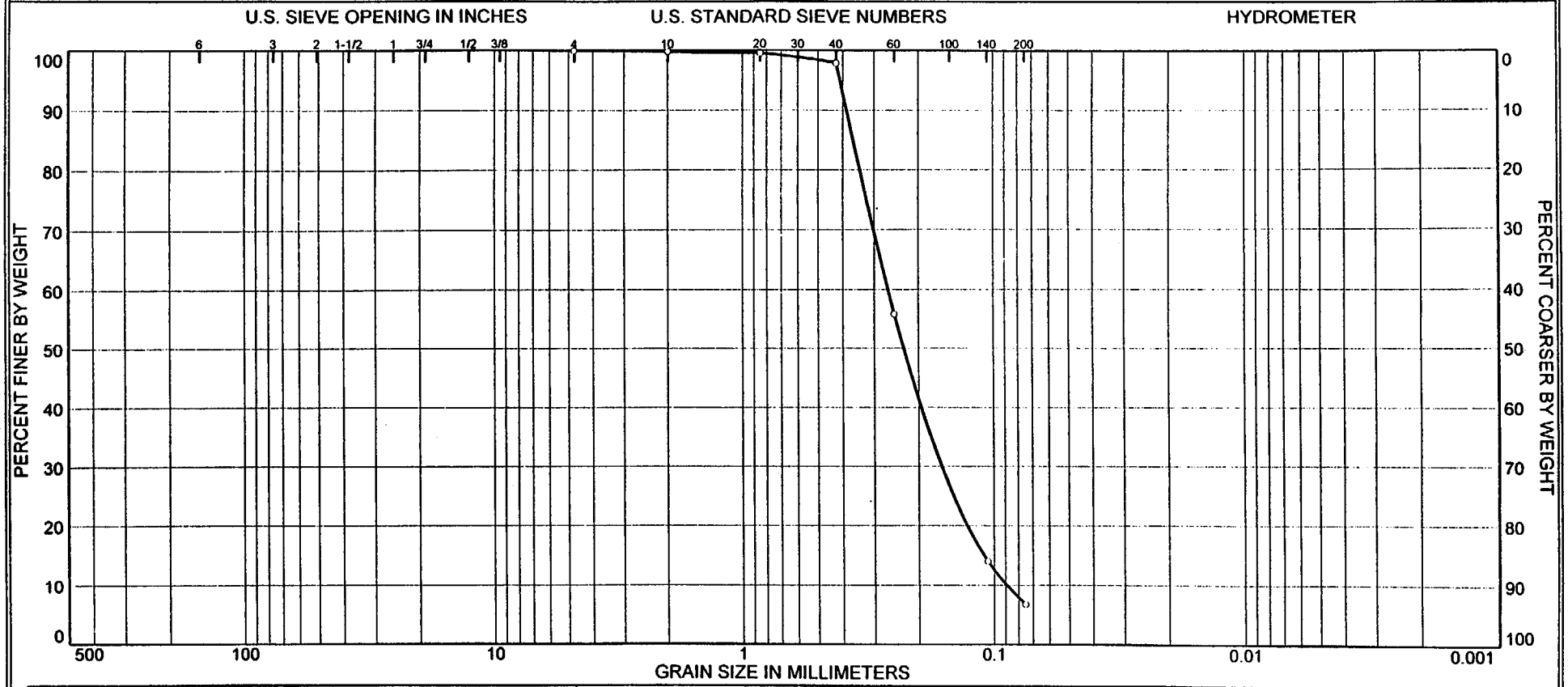
046

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.2	1.9	91.1	6.8	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	20	93.5-94.0	8/17/00		Red Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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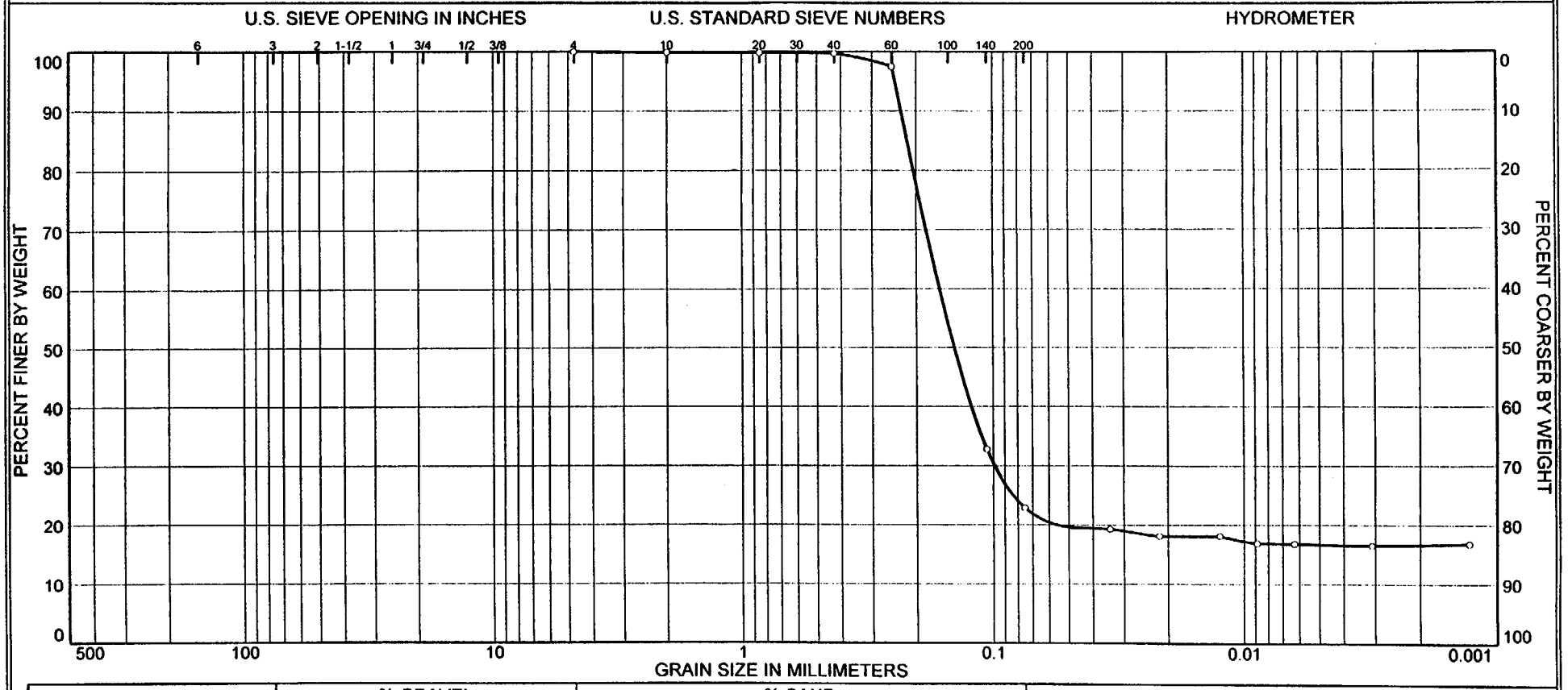
047

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	0.2	76.8	6.2	16.7

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	21 (top)	96-98'	9/25/00	SC	Tan Clayey sand		59	29

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 5016003963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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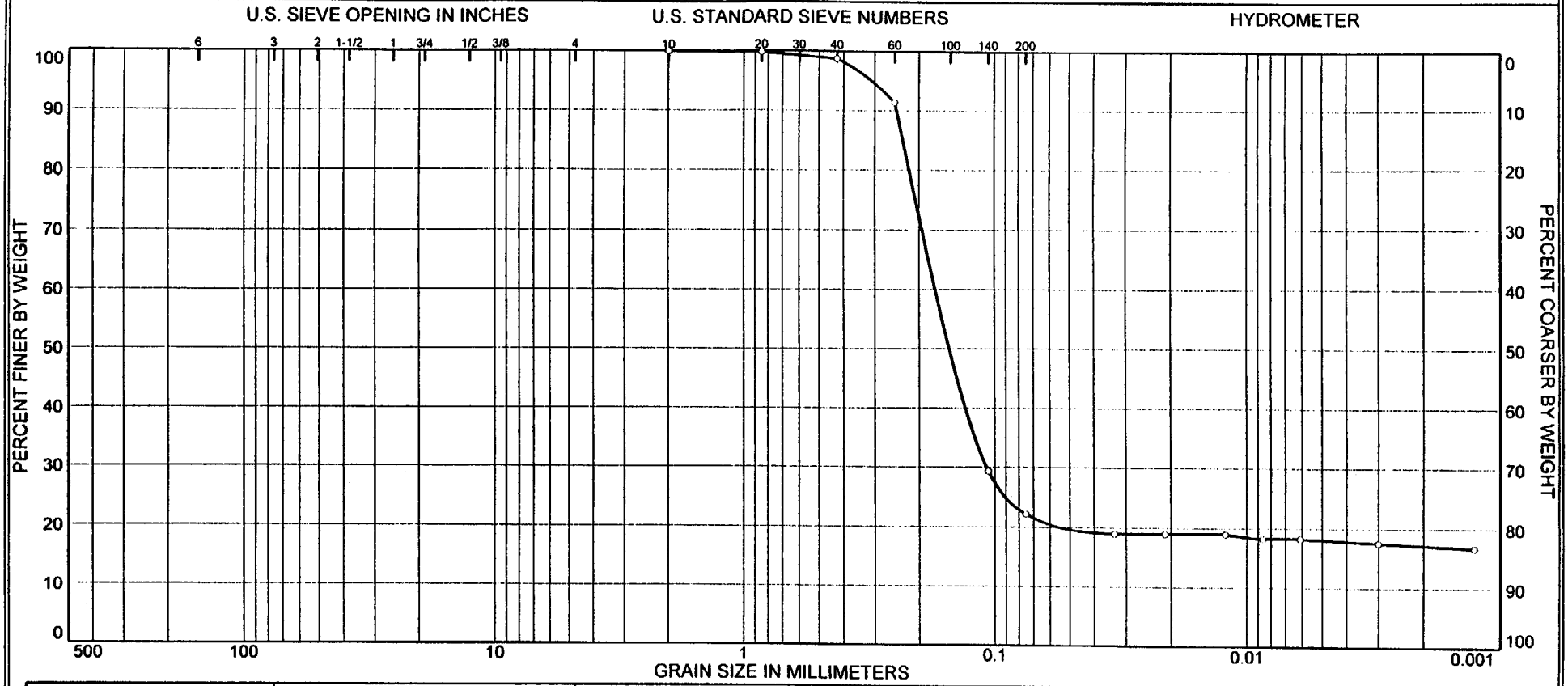
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	1.3	76.5	4.1	18.1

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	21	96-98'	02/09/01		Brown Clayey Sand			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

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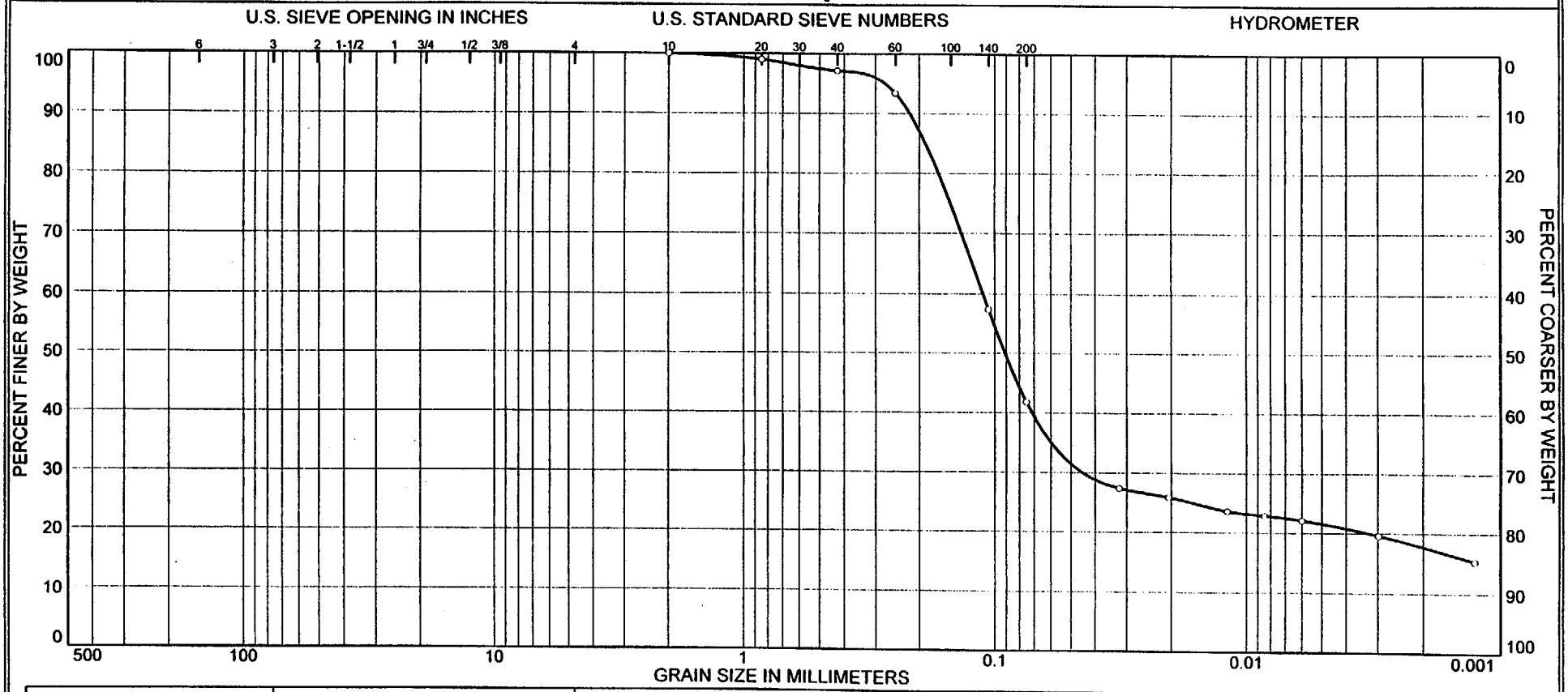
LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL Reviewed by: HJ

049

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	2.8	55.4	20.3	21.5

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	22	103.5-104'	8/23/00	SC	Tan Brown Clayey sand	31.4	49	24

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

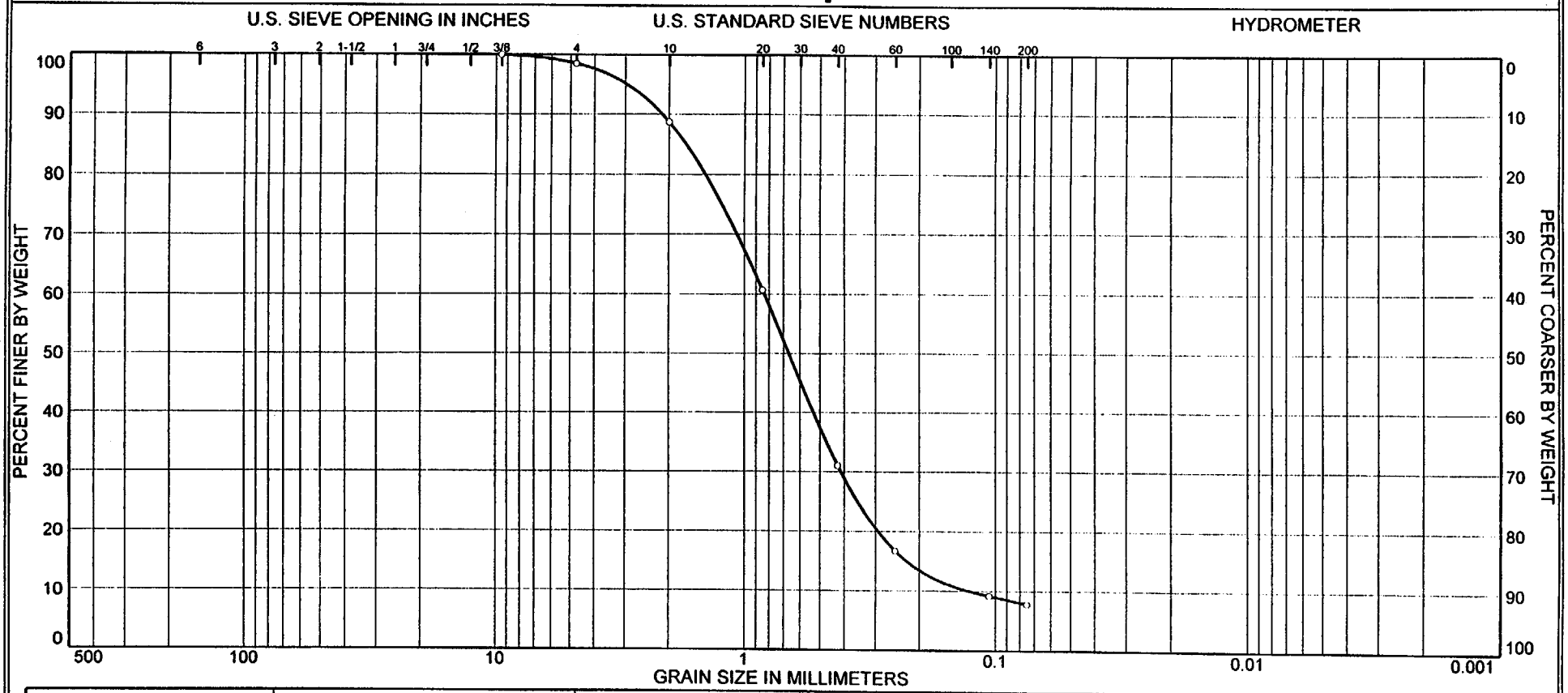
Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC/WFL/JTM Reviewed by:

050

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	1.5	9.8	57.7	23.2	7.8	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-2	25	118-118.5'	8/17/00		Tan Brown Well-graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL REviewed by: HJ

051

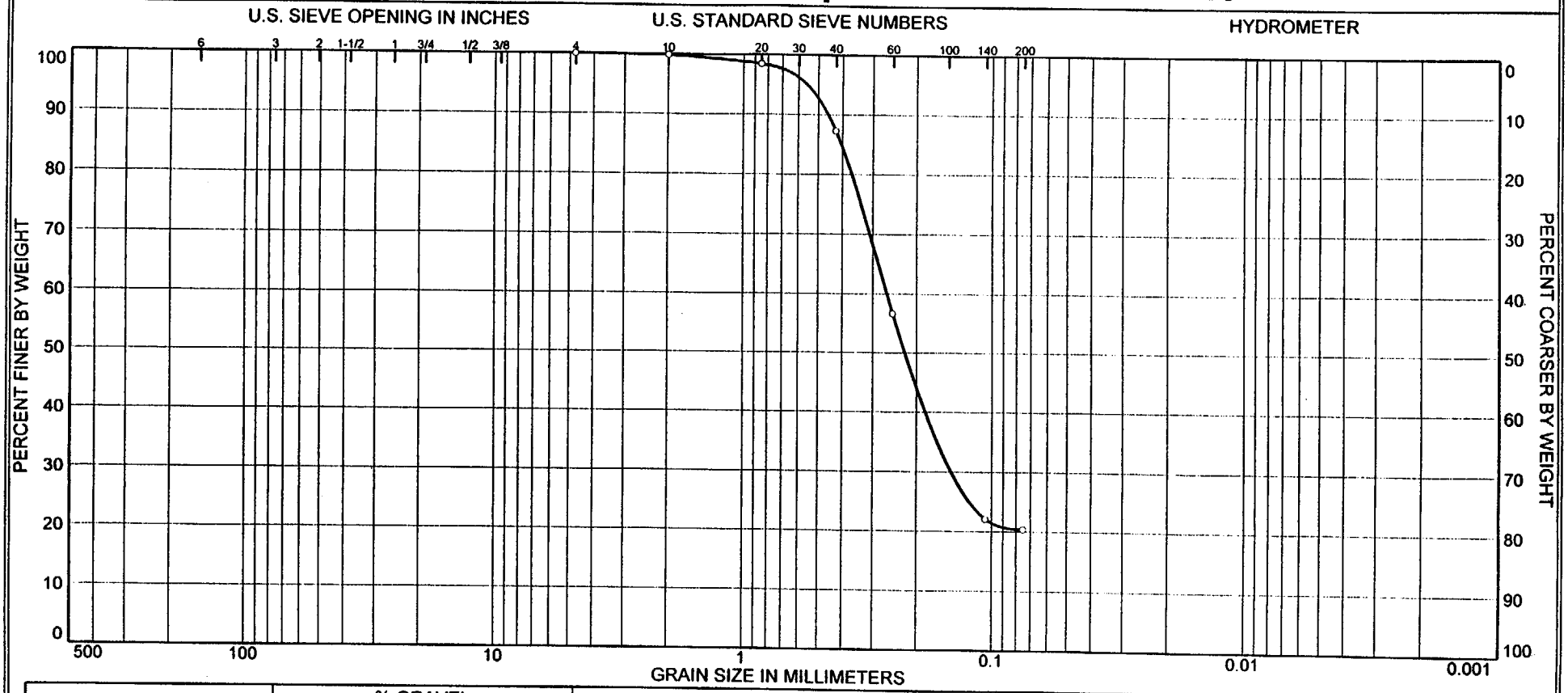
Grain Size & Atter g Limits Summary

Project: **MOX Fuel Fabrication Facility** **LAW Project No:** **50160-0-3963**

Source of Sample	Sample No.	Depth	Material Description	Sand (%)	Silt (%)	Clay (%)	Fines (%)	Natural Moisture (%)	LL	PL	PI
Boring BH-3											
	3	14.5-15	Red Brown Silty sand	79.6			20.4				
	5	24.5-25 Ft.	Red Brown Silty sand	77.1			22.9				
	9	43.2-43.8	Brown Poorly graded sand with silt	93.8			6.2				
	10A-1	48.5-49'	Brown Clayey sand	82.1	3.4	14.5	17.9	28.3	33	18	15
	10A-2	49-49.5'	Brown Clayey sand	65.9			34.1	31.5	87	33	54
	10B (top)	50-52'	Tan Fat clay	12	14.3	73.7	88		148	47	101
	10B (bottom)	50-52'	Tan Elastic silt	10.3	17.2	72.5	89.7		175	82	93
	11-1	53-53.5'	Brown Clayey sand	70.8	5.4	23.8	29.2	34.9	59	29	30
	11-2	54-54.5'	Brown Poorly graded sand with clay	89.8	2	8.2	10.2	24.7	84	24	60
	12-2	59-59.5 Ft.	Tan Brown Silty sand	79.8	4.1	16.1	20.2				
	13	63.5-64 Ft	Tan Poorly graded sand with silt	91.9			8.1				
	14	68-69.5'	Tan Brown Poorly graded sand with clay	92.1	1.1	6.8	7.9	25.7	39	25	14
	15B (top)	75-77'	Tan Poorly graded sand with clay	90.9	2.4	6.7	9.1		101	26	75
	16	81-82'	Brown Poorly graded sand	95.3			4.7				
	17A-1	86-87.5'	Tan & Black Clayey sand	72.1	8.6	19.3	27.9	37.70%	59	24	35
	17B (top)	88-90'	Brown Clayey sand	61.2	11.5	27.3	38.8		98	36	62
	17B (bottom)	88-90'	Brown Silty sand	79.4	5.7	14.9	20.6		43	31	12
	21 (Composite)	111.5-112.5'	Brown Silty sand	80.8	4.5	14.7	19.2	33.5	44	28	16

052

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	12.6	66.9	20.4	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	3	14.5-15	8/17/00		Red Brown Silty sand			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

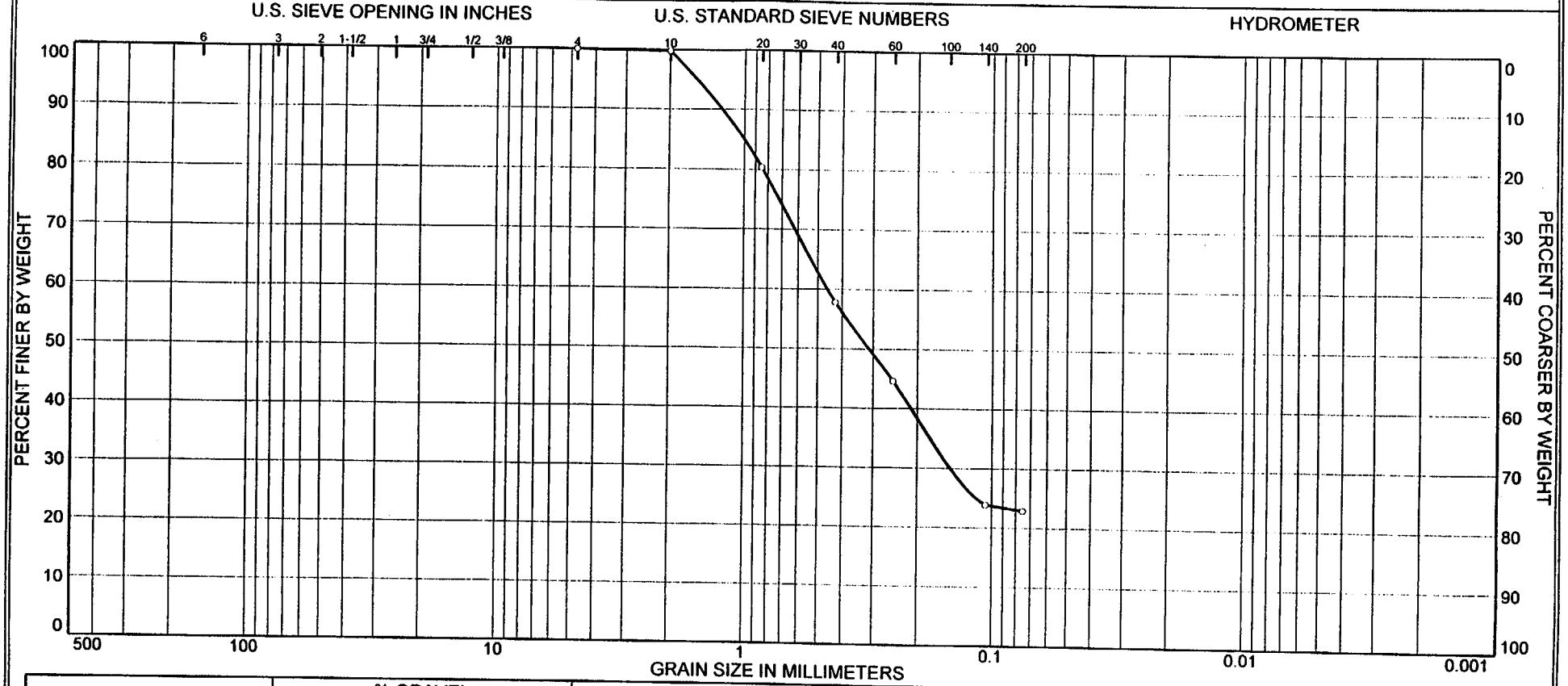
Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL Reviewed by: HJ

053

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.2	42.0	34.9	22.9	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	5	24.5-25 Ft.	8/17/00		Red Brown Silty sand			

Client Duke Cogema Stone & Webster (DCS)

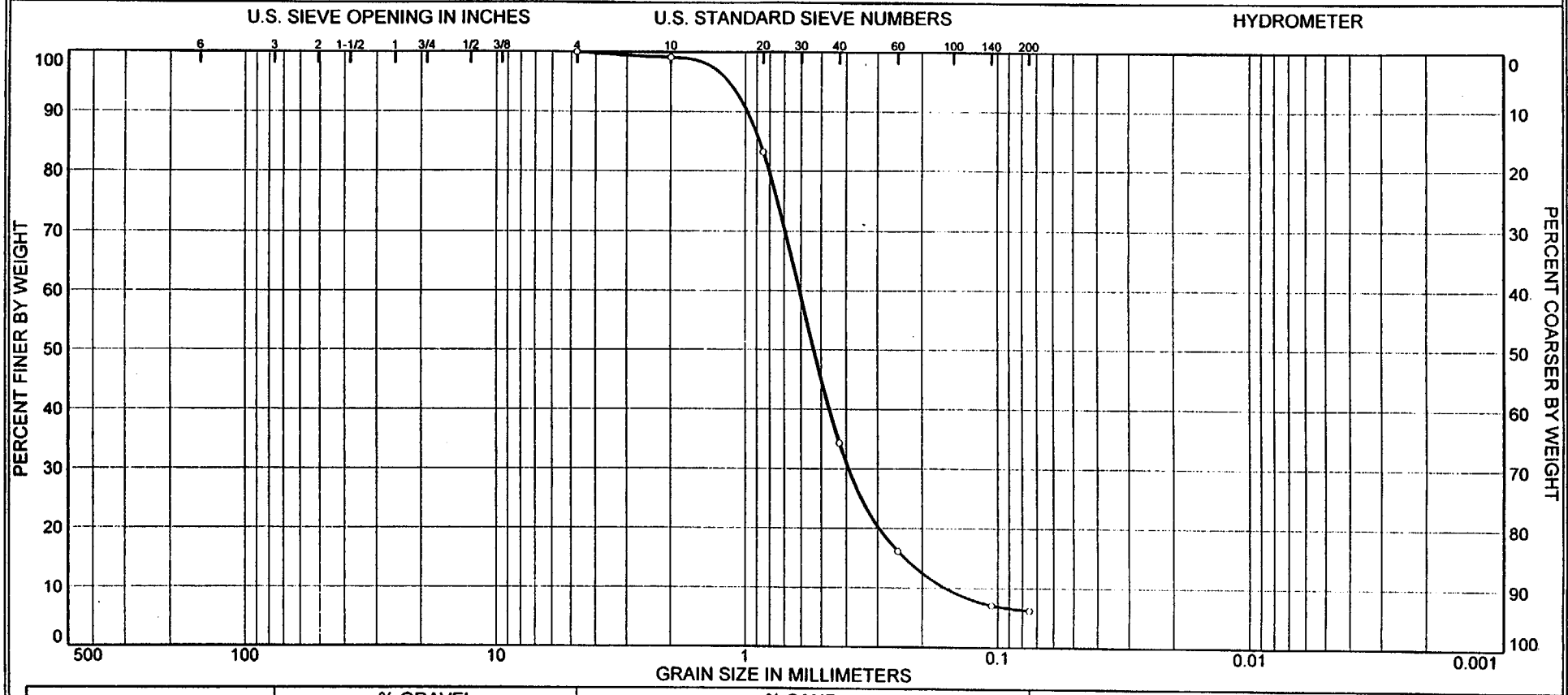
Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL Reviewed by: HJ

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.9	64.8	28.1	6.2	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	9	43.2-43.8	8/17/00		Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

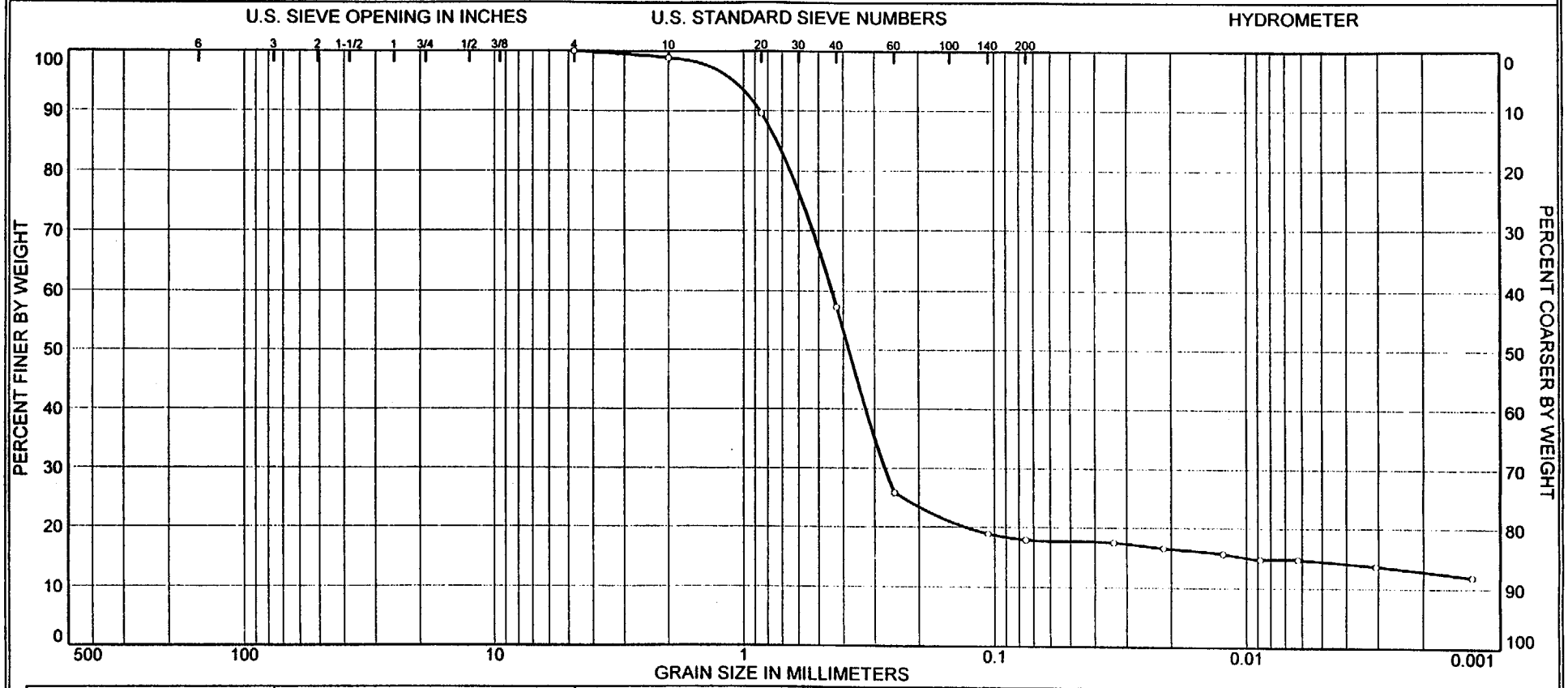
Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL Reviewed by: HJ

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.1	41.6	39.4	3.4	14.5

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	10A-1	48.5-49'	9/1/00	SC	Brown Clayey sand	28.3	33	18

Client Duke Cogema Stone & Webster (DCS)

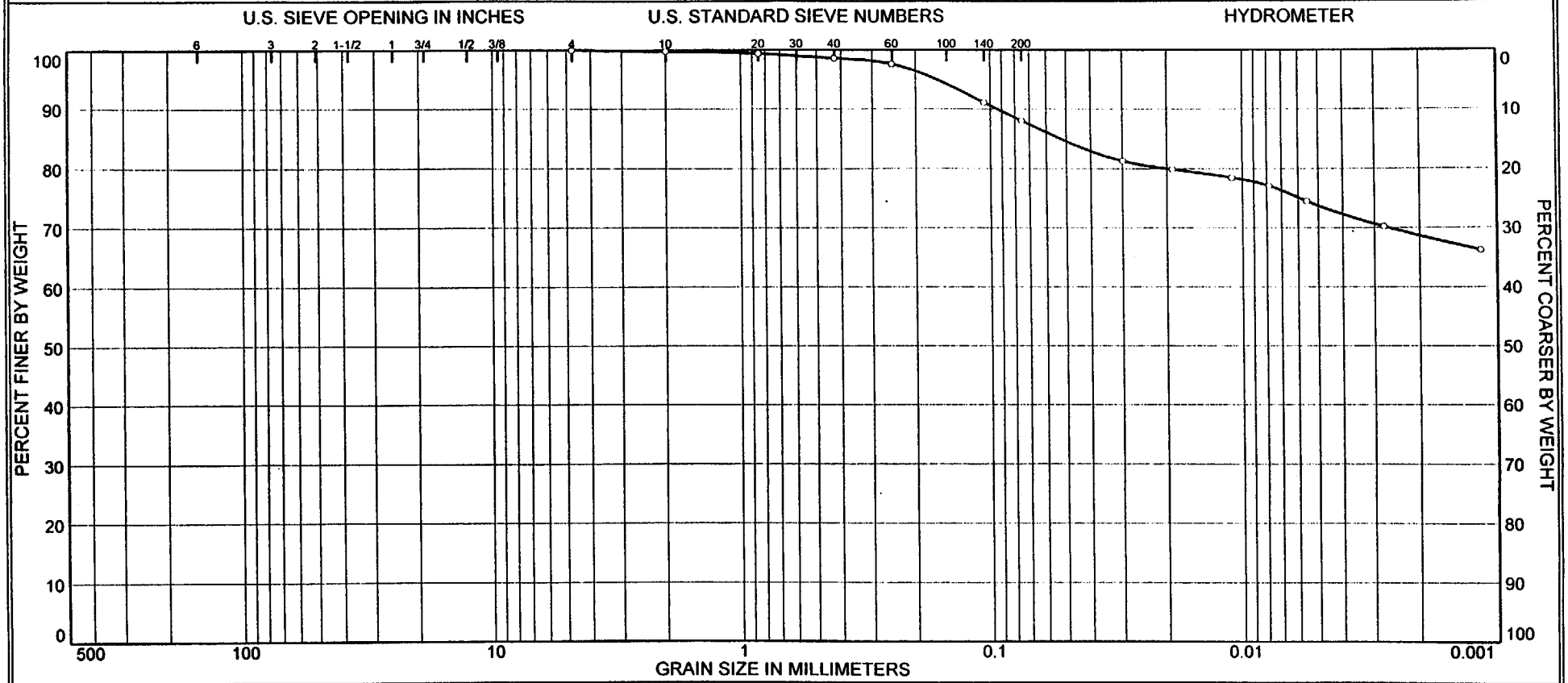
Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL Reviewed by: HJ

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.2	1.2	10.6	14.3	73.7

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	10B (TOP)	50-52'	9/25/00	CH	Tan Fat clay		148	47

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

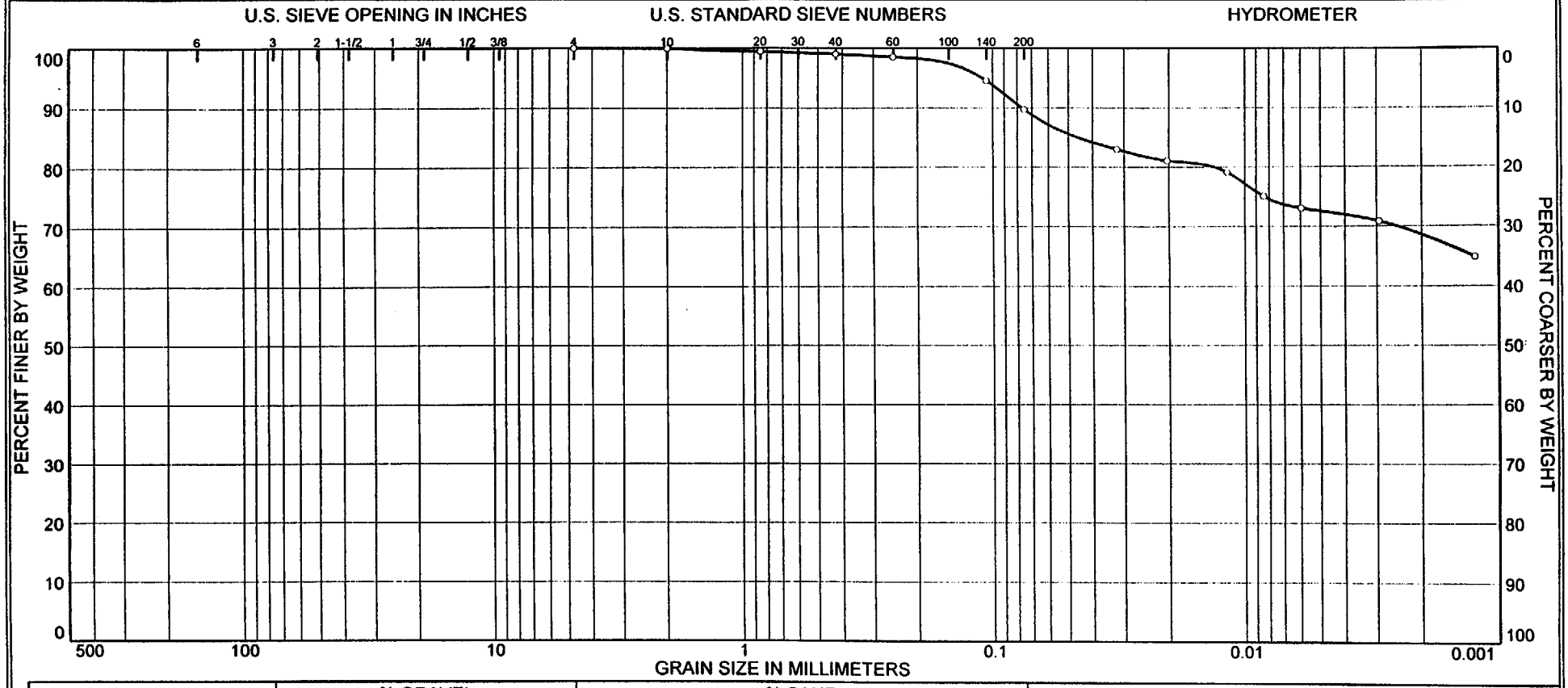
Project No. 5016003963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC/WFL Reviewed by: HJ

057

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	1.0	9.3	17.2	72.5

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	10B bot	50-52'	9/25/00	MH	Tan Elastic silt		175	82

Client Duke Cogema Stone & Webster (DCS)

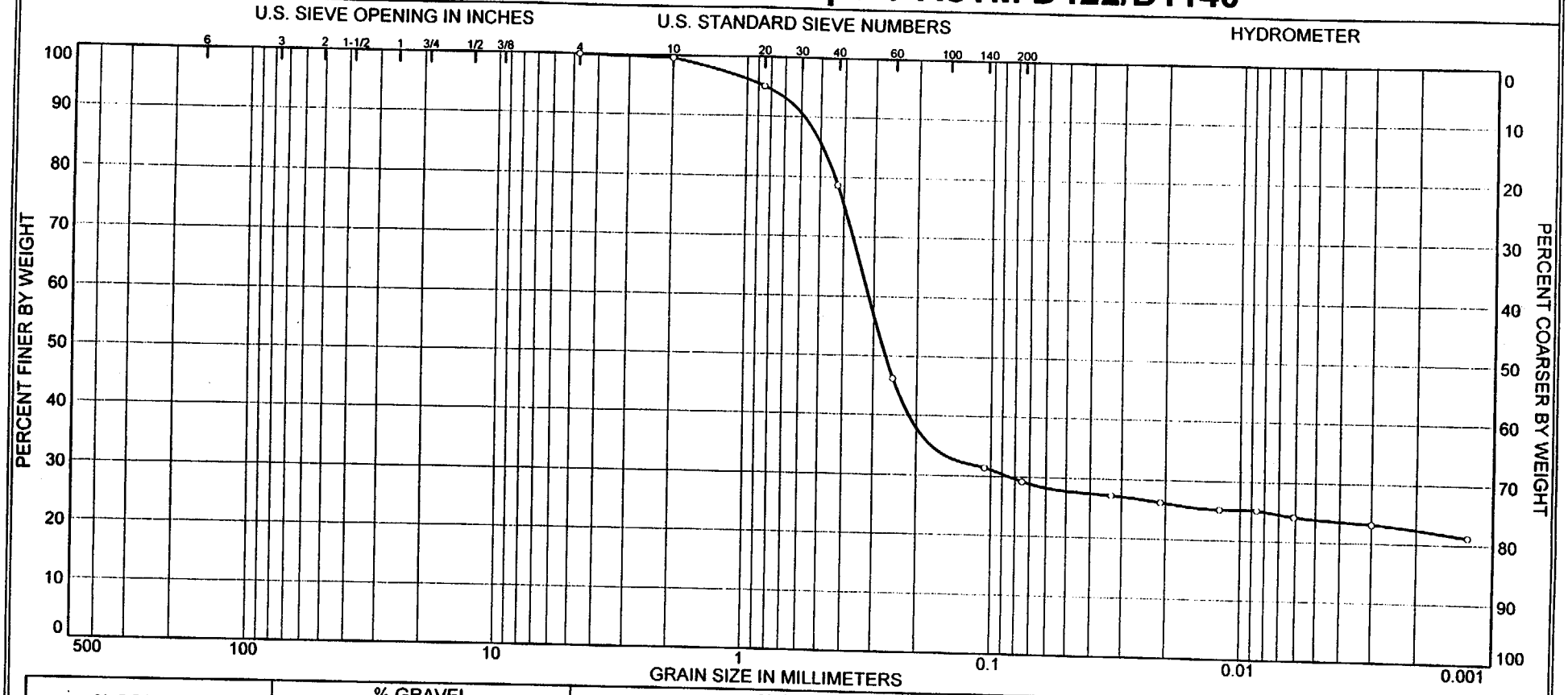
Project MOX Fuel Fabrication Facility

Project No. 5016003963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC/WFL Reviewed by: HJ

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.4	20.9	49.5	5.4	23.8

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	11-1	53-53.5'	8/23/00	SC	Brown Clayey sand	34.9	59	29

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

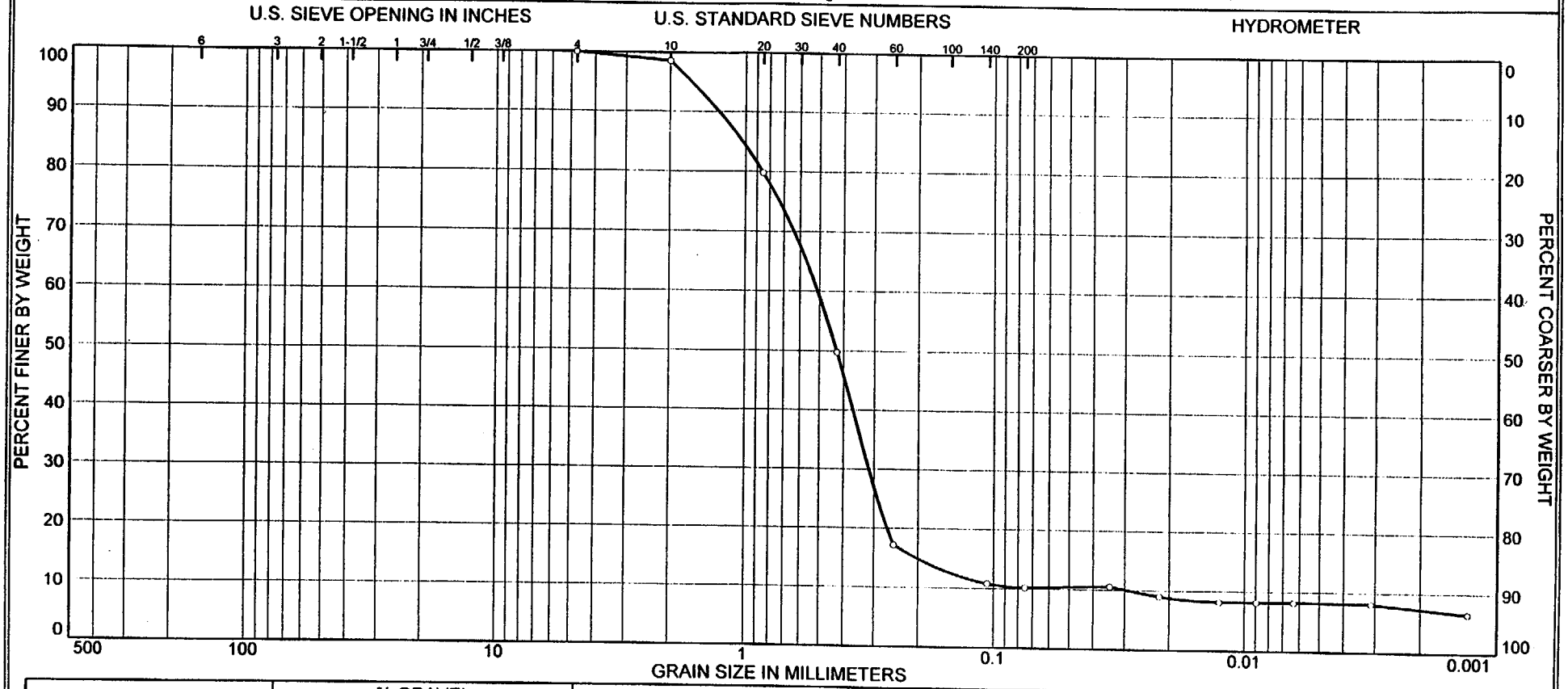
Project No. 50160-0-3963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC/WFL/JTM Reviewed by: HJ

059

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.4	48.8	39.6	2.0	8.2

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	11-2	54-54.5'	8/23/00	SP-SC	Brown Poorly graded sand with clay	24.7	84	24

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

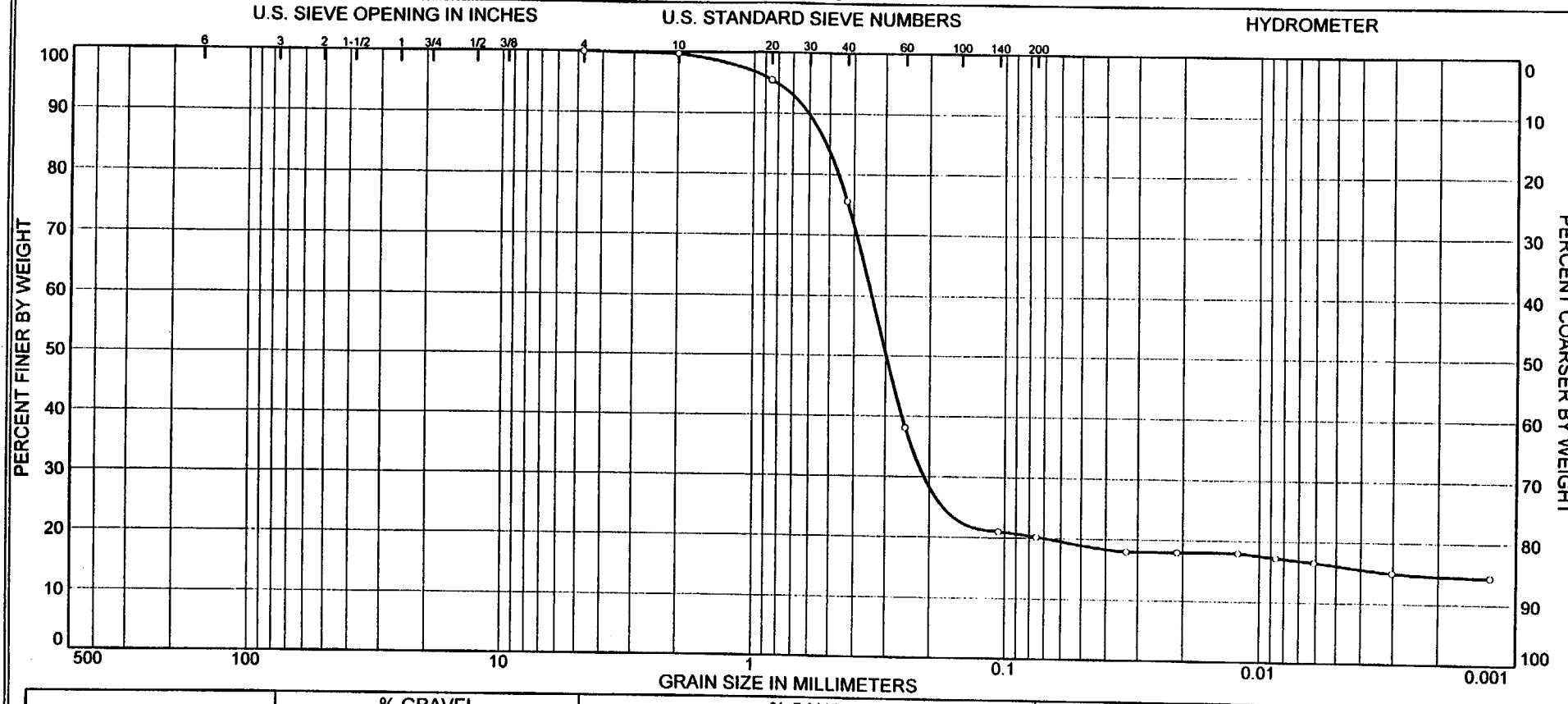
Project No. 50160-0-3963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL/SC/JTM Reviewed by: HJ

090

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.3	24.1	55.4	4.1	16.1

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	12-2	59-59.5 Ft.	8/17/00		Tan Brown Silty sand			

Client Duke Cogema Stone & Webster (DCS)

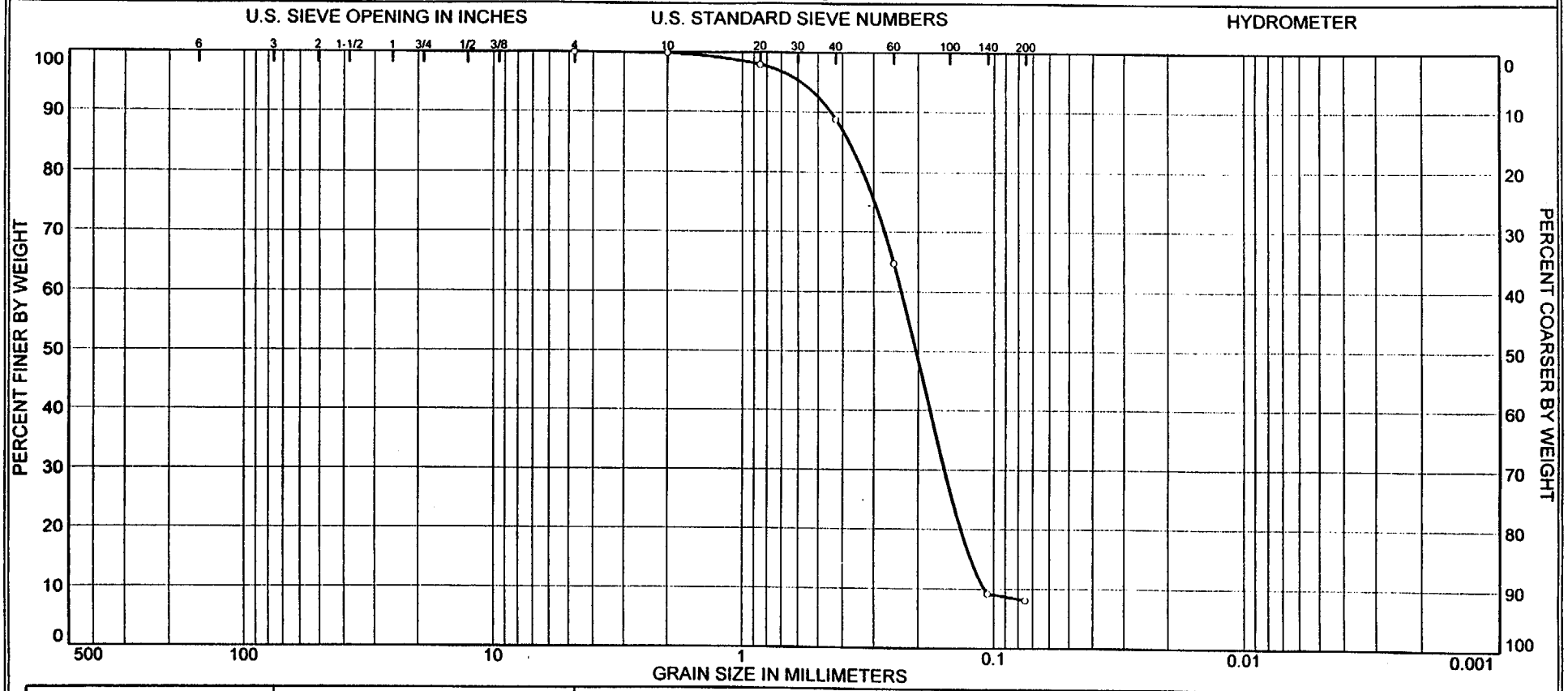
Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC/WFL Reviewed by: HJ

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	11.1	80.7	8.1	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	13	63.5-64 Ft	8/17/00		Tan Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

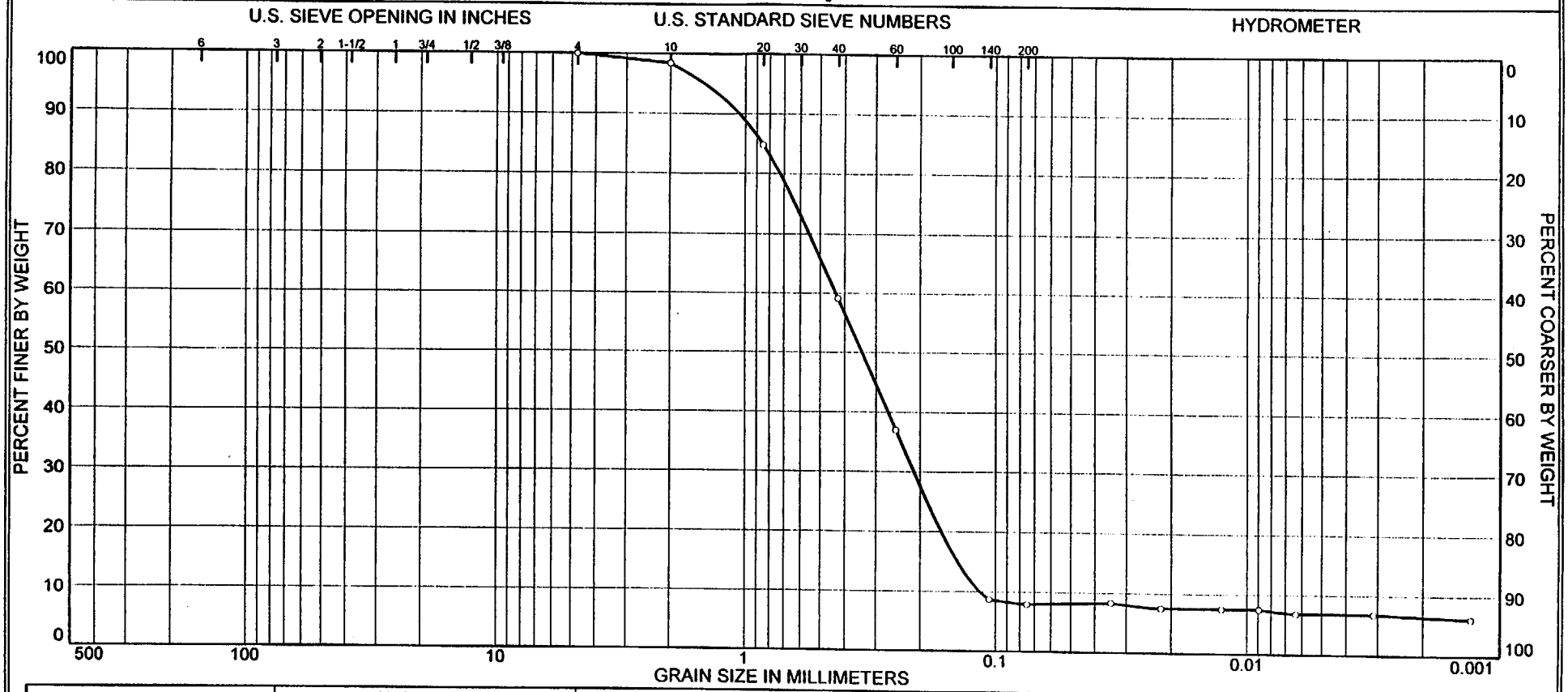
Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL Reviewed by: HJ

062

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.6	39.3	51.2	1.1	6.8

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	14	68-69.5'	9/1/00	SP-SC	Tan Brown Poorly graded sand with clay	25.7	39	25

Client Duke Cogema Stone & Webster (DCS)

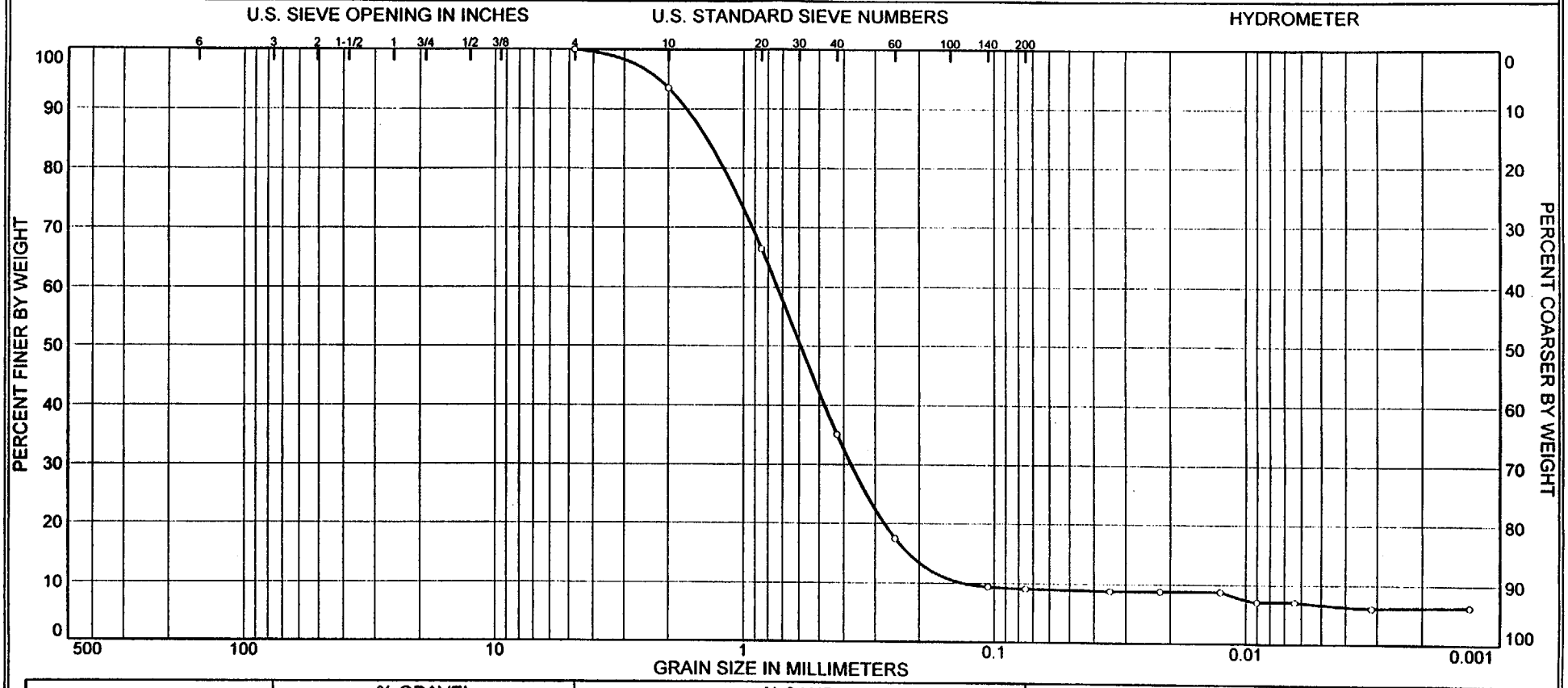
Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL Reviewed by: HJ Moisture Content = 25.7%

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	6.5	58.4	26.0	2.4	6.7

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	15B (TOP)	75-77'	9/25/00	SP-SC	Tan Poorly graded sand with clay		101	26

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

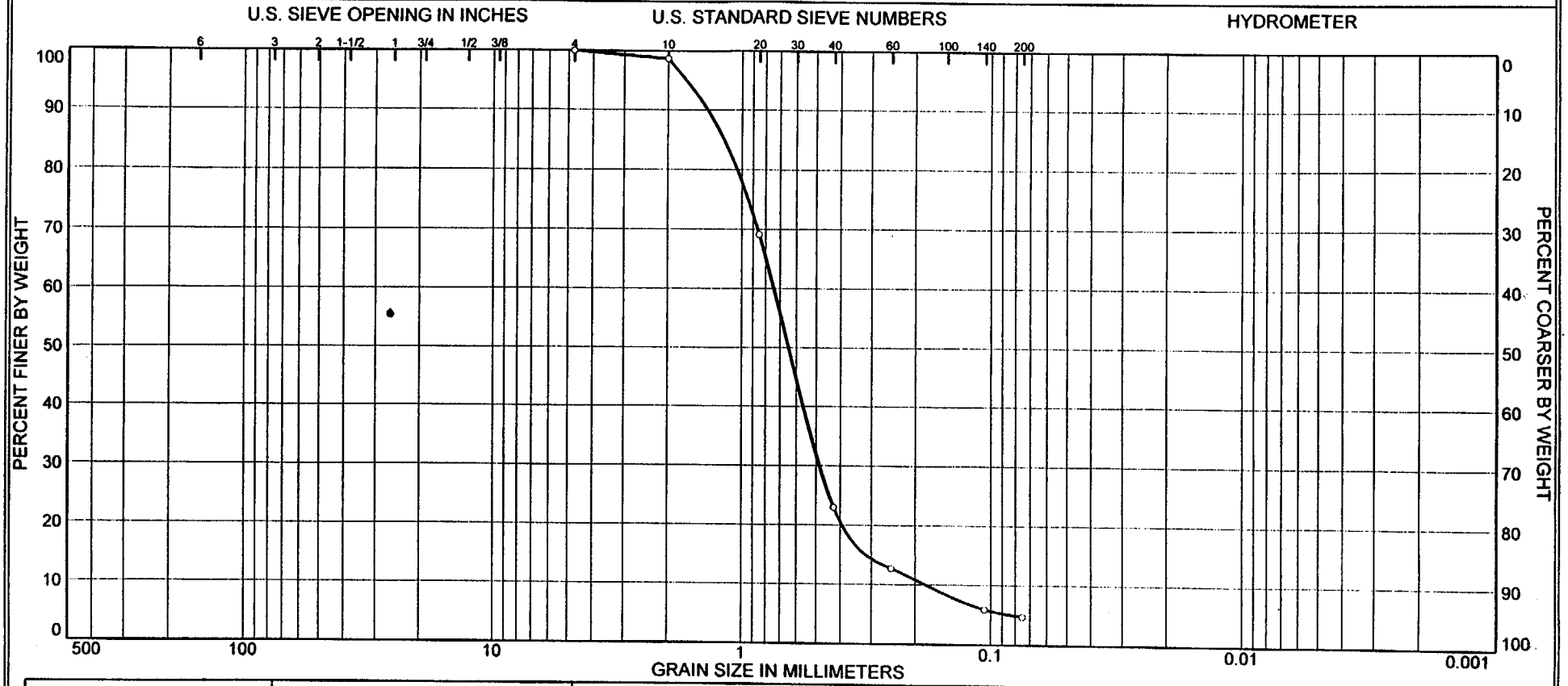
Project No. 5016003963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC/WFL Reviewed by: HJ

064

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.3	75.7	18.3	4.7	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	16	81-82'	8/17/00		Brown Poorly graded sand			

Client Duke Cogema Stone & Webster (DCS)

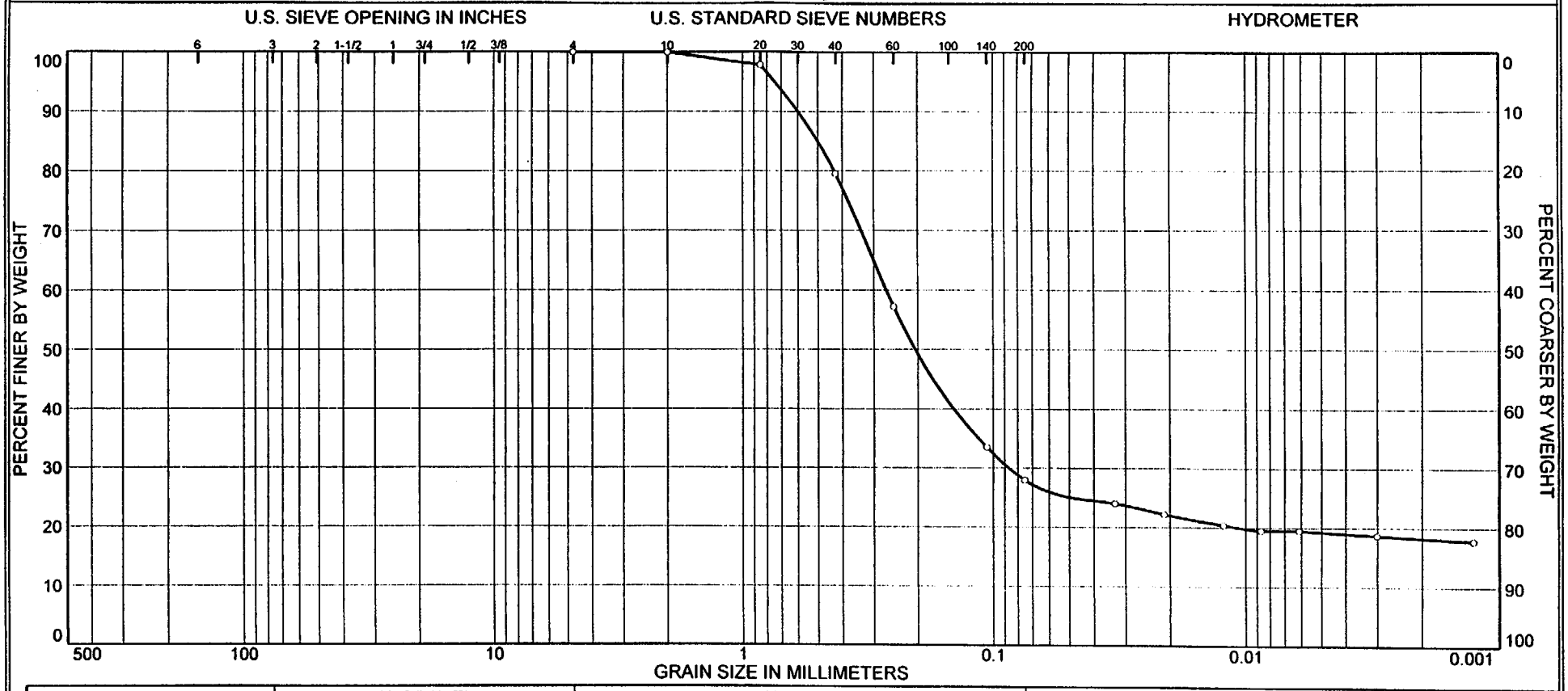
Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL Reviewed by: HJ

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	20.5	51.6	8.6	19.3

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	17A-1	86-87.5'	8/23/00	SC	Tan & Black Clayey sand	37.7%	59	24

Client Duke Cogema Stone & Webster (DCS)

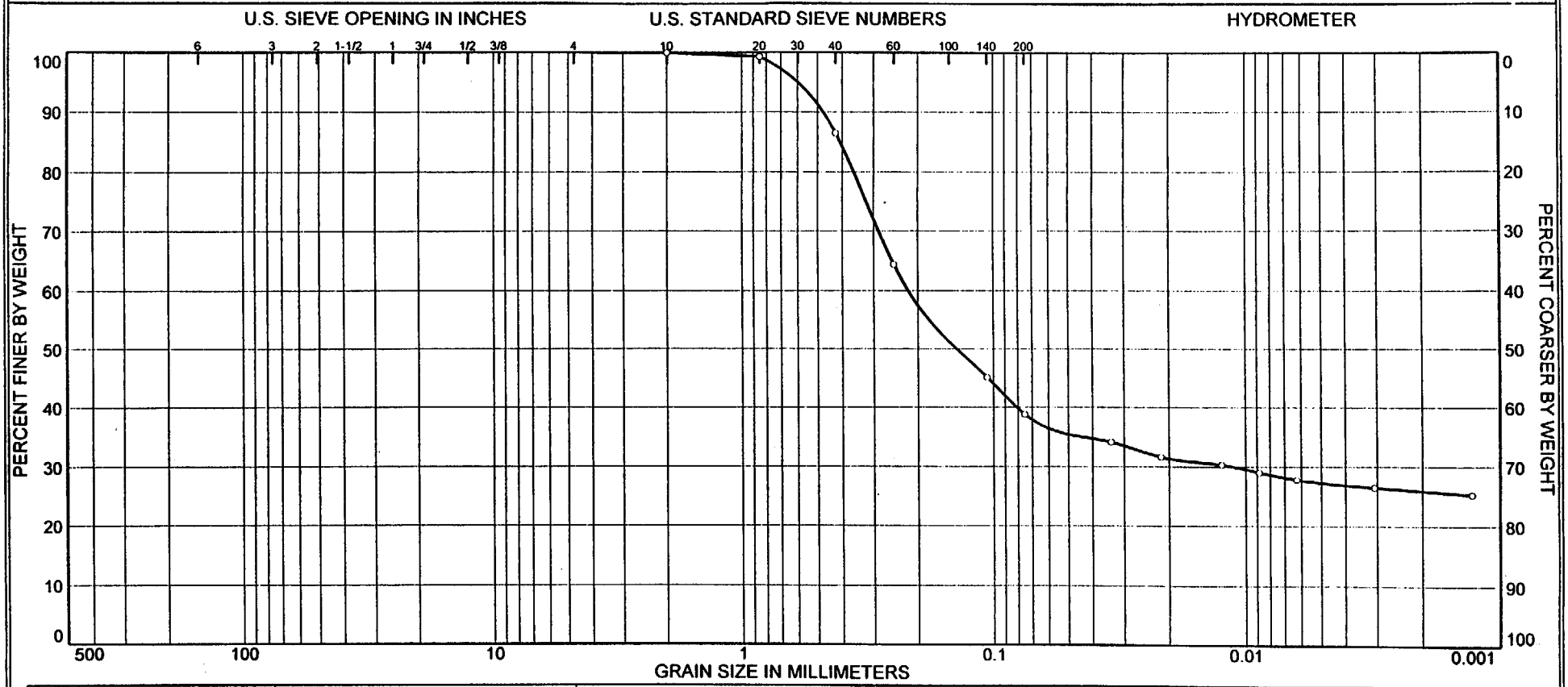
Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC/JTM/WFL Reviewed by: HJ Moisture Content = 37.7%

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	13.5	47.7	11.5	27.3

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	17B (top)	88-90'	10/9/00	SC	Brown Clayey sand		98	36

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 5016003963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL/SC Reviewed by: HJ

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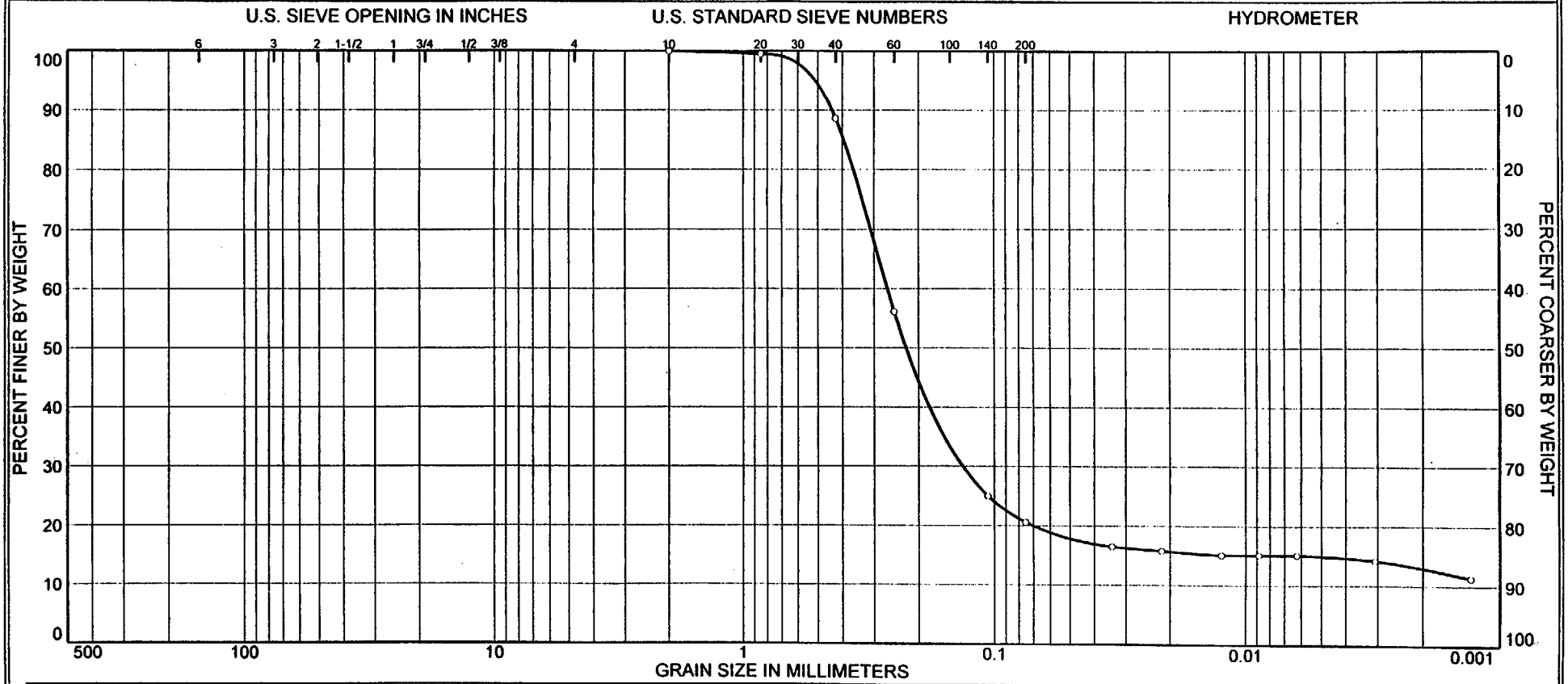
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	11.4	68.0	5.7	14.9

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	17B Bot	88-90'	10/9/00	SM	Brown Silty sand		43	31

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

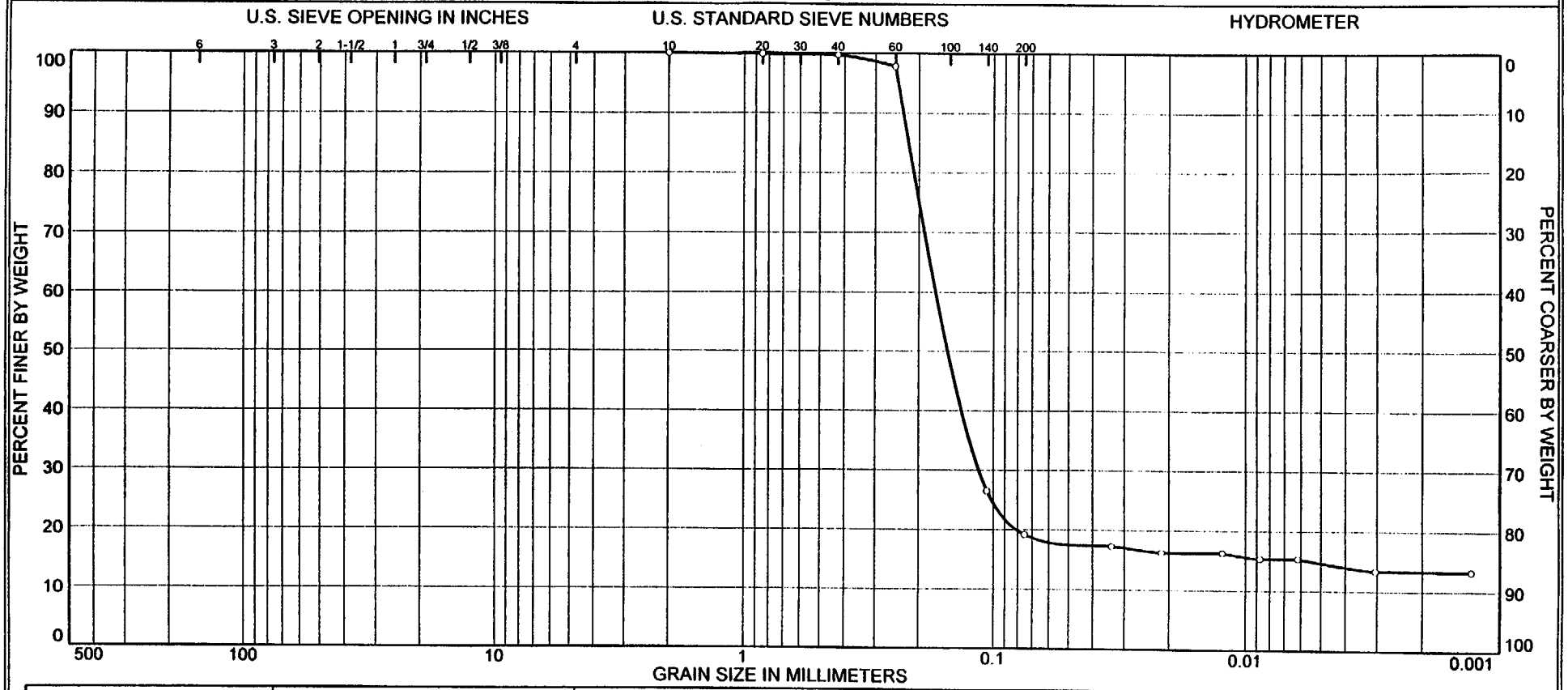
Project No. 5016003963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL?Sc Reviewed by: HJ

068

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	0.3	80.5	4.5	14.7

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-3	21 (Composite)	111.5-112.5'	8/31/00	SM	Brown Silty sand	33.5	44	28

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL/SC Reviewed by: HJ

690

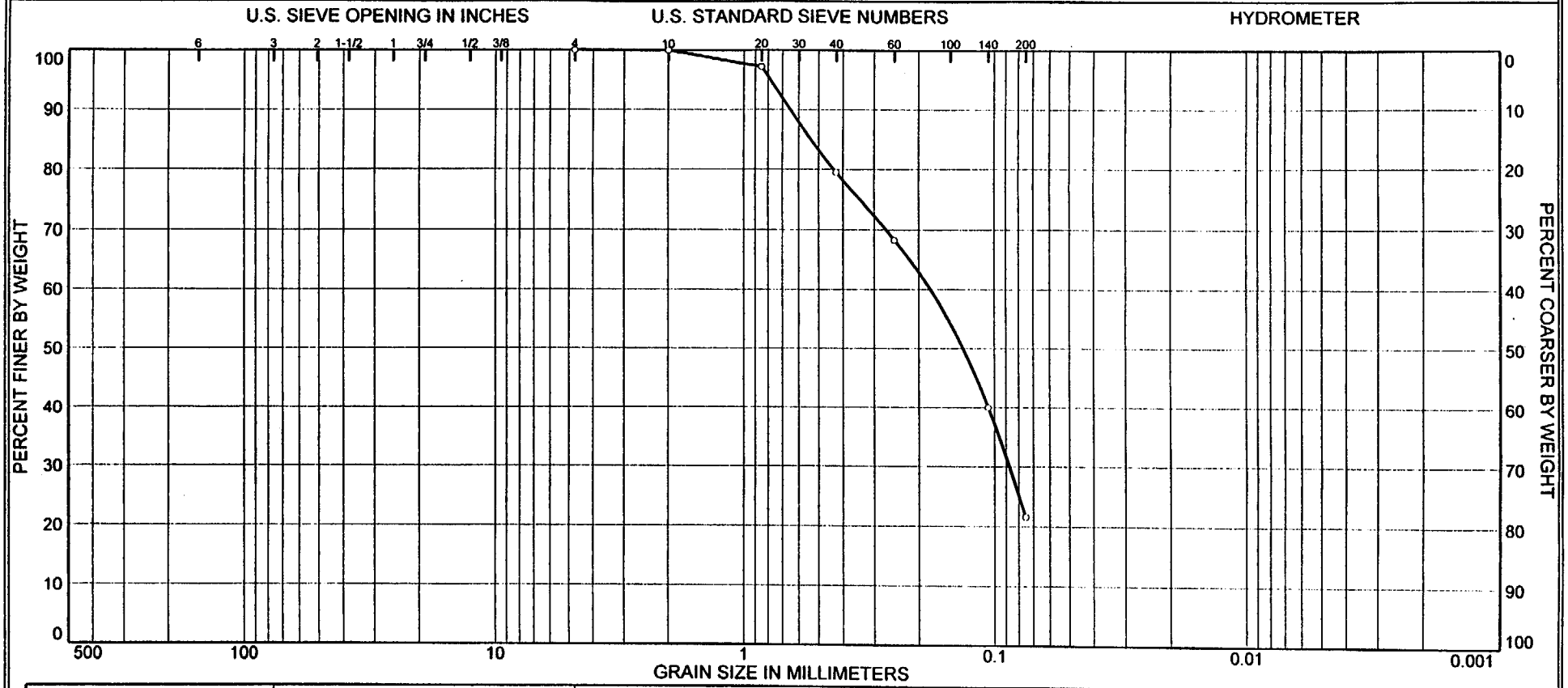
Grain Size & Atterberg Limits Summary

Project: MOX Fuel Fabrication Facility **LAW Project No:** 50160-0-3963

Source of Sample	Sample No.	Depth	Material Description	Sand (%)	Silt (%)	Clay (%)	Fines (%)	Natural Moisture (%)	LL	PL	PI
Boring BH-4											
	4	41-42	Red Brown & Tan Silty sand	78.4			21.6	9.5			
	5	46-47 Ft.	Red Brown & Tan Silty sand	81.4			18.6	22			
	7	57-58 Ft.	Red Brown Silty sand	86			14	17.7			
	10	71.5-72.5'	silt	93.8			6.2				
	12	81.7-82.5'	Tan Poorly graded sand with silt	89.9			10.1				
	14	91-92.5'	Tan Brown Clayey sand	78.6	3	18.4	21.4	26.3	94	36	58
	15	97-97.5'	Gray Brown Sandy elastic silt	43.3	17.7	39	56.7	67	80	62	18
	18	111.5-112.5'	Tan Brown Poorly graded sand with silt	91.2			8.8				
	20 (composite)	121.5-122.5'	Brown Clayey sand	60	10	29.9	40	34.4	74	22	52
	28	161.5-162.5'	Tan Brown Poorly graded sand with silt	88.4			11.6				

070

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	20.5	57.9	21.6	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-4	4	41-42	8/17/00		Red Brown & Tan Silty sand	9.5		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

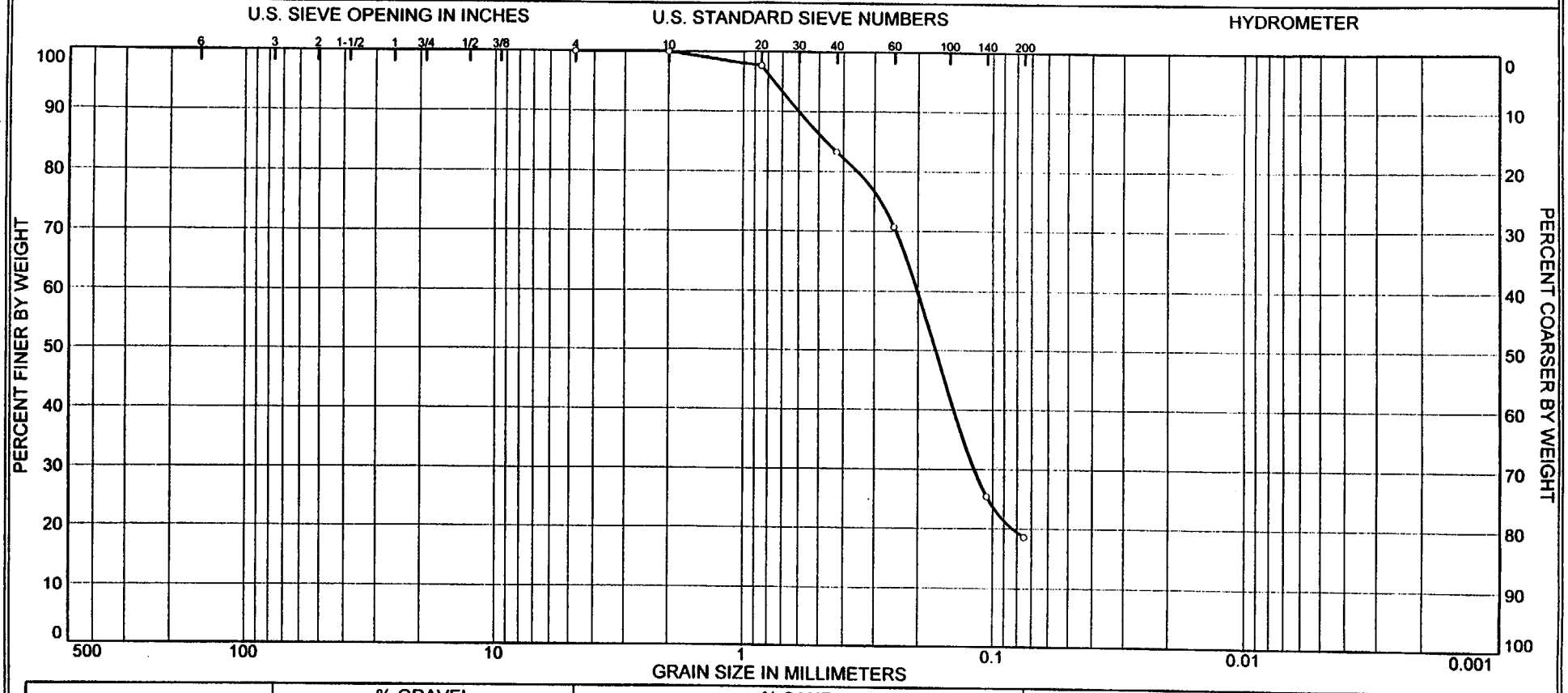
Project No. 50160-0-3963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL Reviewed by: HJ

071

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	16.7	64.7	18.6	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-4	5	46-47 Ft.	8/17/00		Red Brown & Tan Silty sand	22.0		

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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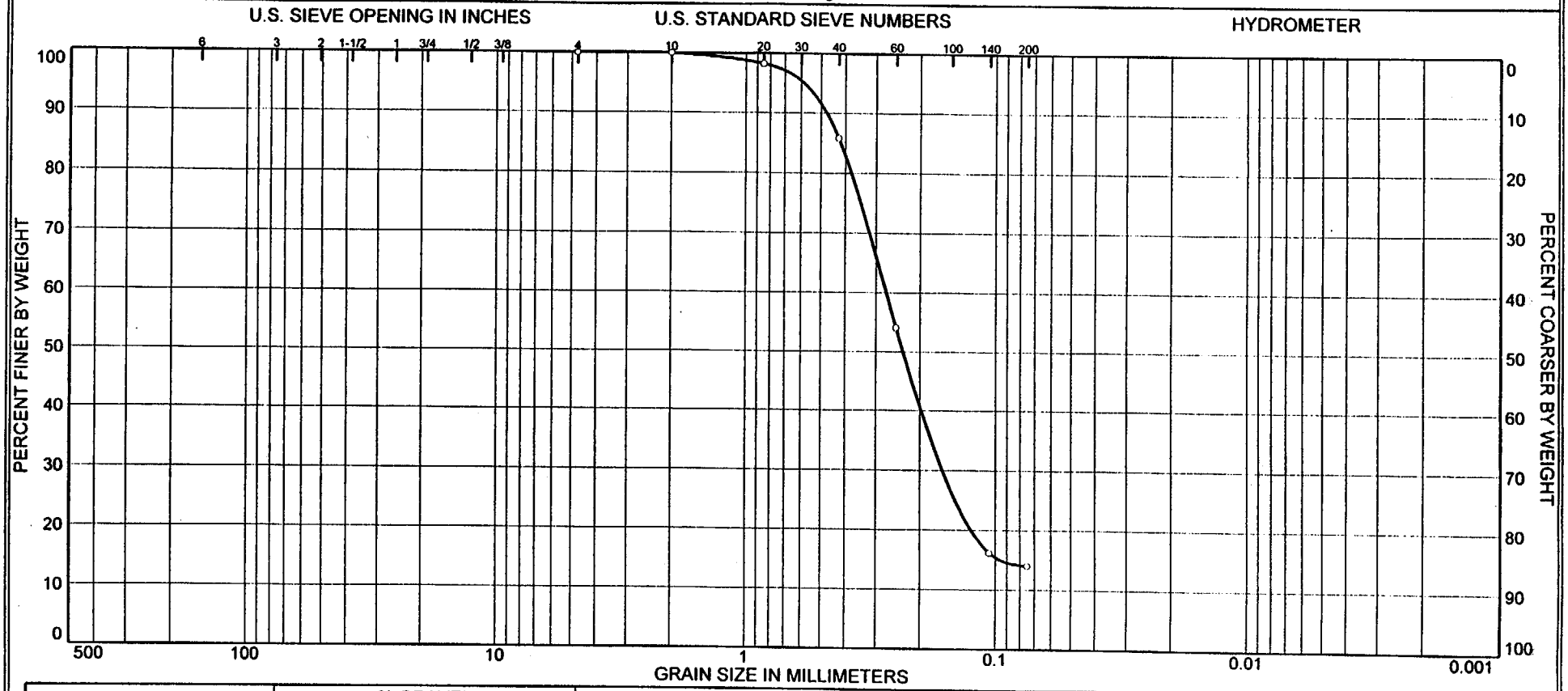
072

Particle Size Distribution Report ASTM D422/D1140



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	14.2	71.8	14.0	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-4	7	57-58 Ft.	8/17/00		Red Brown Silty sand	17.7		

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Project No. 50160-0-3963 | Plate

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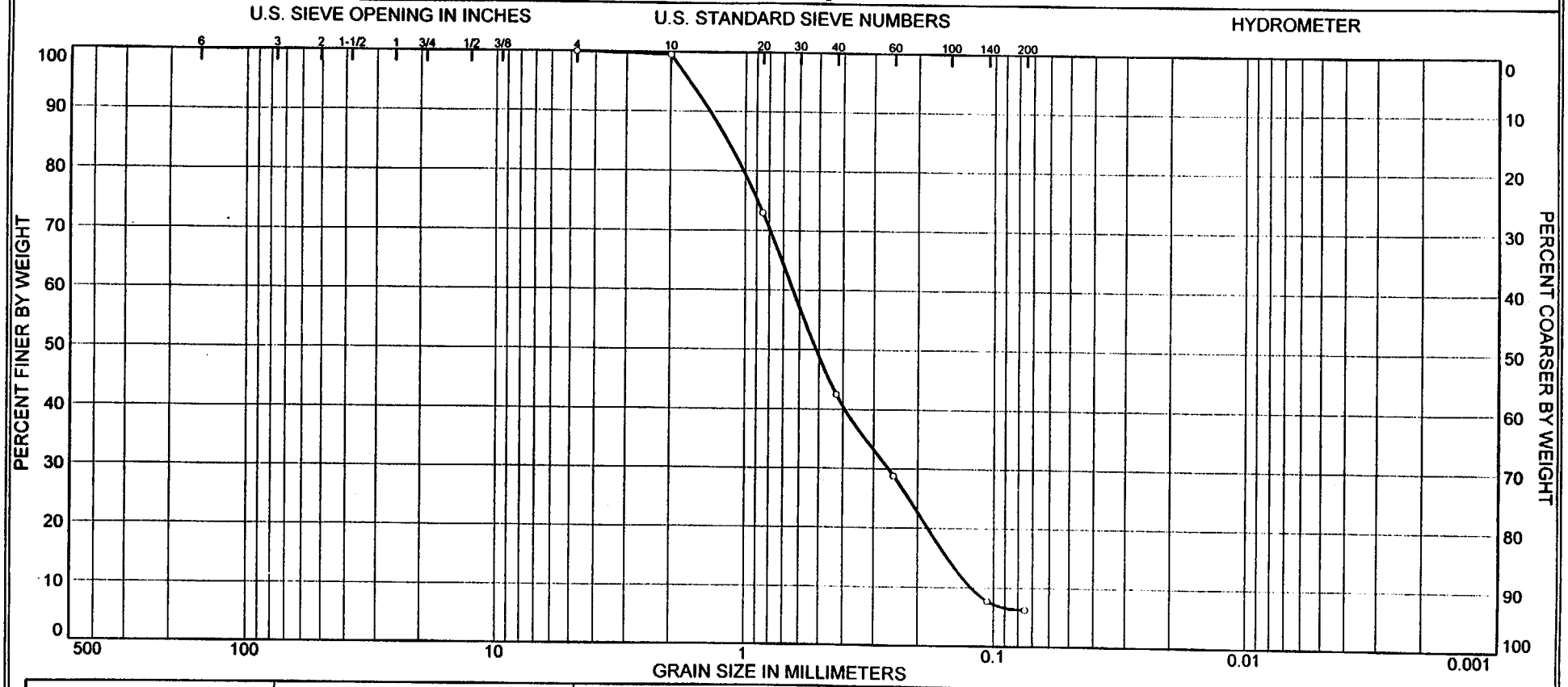
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.4	57.1	36.3	6.2	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-4	10	71.5-72.5'	8/17/00		Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

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Project No. 50160-0-3963 Plate

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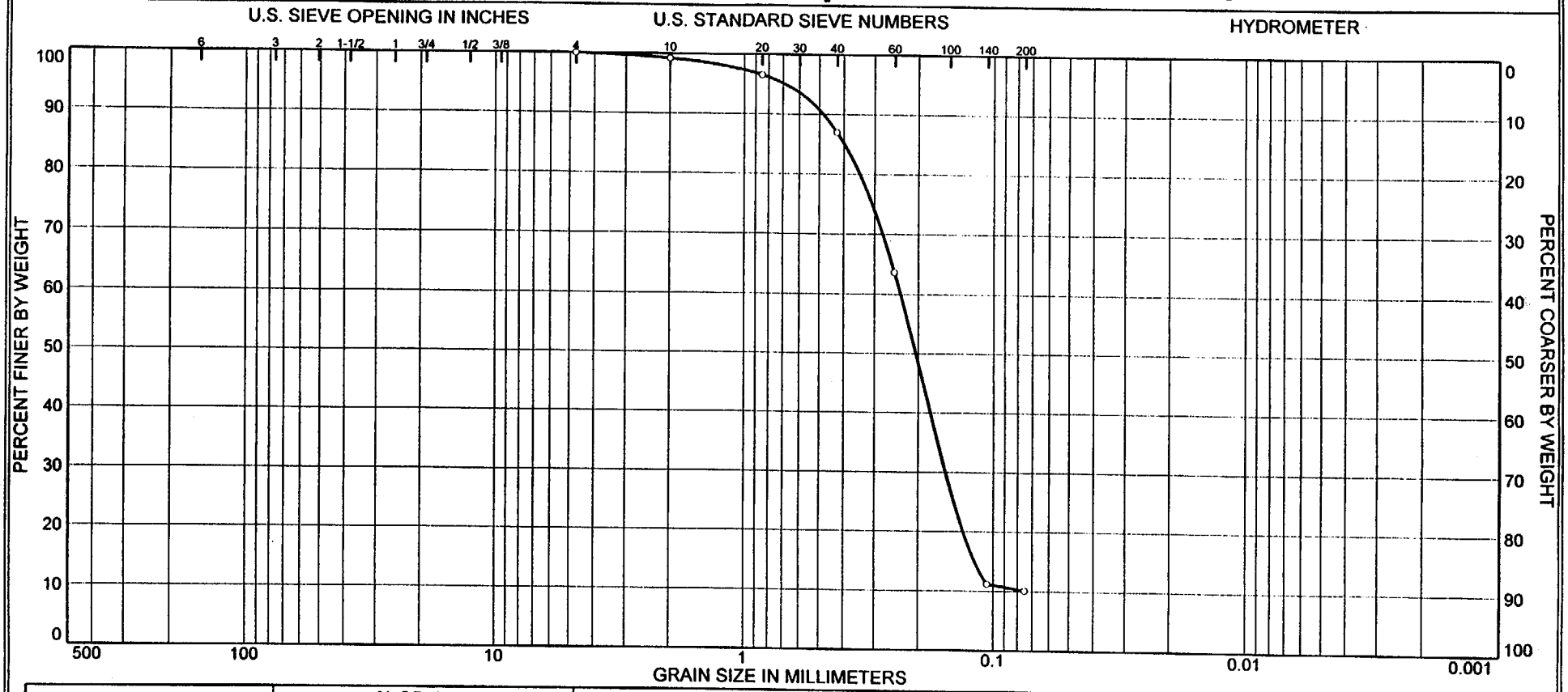
074

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.8	12.2	76.9	10.1	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-4	12	81.7-82.5'	8/17/00		Tan Poorly graded sand with silt			

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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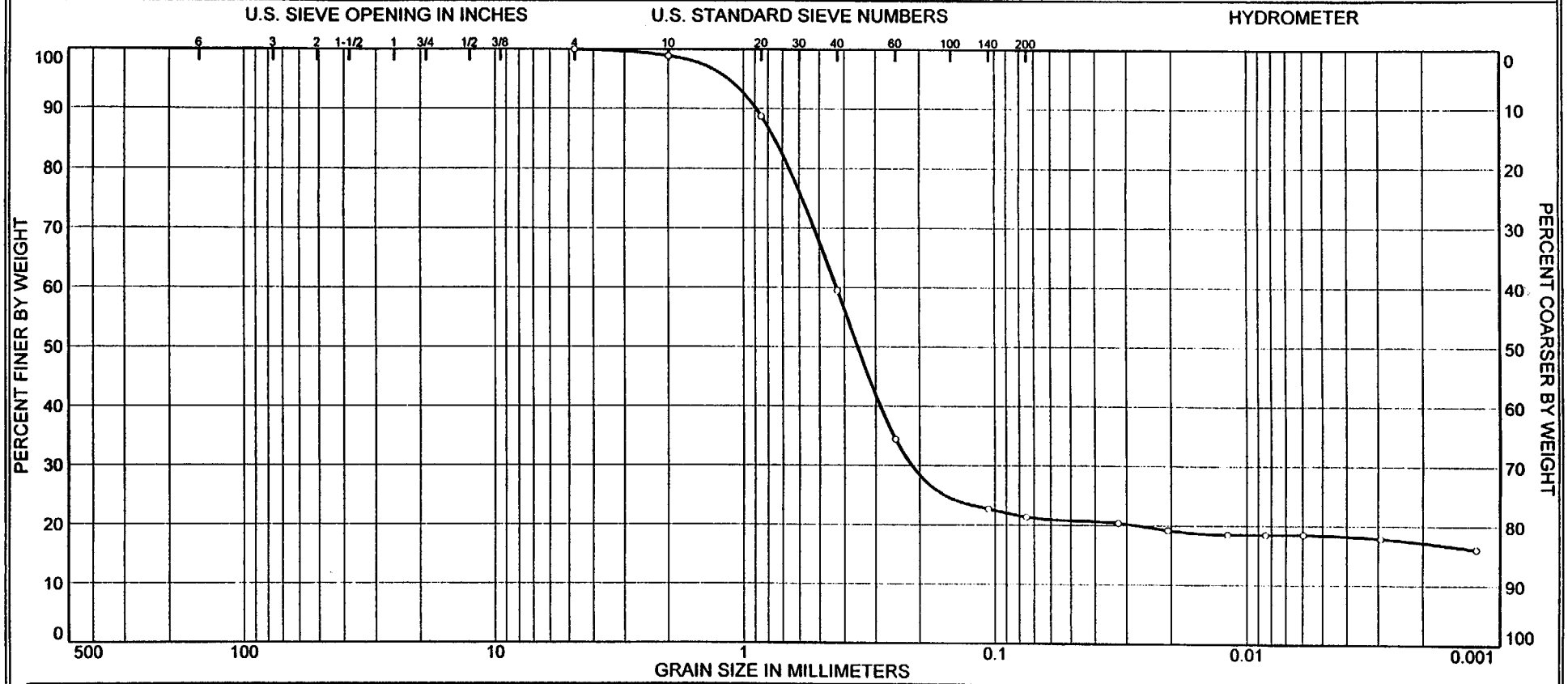
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.1	39.4	38.1	3.0	18.4

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-4	14	91-92.5'	8/22/00	SC	Tan Brown Clayey sand	26.3	94	36

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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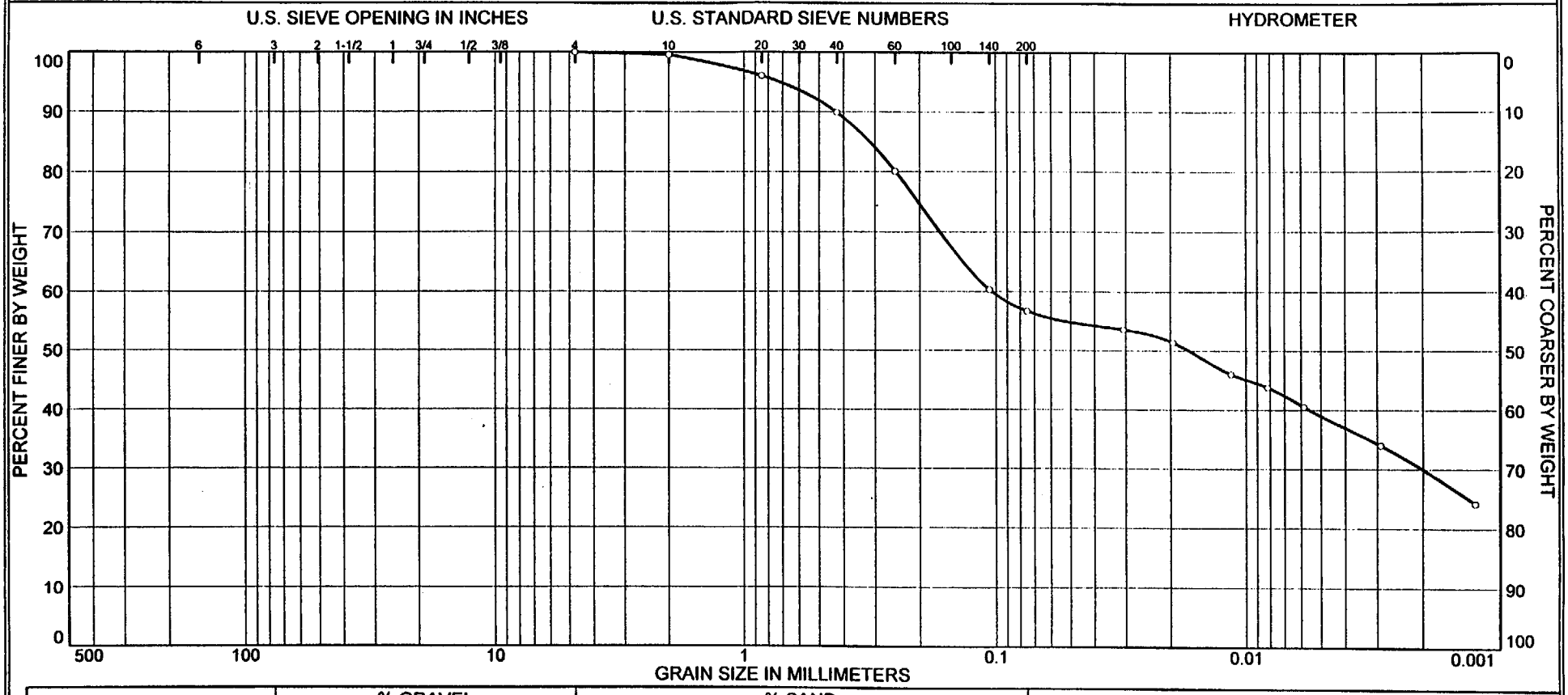
076

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.4	9.7	33.2	17.7	39.0

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-4	15	97-97.5'	8/22/00	MH	Gray Brown Sandy elastic silt	67.0	80	62

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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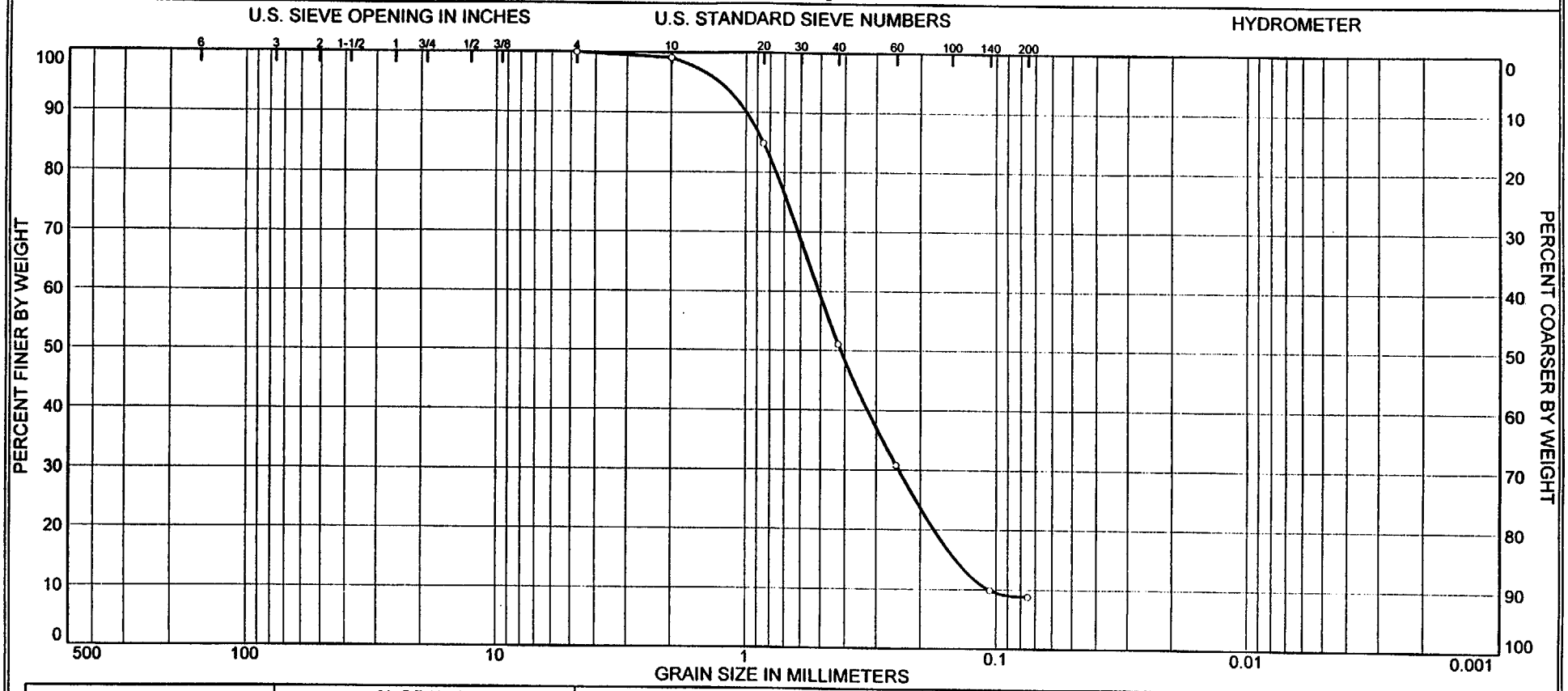
077

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.9	48.0	42.3	8.8	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-4	18	111.5-112.5	8/17/00		Tan Brown Poorly graded sand with silt			

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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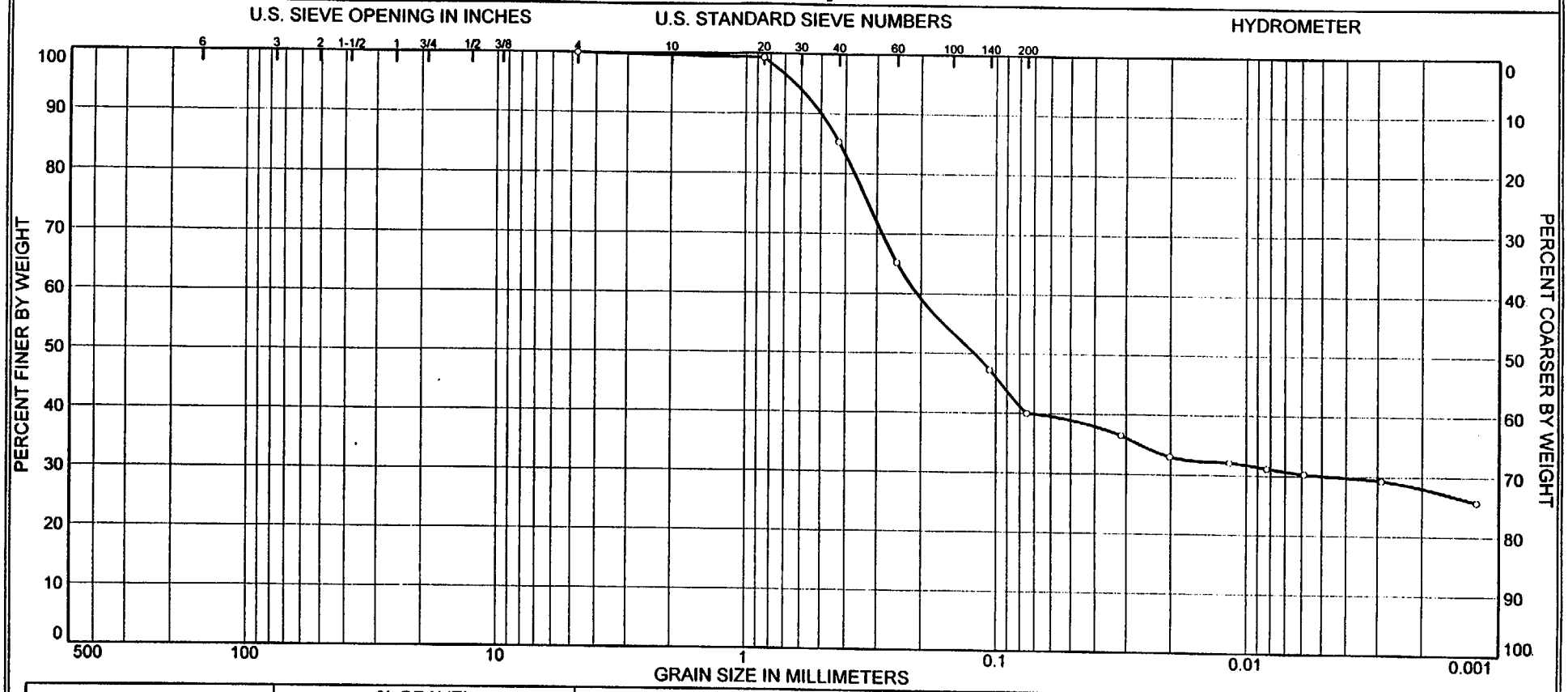
078

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.4	14.4	45.2	10.0	29.9

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-4	20 (composite)	121.5-122.5'	8/22/00	SC	Brown Clayey sand	34.4	74	22

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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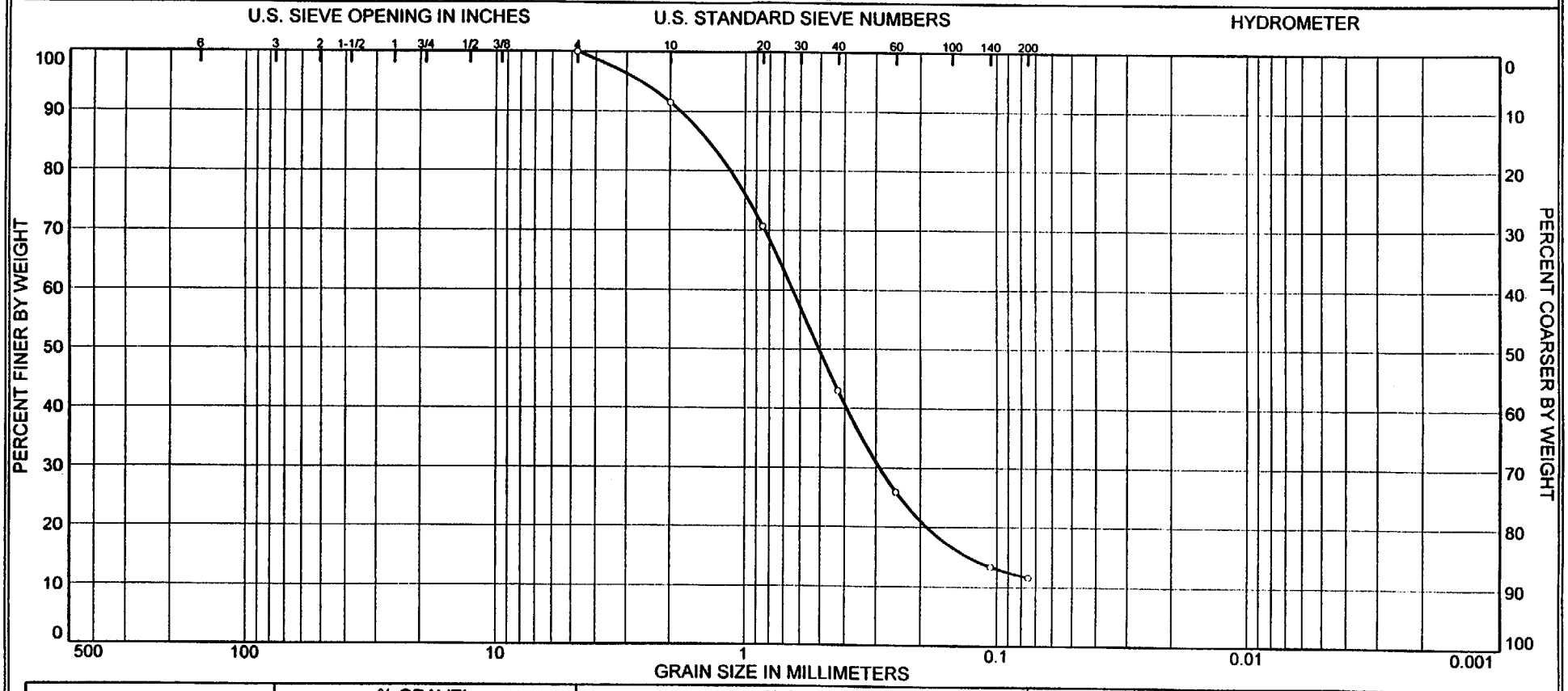
079

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	8.5	48.5	31.4	11.6	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-4	28	161.5-162.5	8/17/00		Tan Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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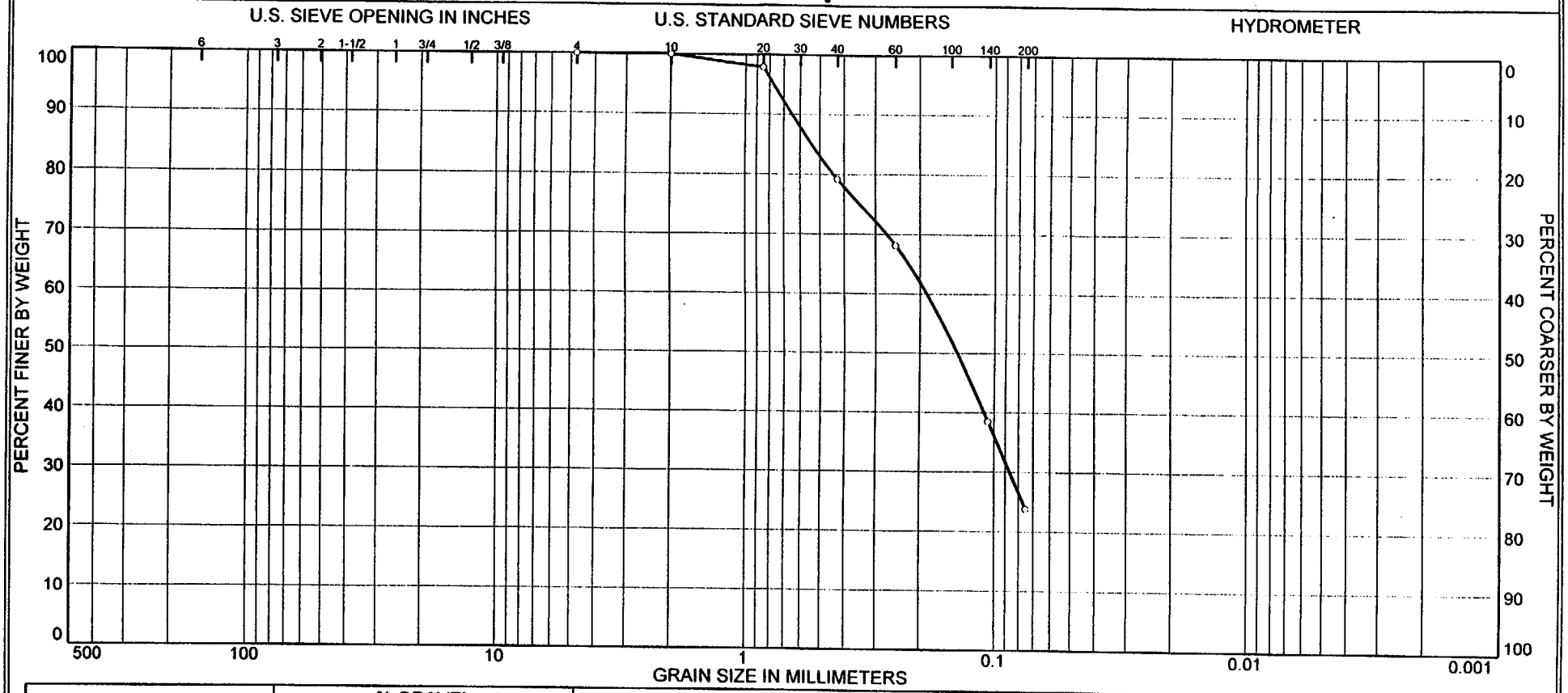
080

Grain Size & Atte[illegible]g Limits Summary

Project: MOX Fuel Fabrication Facility **LAW Project No:** 50160-0-3963

Source of Sample	Sample No.	Depth	Material Description	Sand (%)	Silt (%)	Clay (%)	Fines (%)	Natural Moisture (%)	LL	PL	PI
Boring BH-5	3	13.5-14.0'	Red Brown & Tan Silty sand	76.2			23.8	13.6			
	5	23-23.7'	Tan & Red Brown Clayey sand	80.4	4.1	15.5	19.6	15.4	37	20	17
	7	33.5-34.0'	Tan Brown Silty sand	79.7			20.3				
	8 (top)	38-39.8'	Yellowish Tan Silty sand	78.3	4.5	16.8	21.3		112	48	64
	9	43-43.5'	Red Brown Poorly graded sand with silt	94.3			5.7				
	10	48.25-48.75'	Red Brown Poorly graded sand with silt	92.9			7.1				
	12	58.25-58.75'	Red Brown Poorly graded sand	92.5			7.5				
	13	63.25-63.75'	Red Brown Sandy fat clay	33.3	15.8	50.9	66.7	41.4	92	28	64
	14 (top)	65-66.5'	Red Brown Sandy fat clay	31.6	23.9	44.5	68.4		78	25	53
	15	68.5-69.0'	Tan Brown Sandy silt	49	11.7	39.3	51	42.5			
	16	73.5-74.0'	silt	91.2			8.8				
	18A	83.5-84.0'	Tan Poorly graded sand with silt	91.4	1	7.6	8.6	29.5			
	19	88.5-89.0'	silt	95			5				
	20	93.5-94'	Tan Brown Clayey sand	83.7	5.1	11.2	16.3	31.2	60	27	33
	22 (top)	100-102'	Tan Clayey sand	75.9	6.6	17.5	24.1		67	32	35
	22 (bottom)	100-102'	Tan Clayey sand	75.9	6.6	17.5	24.1		67	32	35
	22 (bottom Consol sample)	100-102'	Tan Silty sand	82.1	4.2	13.7	17.9				
	24	108.5-109'	Tan Brown Poorly graded sand with silt	89.4			10.6				
	27	123.5-124.'	Tan Brown Clayey sand	75	4.3	20.7	25	34.6	61	30	31
	29 (top)	130-132'	Tan Sandy fat clay	42	37.8	20.2	58		61	25	36

Particle Size Distribution Report ASTM D422/D1140



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	20.8	55.4	23.8	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-5	3	13.5-14.0'	8/17/00		Red Brown & Tan Silty sand	13.6		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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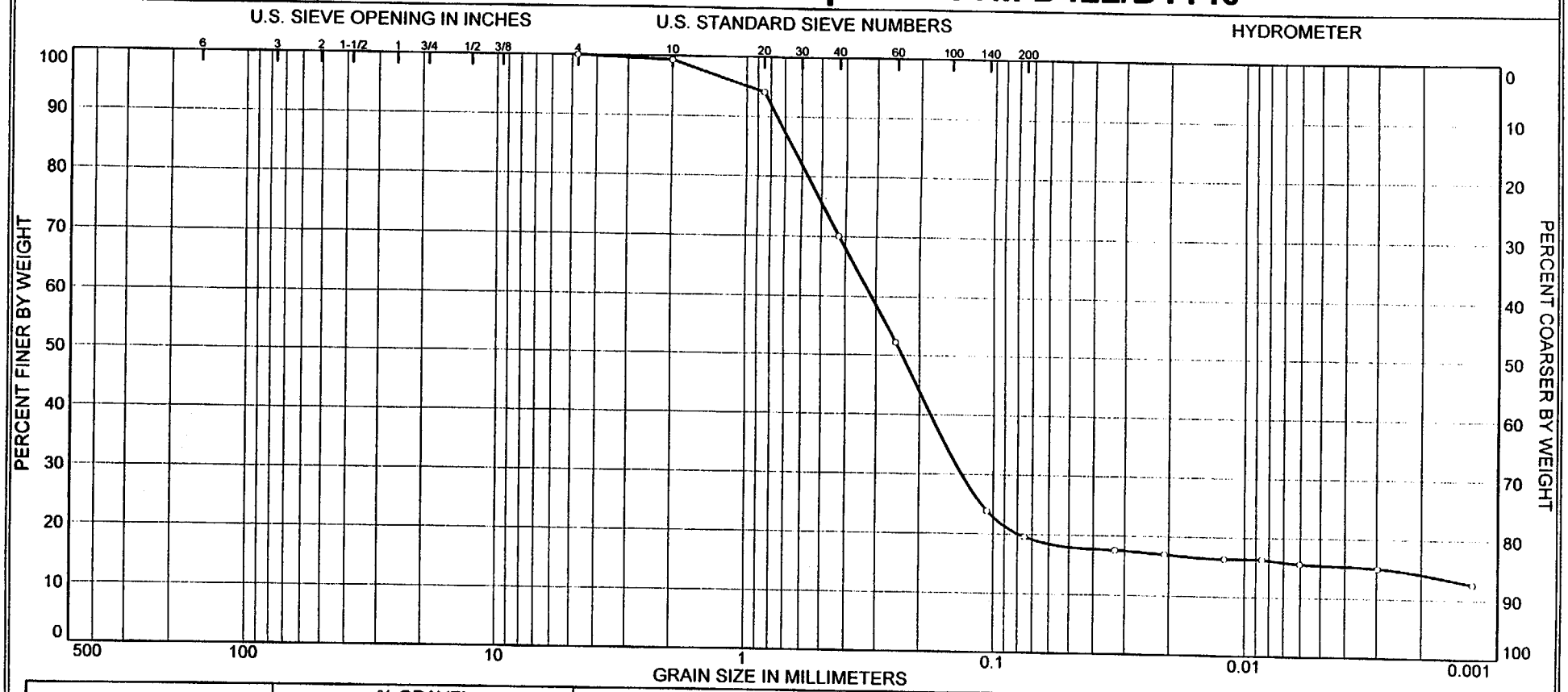
Particle Size Distribution Report ASTM D422/D1140



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.7	29.2	50.5	4.1	15.5

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-5	5	23-23.7'	8/22/00	SC	Tan & Red Brown Clayey sand	15.4	37	20

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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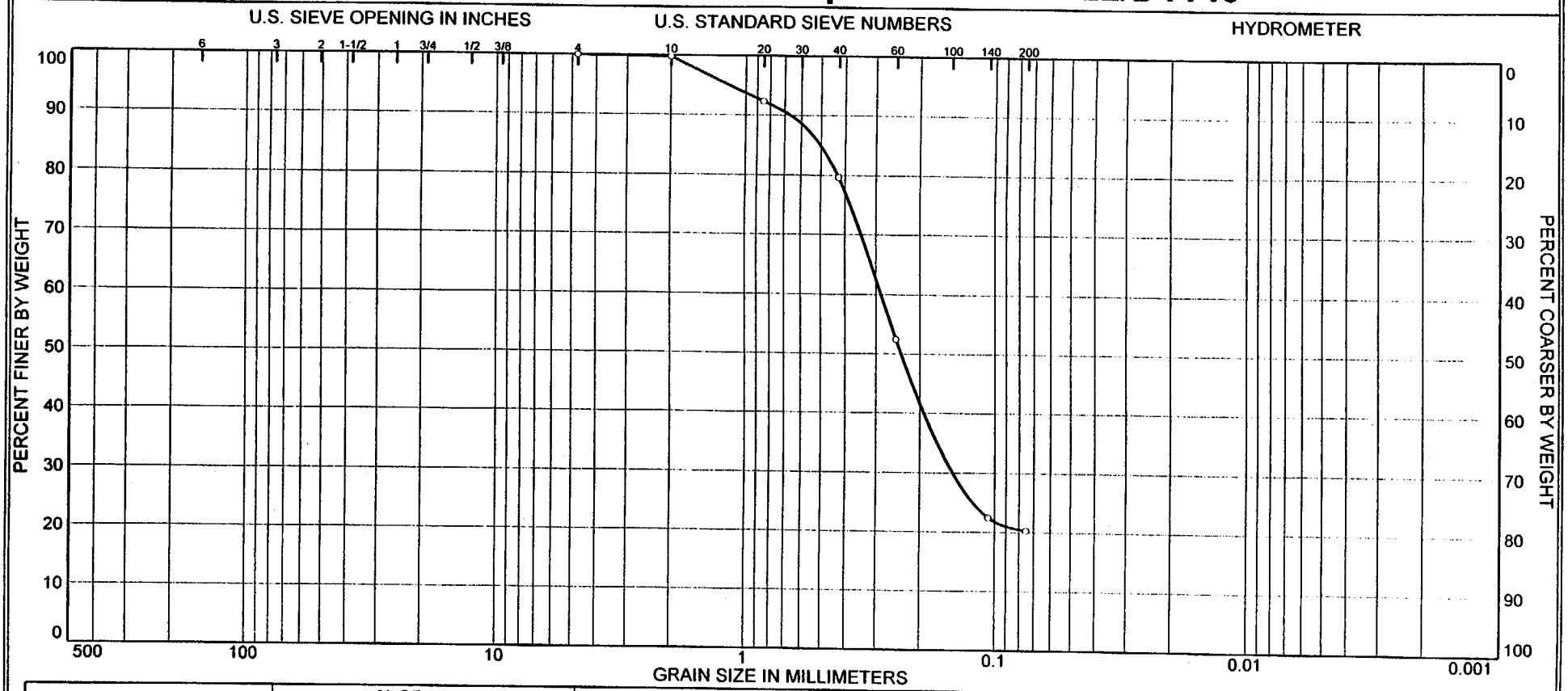
Particle Size Distribution Report ASTM D422/D1140



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.2	20.1	59.4	20.3	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-5	7	33.5-34.0'	8/17/00		Tan Brown Silty sand			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

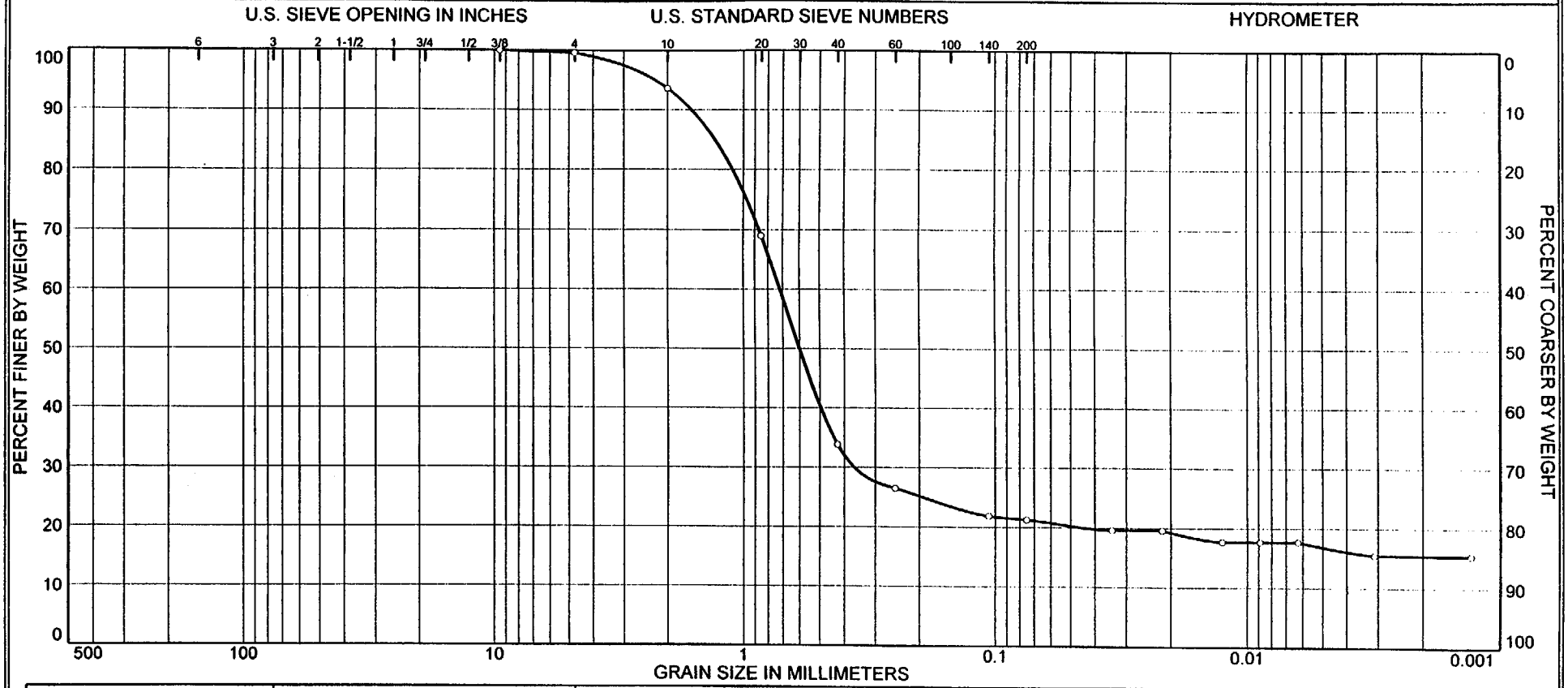
Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

Tested by: WFL Reviewed by: HJ

084

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.4	6.0	59.8	12.5	4.5	16.8

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-5	8 (top)	38-39.8'	9/25/00	SM	Yellowish Tan Silty sand		112	48

Client Duke Cogema Stone & Webster (DCS)

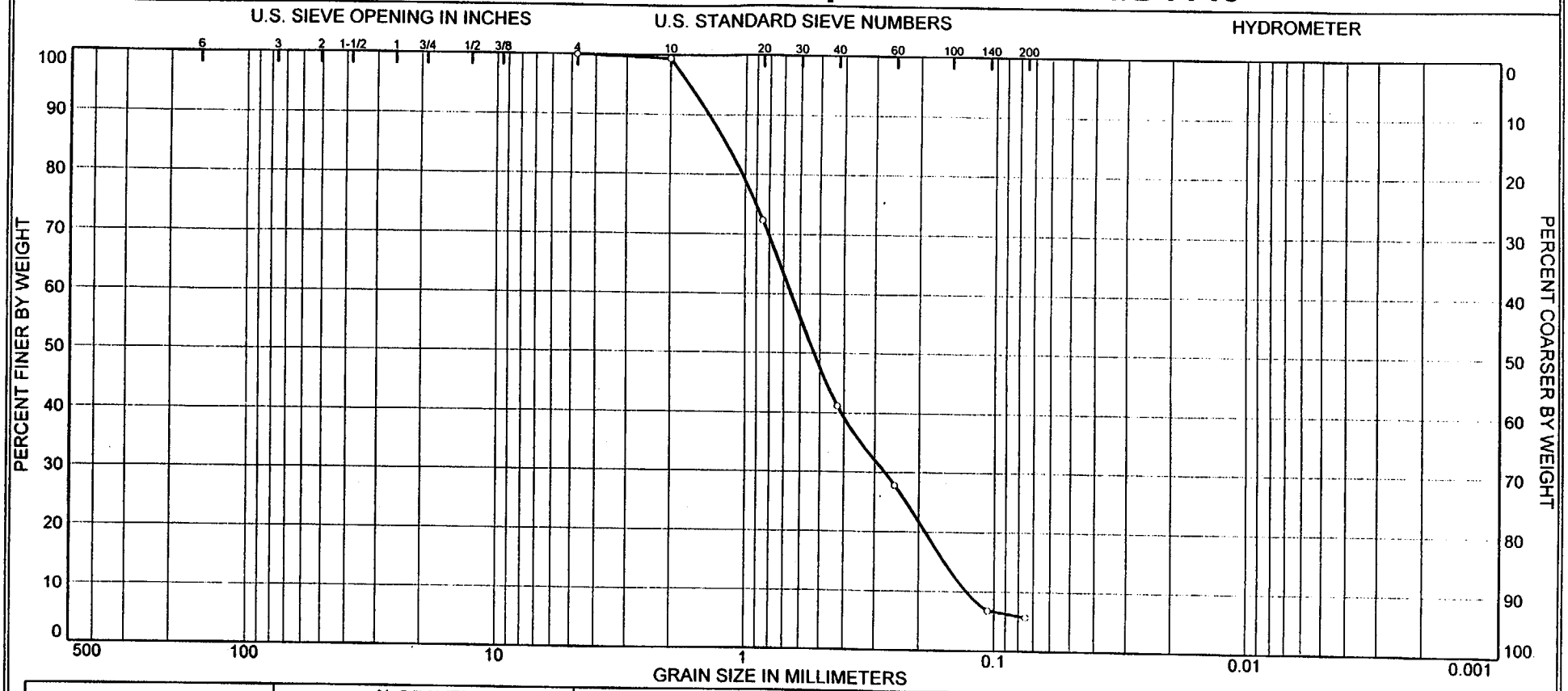
Project MOX Fuel Fabrication Facility

Project No. 5016003963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC Reviewed by: HJ

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.6	58.2	35.5	5.7	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-5	9	43-43.5 Ft.	8/17/00		Red Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 Plate

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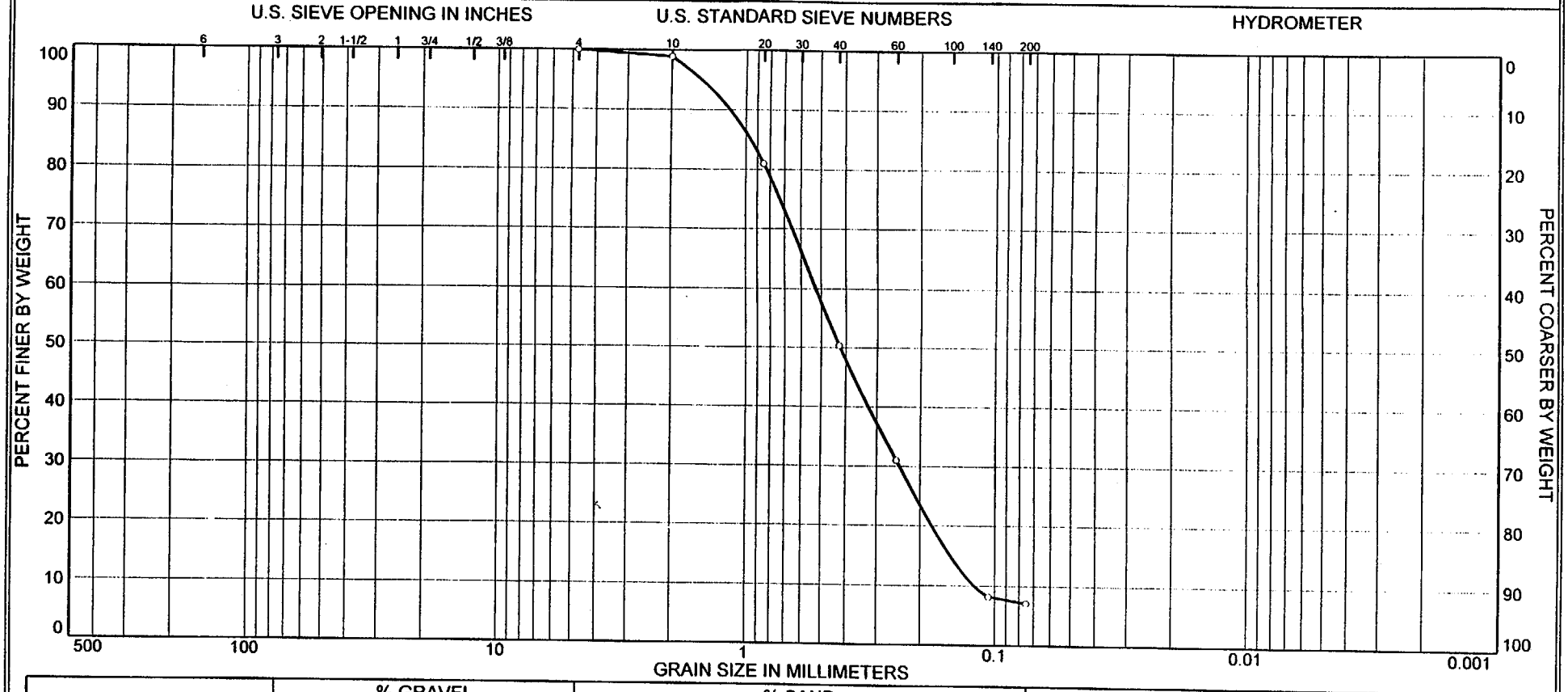

% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	1.1	48.5	43.3	7.1	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-5	10	48.25-48.75	8/17/00		Red Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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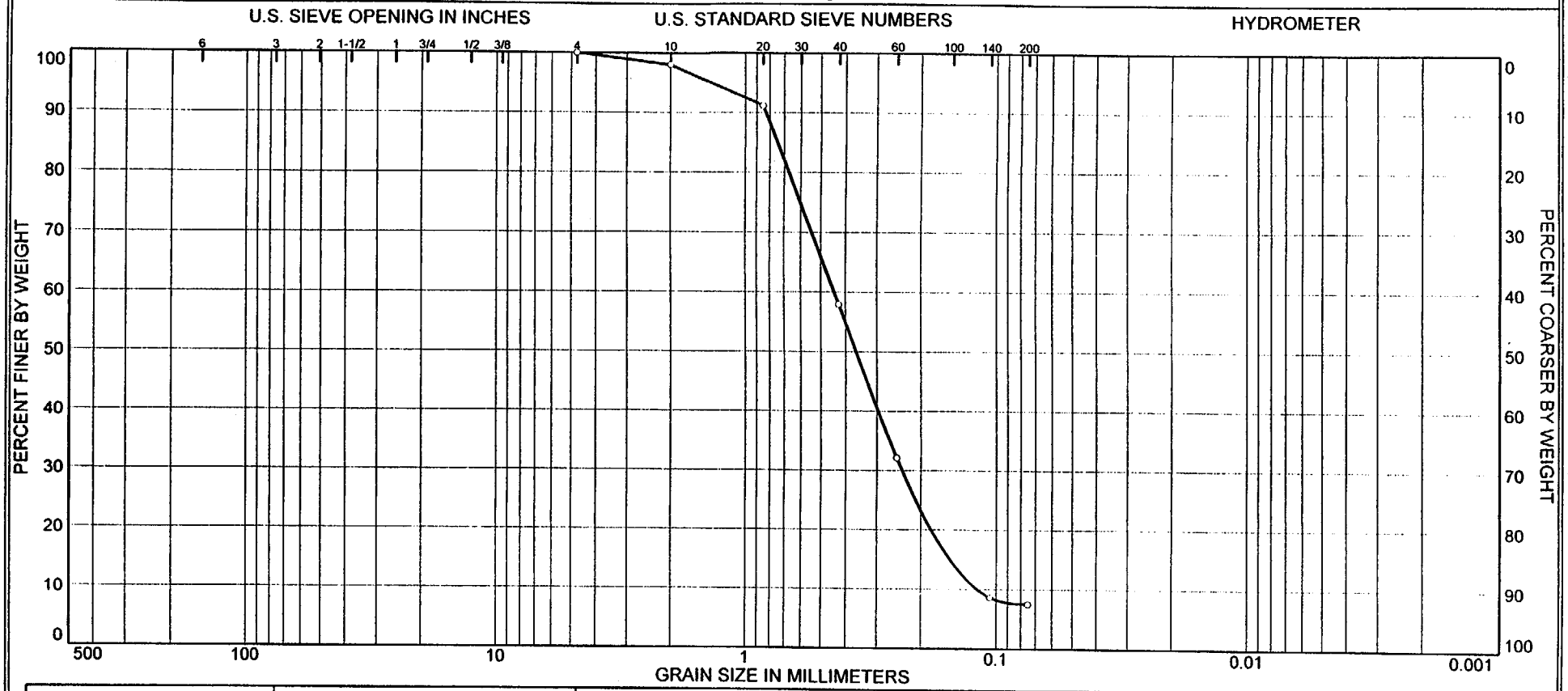
087

Particle Size Distribution Report ASTM D422/D1140



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	2.0	40.1	50.4	7.5	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-5	12	58.25-58.75	8/17/00		Red Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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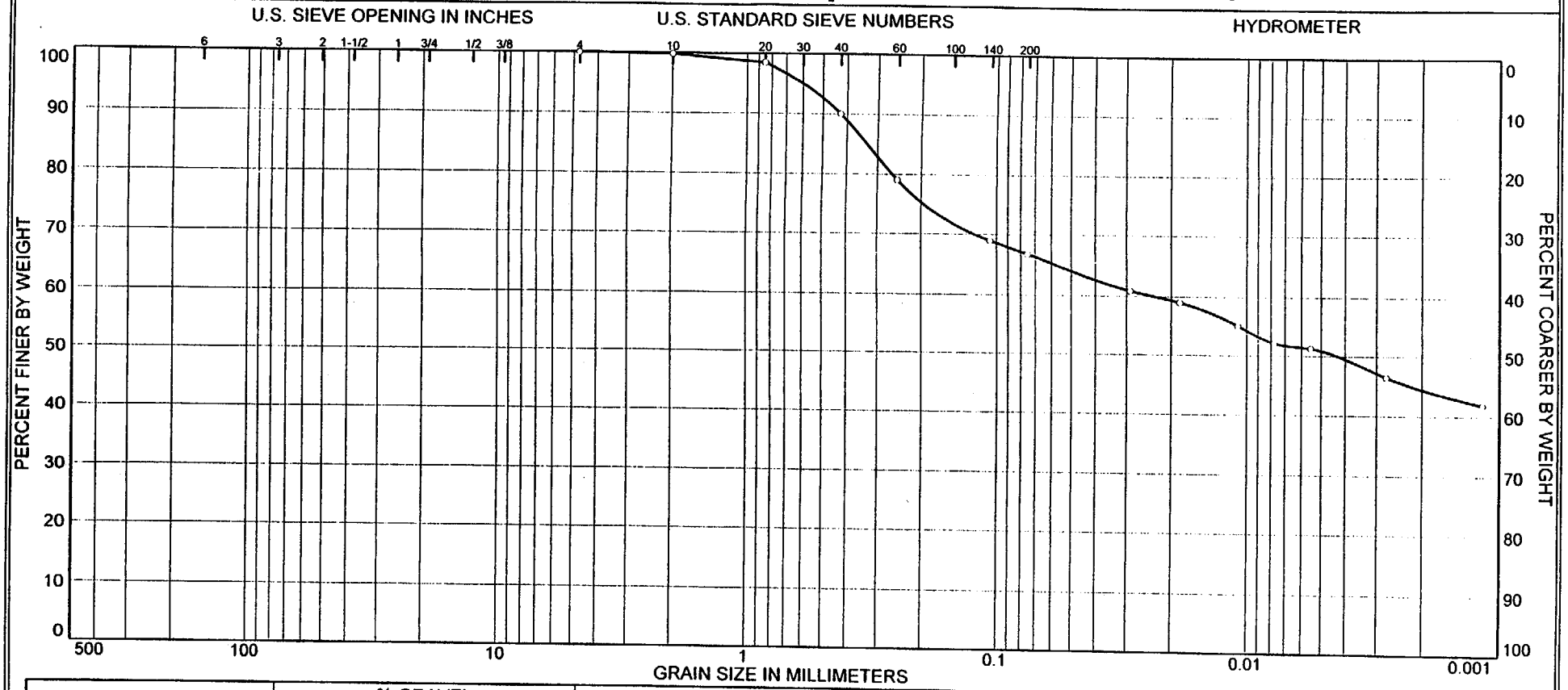
Particle Size Distribution Report ASTM D422/D1140



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.2	9.8	23.3	15.8	50.9

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-5	13	63.25-63.75	8/22/00	CH	Red Brown Sandy fat clay	41.4	92	28

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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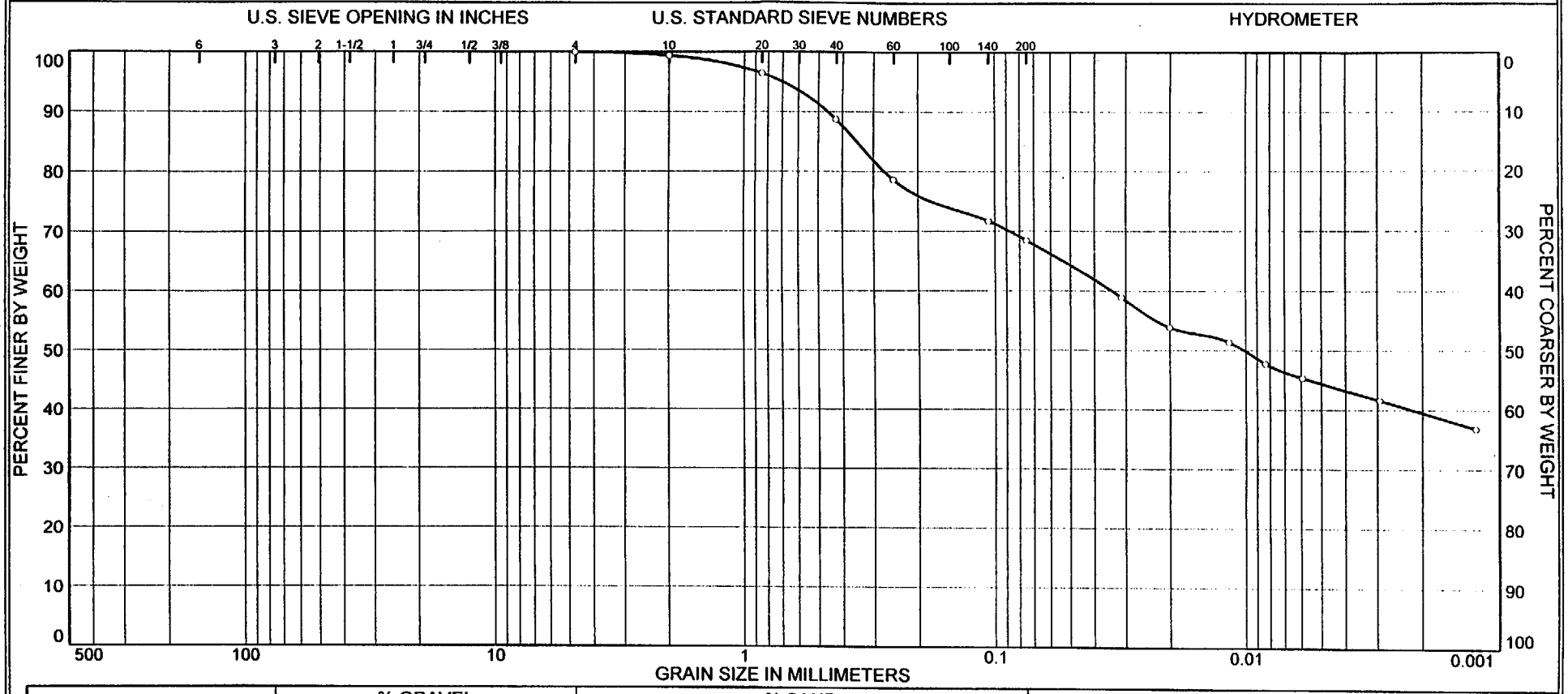
0809

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.6	10.7	20.3	23.9	44.5

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-5	14 (Top)	65-66.5'	10/9/00	CH	Red Brown Sandy fat clay		78	25

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 5016003963 | Plate

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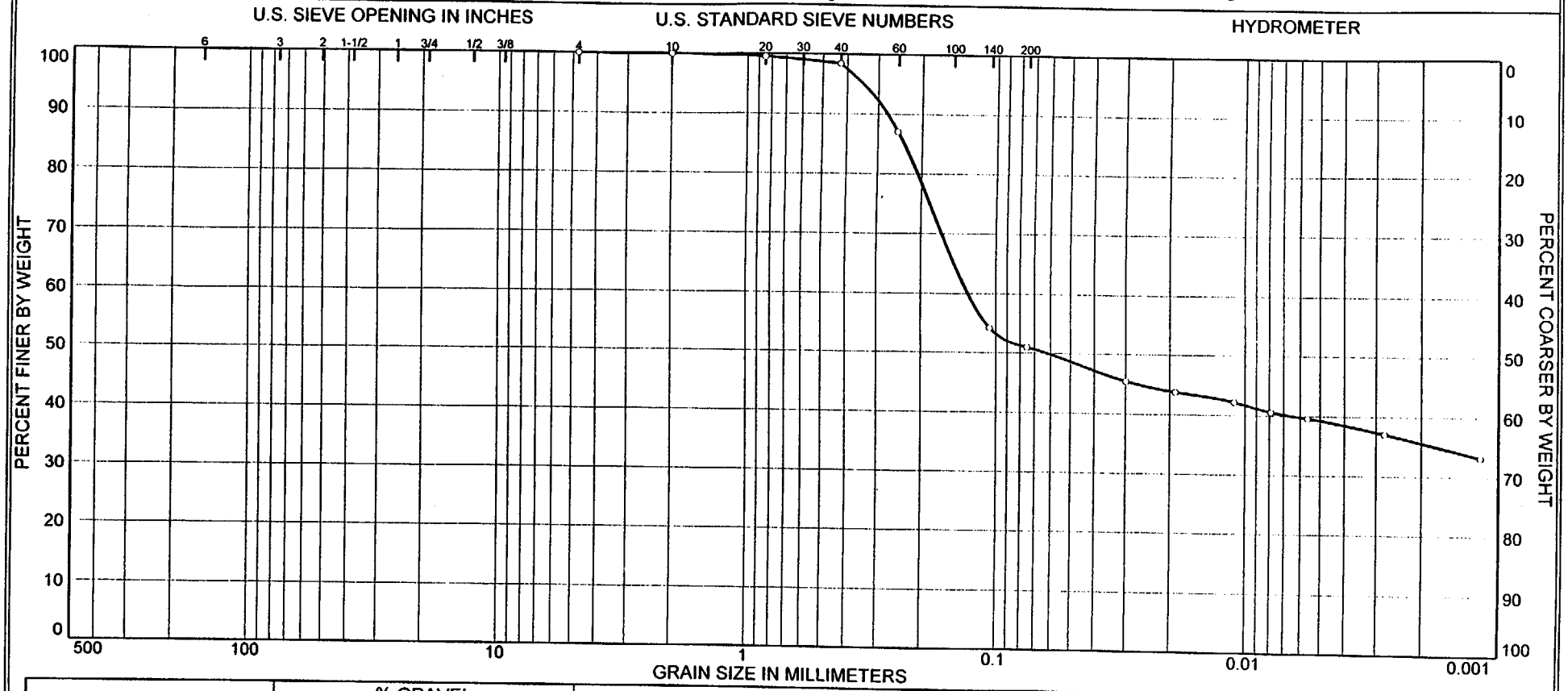
060

Particle Size Distribution Report ASTM D422/D1140



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	1.6	47.4	11.7	39.3

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-5	15	68.5-69.Ft.	8/17/00		Tan Brown Sandy silt	42.5		

Client Duke Cogema Stone & Webster (DCS)

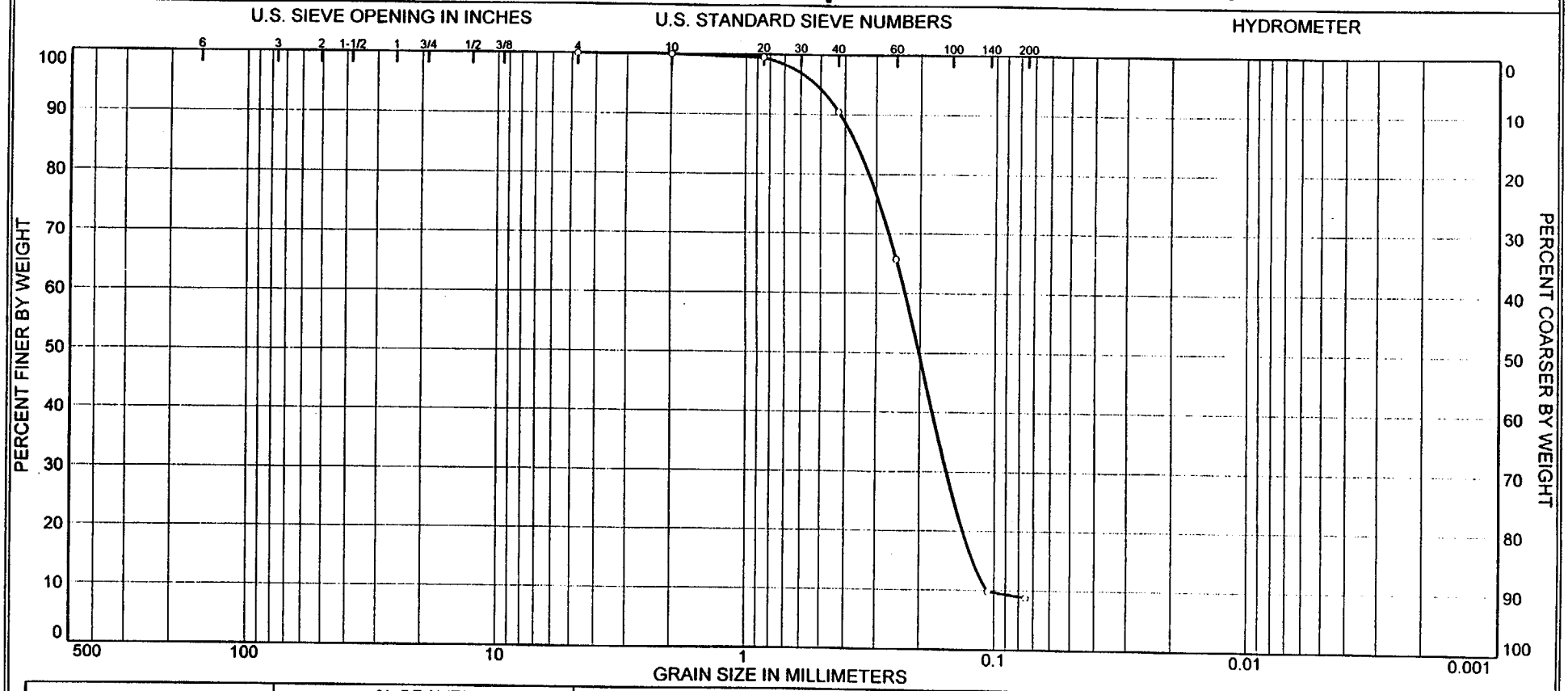
Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

Tested by: SC/WFL Reviewed by: HJ

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	9.5	81.7	8.8	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-5	16	73.5-74.0'	8/23/00		Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

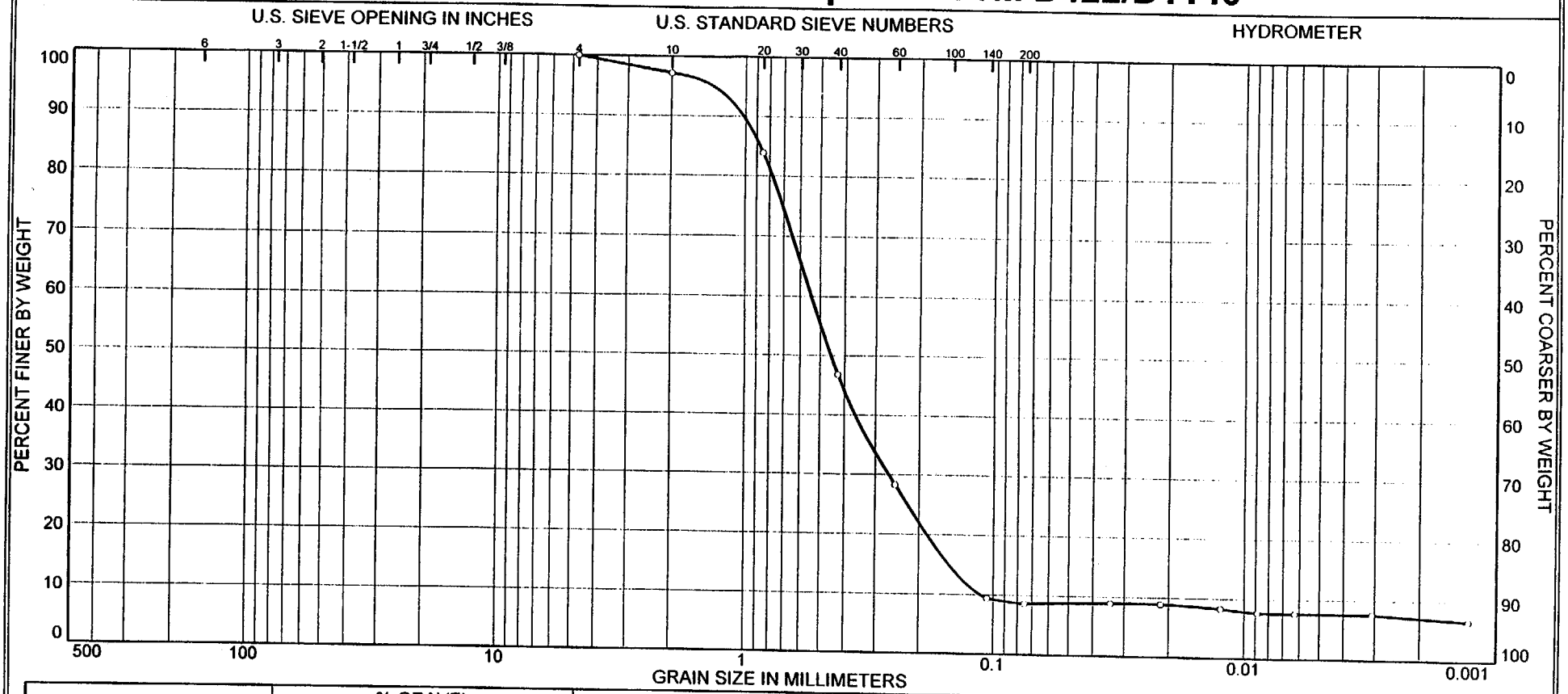
Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL Reviewed by: HJ

092

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	2.8	50.4	38.2	1.0	7.6

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-5	18A	83.5-84 Ft.	8/17/00		Tan Poorly graded sand with silt	29.5		

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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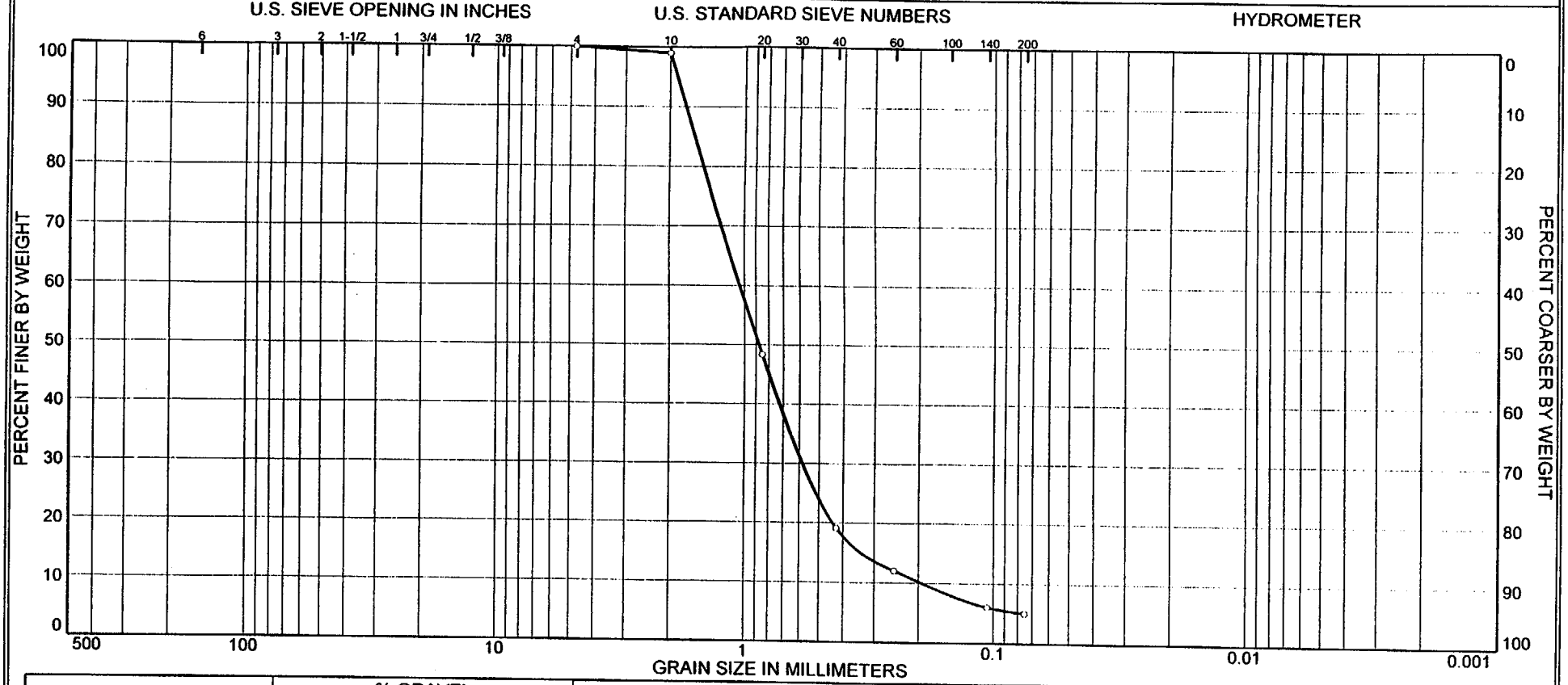
093

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.0	79.9	14.1	5.0	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-5	19	88.5-89.0'	8/23/00		Brown Poorly graded sand with silt			

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Project No. 50160-0-3963 | Plate

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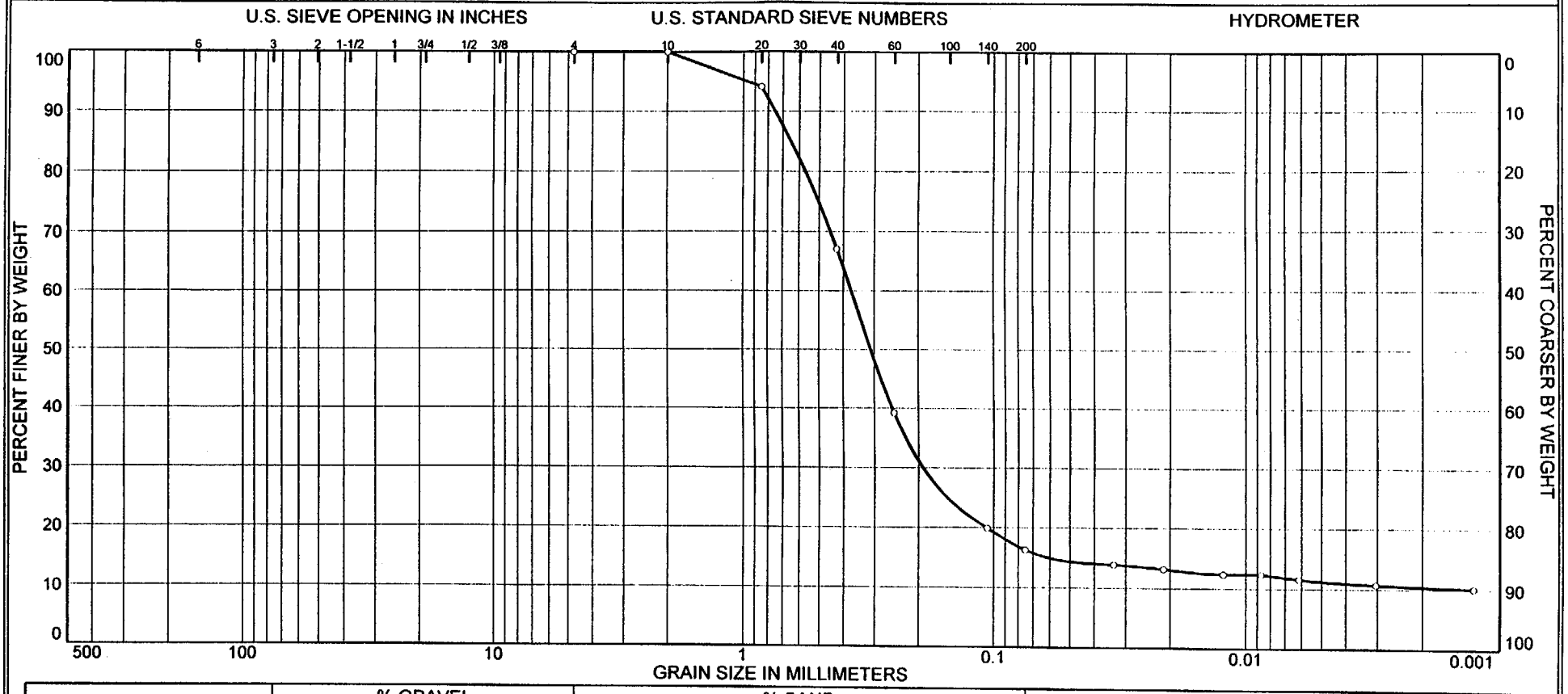
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	32.9	50.8	5.1	11.2

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-5	20	93.5-94'	8/23/00	SC	Tan Brown Clayey sand	31.2	60	27

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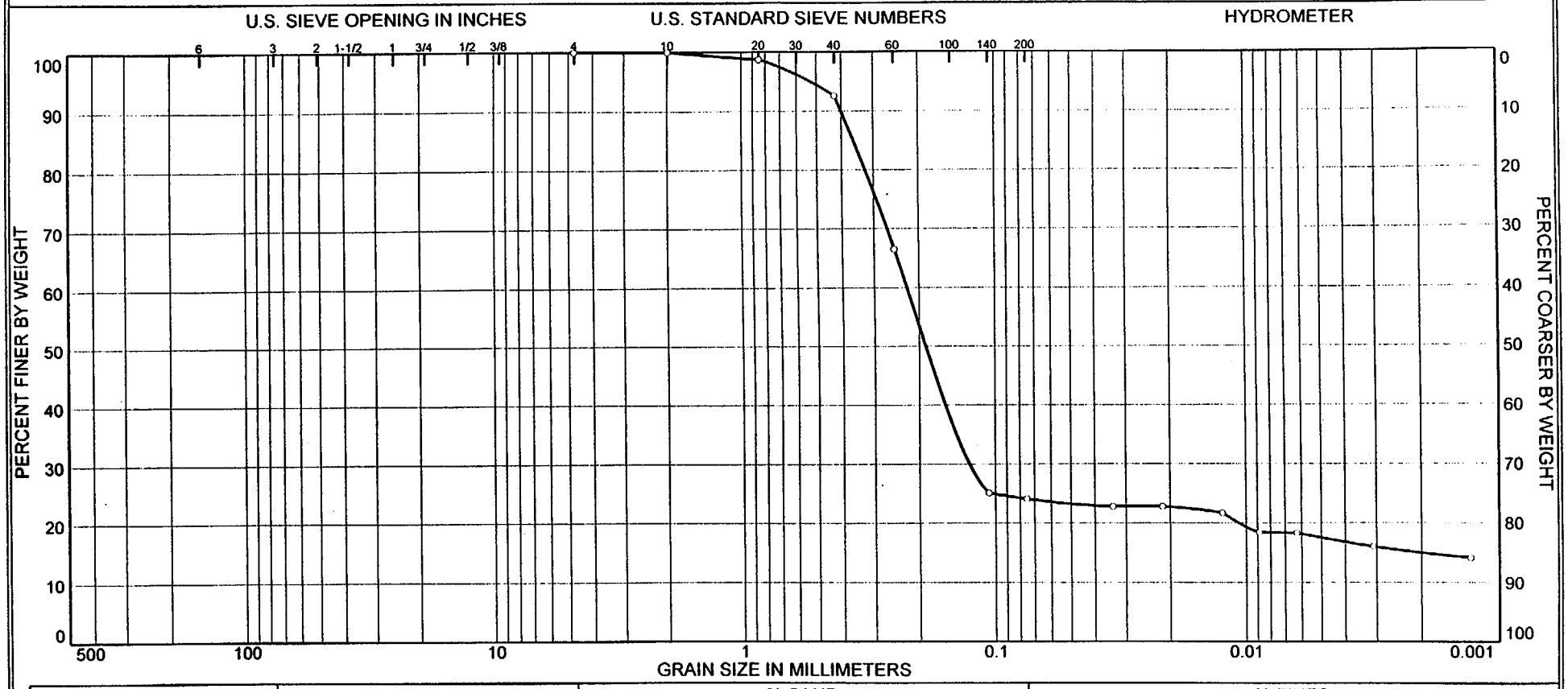
095

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	7.4	68.5	6.6	17.5

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-5	22 (top)	100-102'	9/13/00	SC	Tan Clayey sand		67	32

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Project No. 5016003963 | Plate

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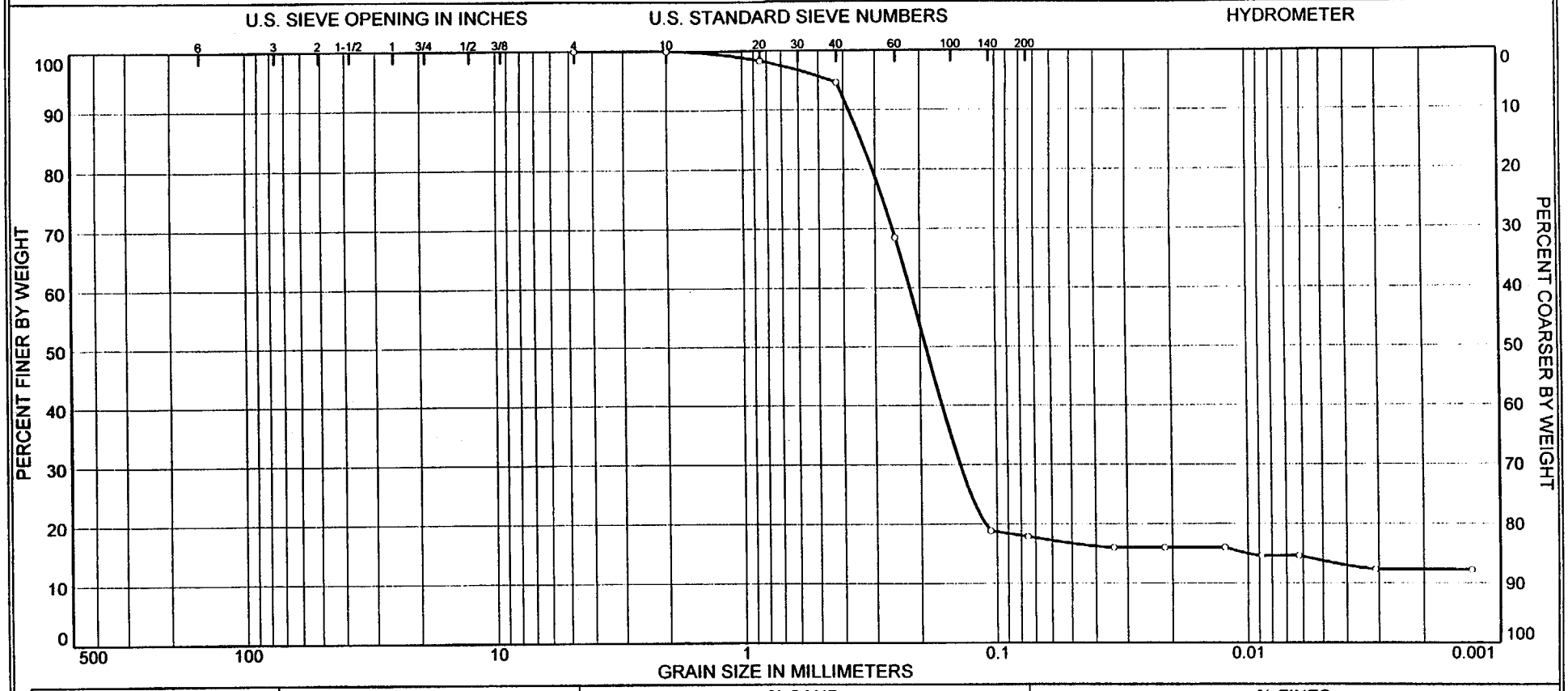
960

Particle Size Distribution Report ASTM D422/D1140



% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	5.4	76.7	4.2	13.7

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-5	22 Bottom Consol sample	100-102'	9/25/00		Tan Silty sand			

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Project MOX Fuel Fabrication Facility

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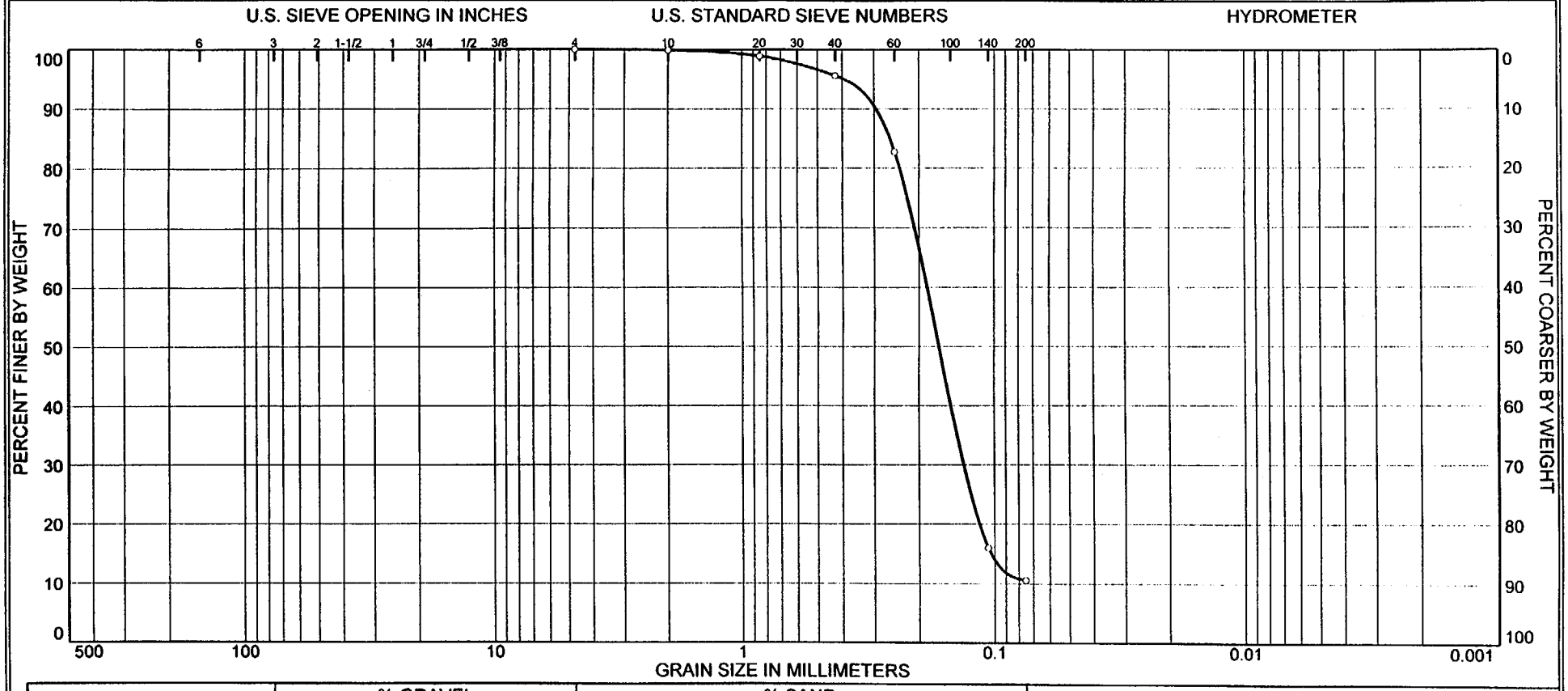
097

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	4.3	85.0	10.6	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-5	24	108.5-109'	8/17/00		Tan Brown Poorly graded sand with silt			

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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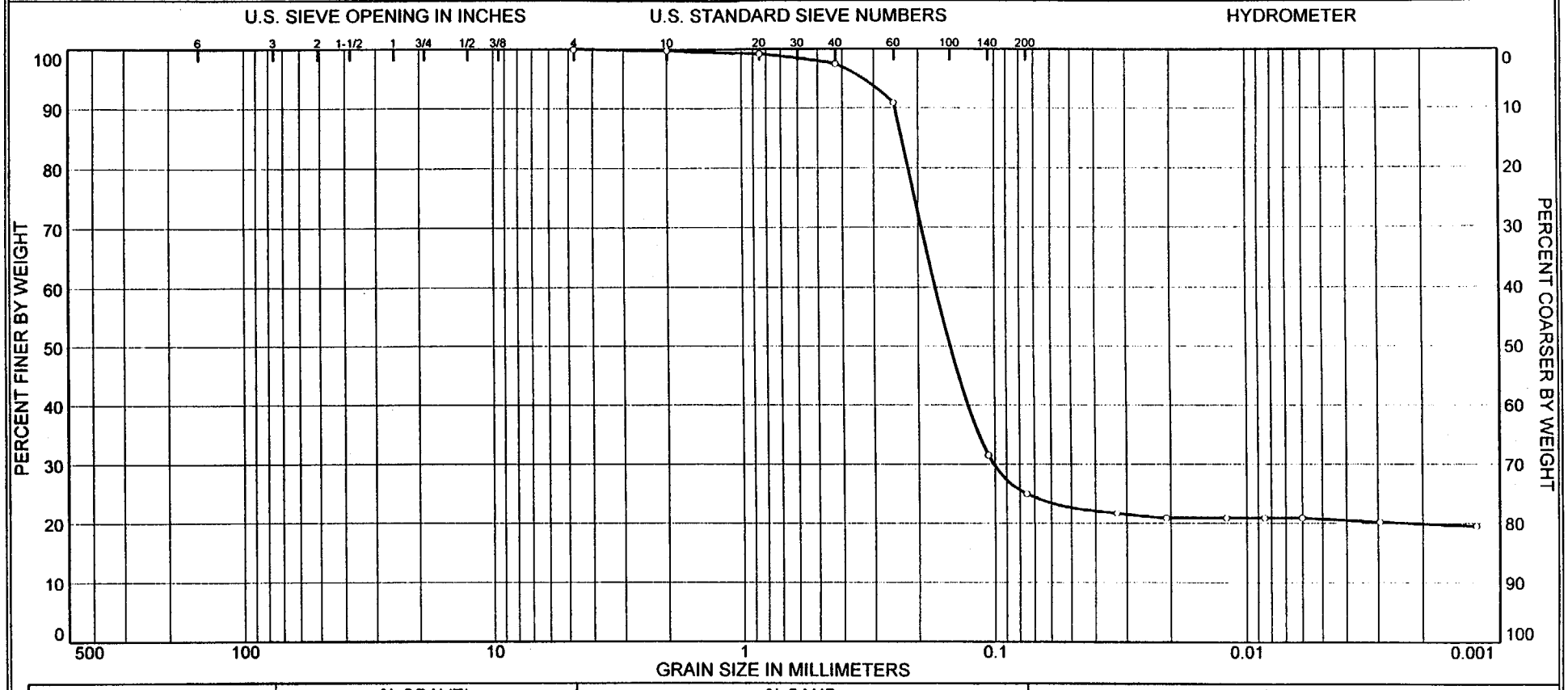
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.2	2.3	72.5	4.3	20.7

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-5	27	123.5-124.'	8/22/00	SC	Tan Brown Clayey sand	34.6	61	30

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Project No. 50160-0-3963 | Plate

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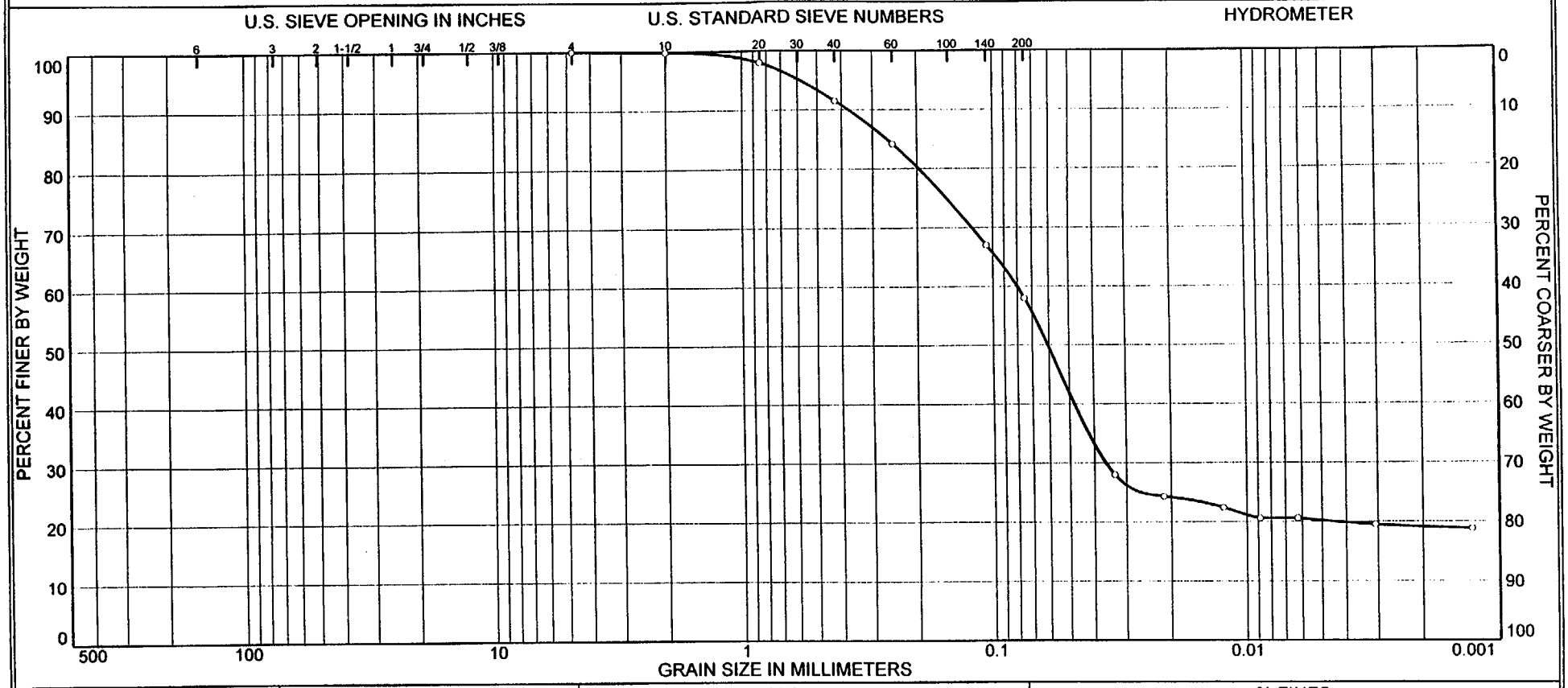
660

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	8.4	33.5	37.8	20.2

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-5	29 (top)	130-132'	9/25/00	CH	Tan Sandy fat clay		61	25

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Project MOX Fuel Fabrication Facility

Project No. 5016003963 | Plate

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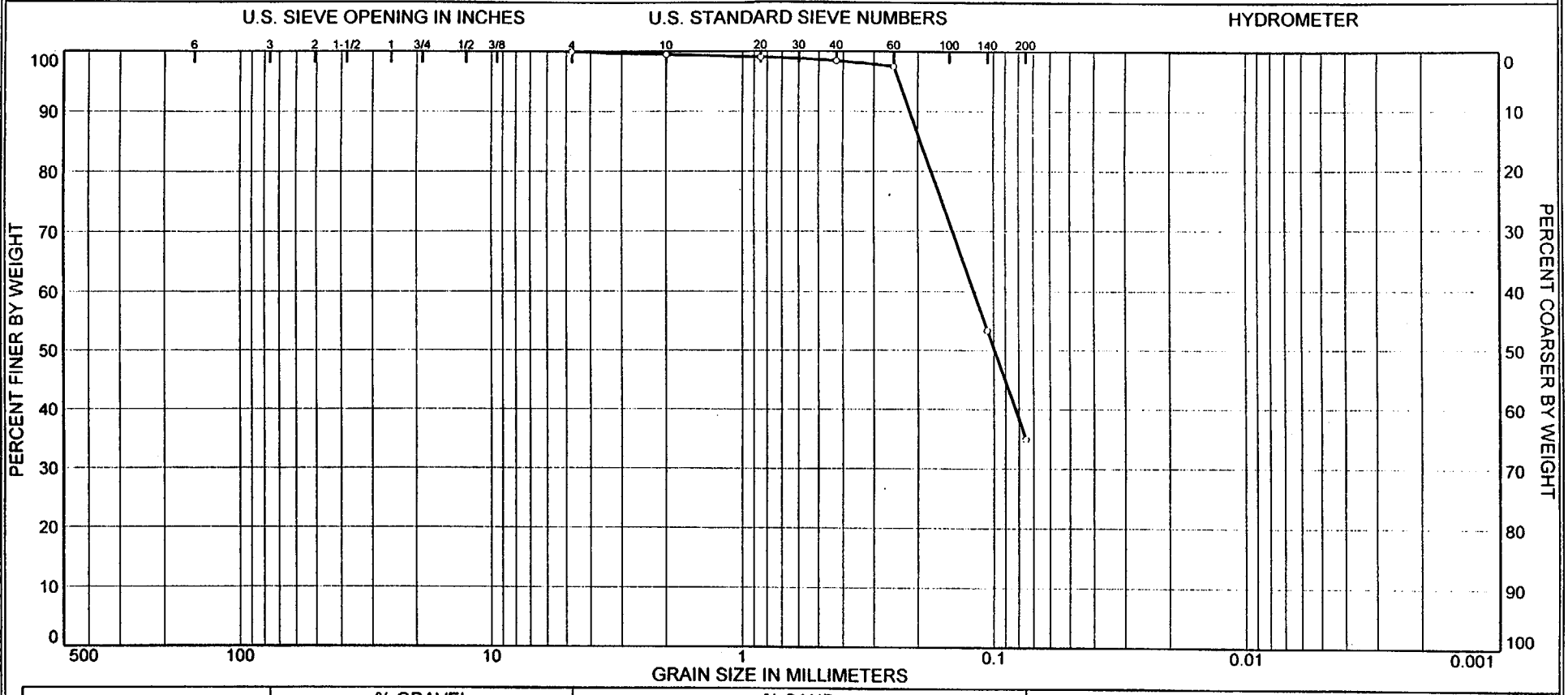
100

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.5	1.1	63.4	35.0	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-5	30	133.8-134.4	8/17/00		Brown Silty sand			

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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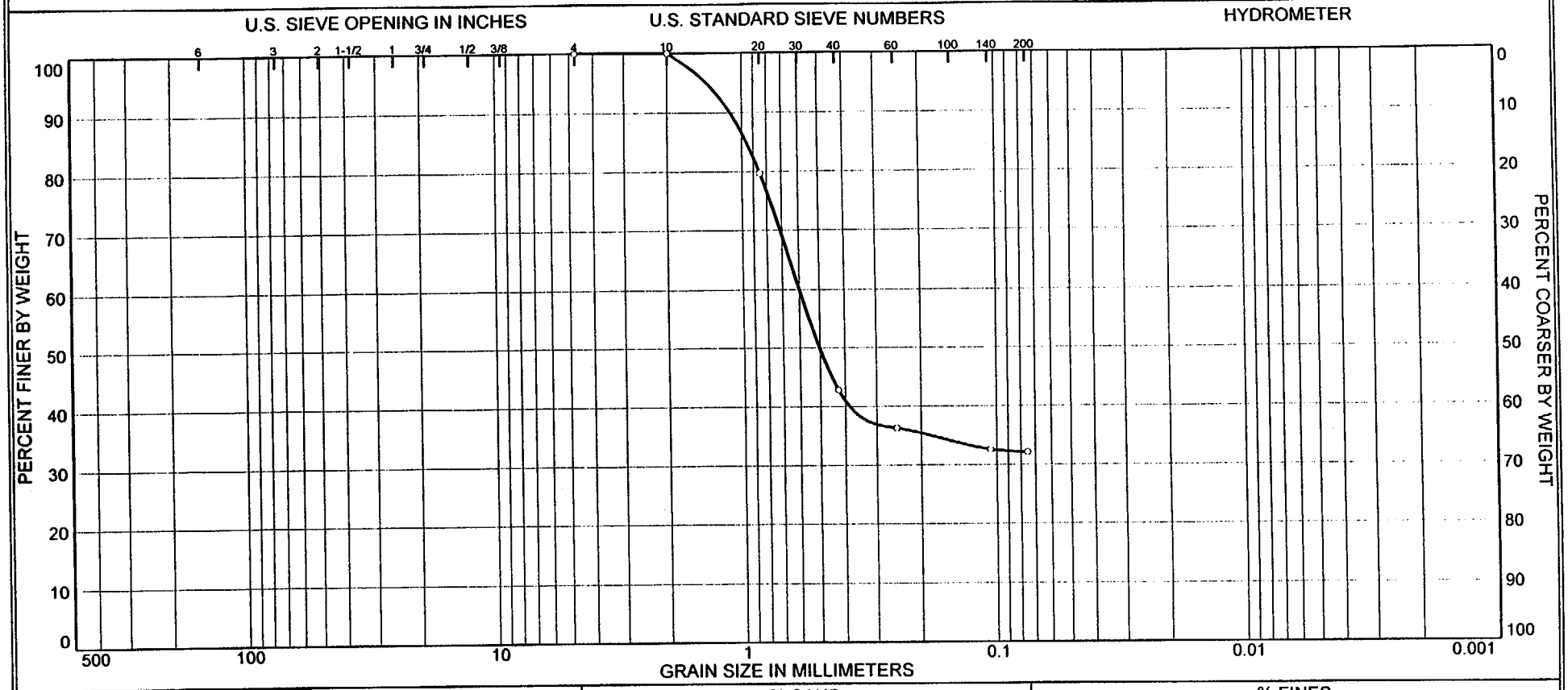
Grain Size & Atterberg Limits Summary

Project: MOX Fuel Fabrication Facility **LAW Project No:** 50160-0-3963

Source of Sample	Sample No.	Depth	Material Description	Sand (%)	Silt (%)	Clay (%)	Fines (%)	Natural Moisture (%)	LL	PL	PI
Boring BH-6											
	3	14.5-15.0'	Red Brown Silty sand	67.9			32.1	13.5			
	4	19-20'	Brown Silty sand	68.9			31.1	13.6			
	6	32.2-33.0'	Tan Brown Poorly graded sand with silt	92.2			7.8				
	7B-2	45.5-47.0'	Tan Silty sand	87.1			12.9				
	9	56.5-57 Ft.	Tan Silty sand	71.1	6.1	22.8	28.9	36.3			
	10	61-62'	Tan Brown Poorly graded sand with silt	90.1			9.9				
	12	71.7-72.5'	Tan Brown Poorly graded sand with silt	93.9			6.1				
	13A-1	76.5-77.0'	Brown Silty sand	75.2	3.3	21.3	24.6	37.6	36	27	9
	13B	77.5-79.0'	Tan Brown Clayey sand	74.2	4.9	20.9	25.8		58	26	32
	13B	77.5-79.0'	Tan Brown Clayey sand	74.2	4.9	20.9	25.8	33.2	58	26	32
	13B (consol sample)	77.5-79'	Tan Silty sand	75.6	5.1	19.3	24.4				
	14	82-82.5 Ft.	Tan Brown Poorly graded sand with silt	92.9			7.1				
	17A	95.5-96.5'	Brown Silty sand	74.5			25.5	35.2			
	17B (bottom)	98-100'	Tan Poorly graded sand with clay	88.8	2.4	8.8	11.2		51	23	28
	17B Dynamic Tests	98-100'	Brown Clayey Sand	72.7	6.6	20.7	27.3				
	18A	100.5-102.0'	Tan Brown Clayey sand	66.6	15.6	17.8	33.4	39.7	49	25	24
	18B (bottom)	103-105'	Tan Clayey sand	51.4	22.6	26	48.6		57	22	35
	19	106.5-107.5'	Tan Brown Sandy fat clay	33.4	39.2	27.4	66.6	34.6	58	30	28
	20	111-113'	Tan Brown Silty sand	61.4	21.4	17.2	38.6	32			

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	57.2	10.7	32.1	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	3	14.5-15.0'	8/23/00		Red Brown Silty sand	13.5		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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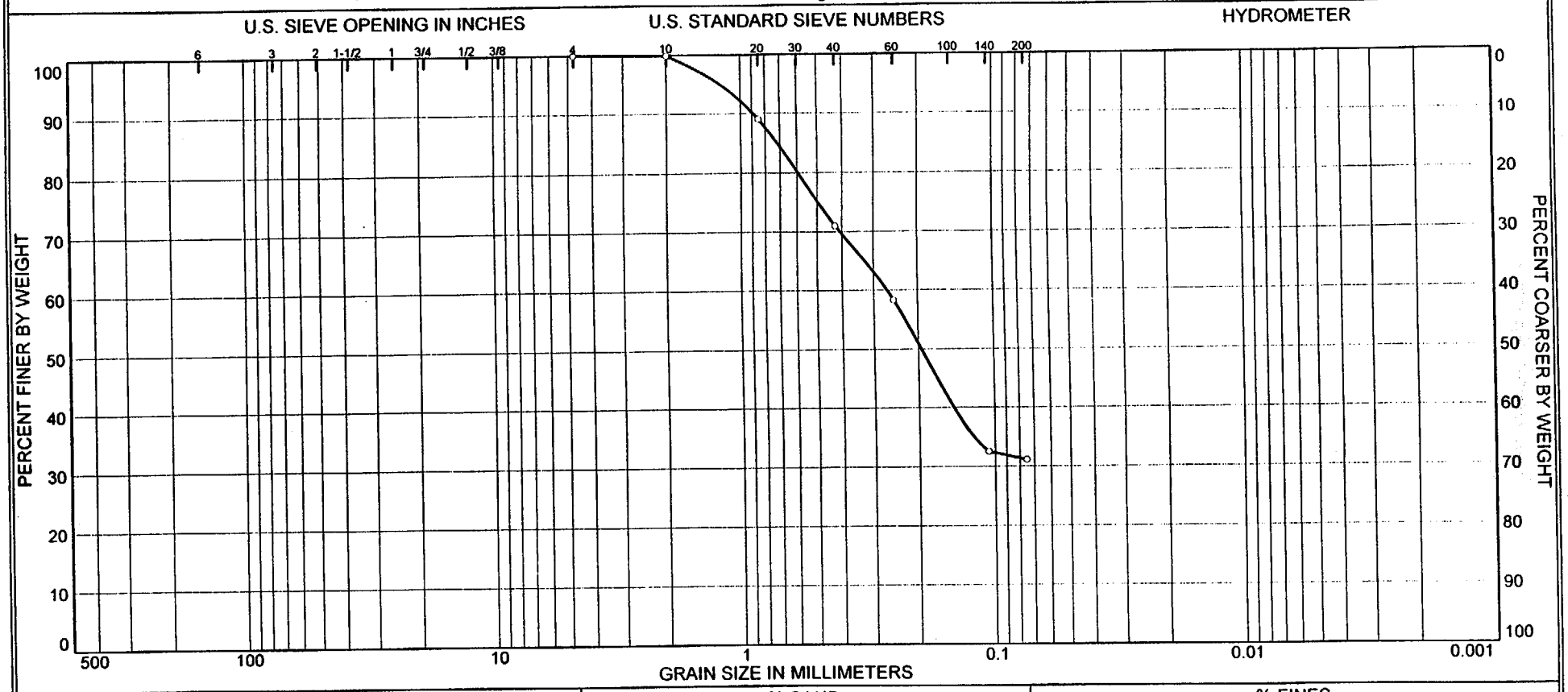
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	28.9	39.9	31.1	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	4	19-20'	8/17/00		Brown Silty sand	13.6		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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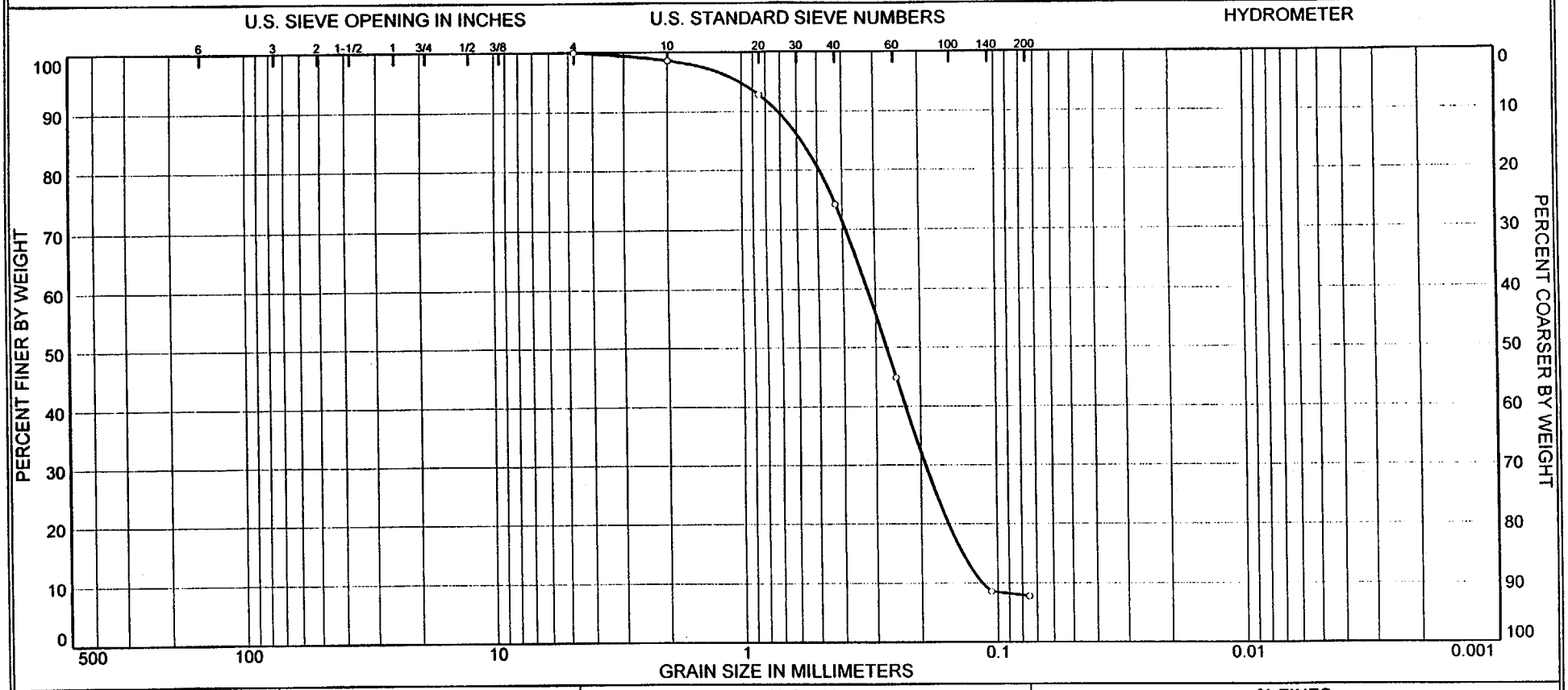
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.4	24.4	66.4	7.8	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	6	32.2-33.0'	8/23/00		Tan Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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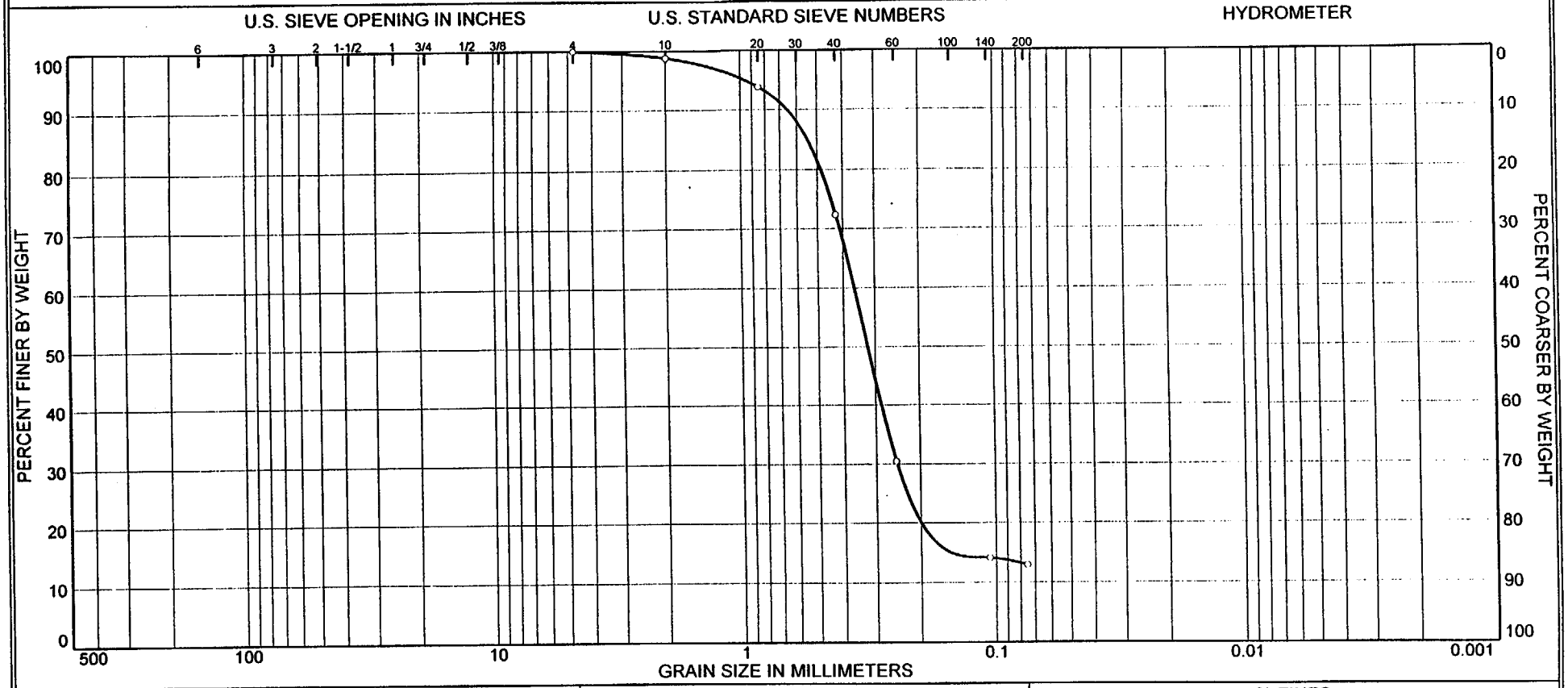
50

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.2	26.4	59.5	12.9	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	7B-2	45.5-47.0'	8/23/00		Tan Silty sand			

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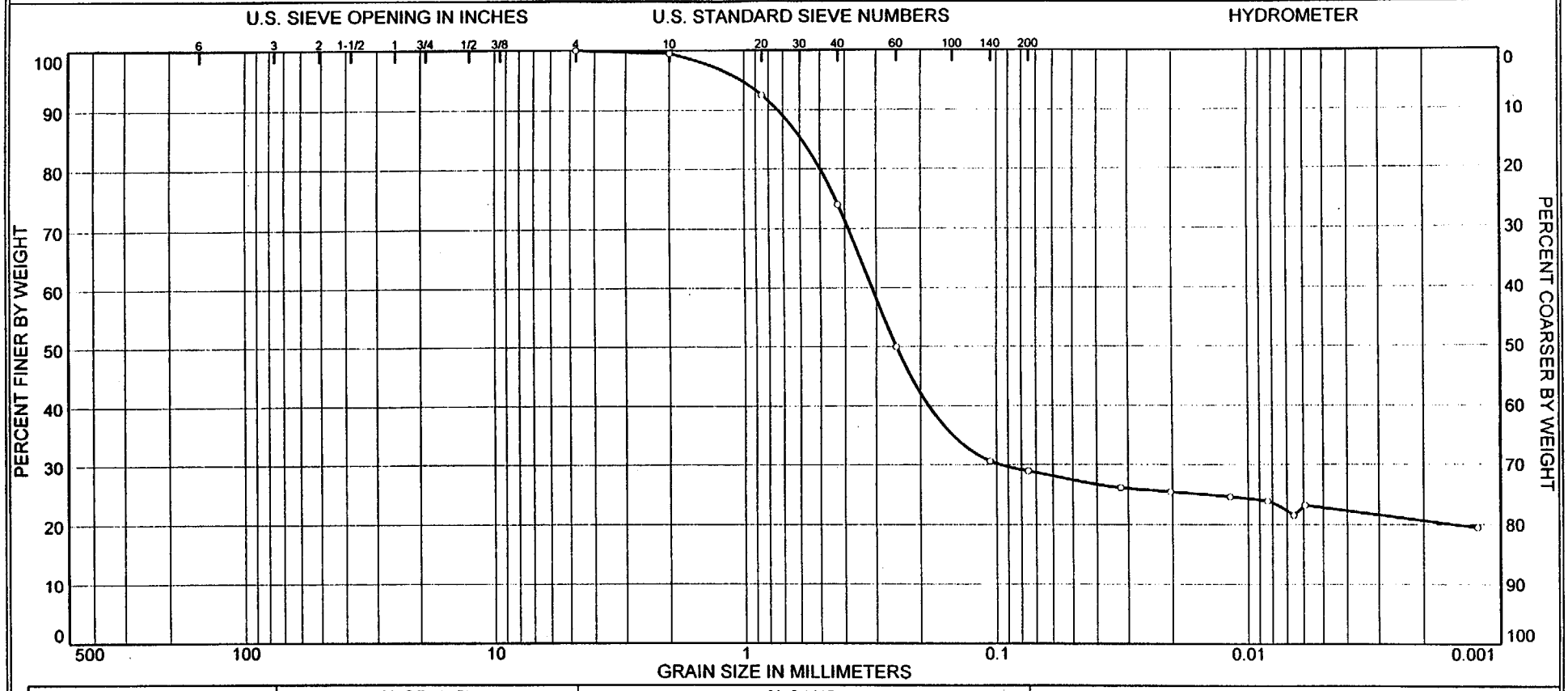
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.5	25.5	45.1	6.1	22.8

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	9	56.5-57 Ft.	8/17/00		Tan Silty sand	36.3		

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Project MOX Fuel Fabrication Facility

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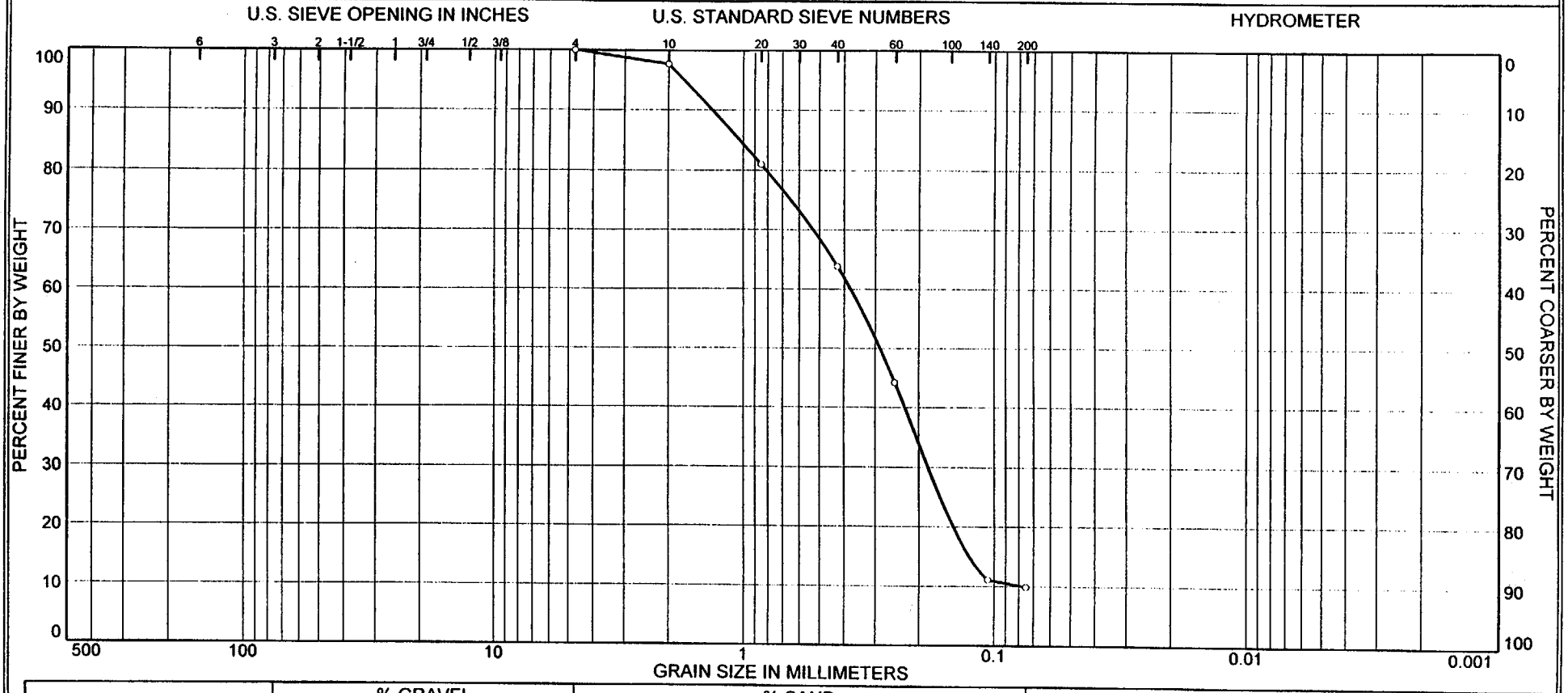
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	2.3	33.9	53.9	9.9	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	10	61-62'	8/17/00		Tan Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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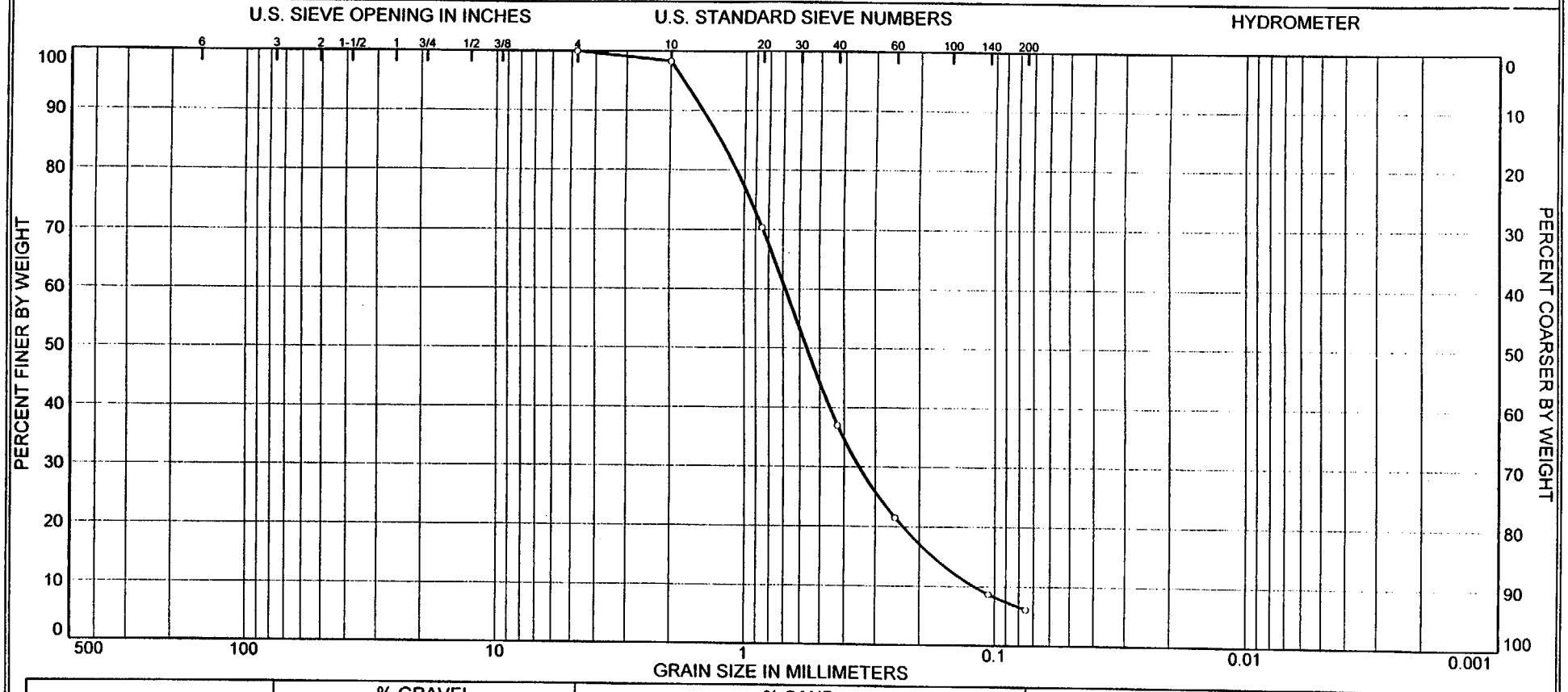
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.7	61.3	30.9	6.1	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	12	71.7-72.5'	8/17/00		Tan Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

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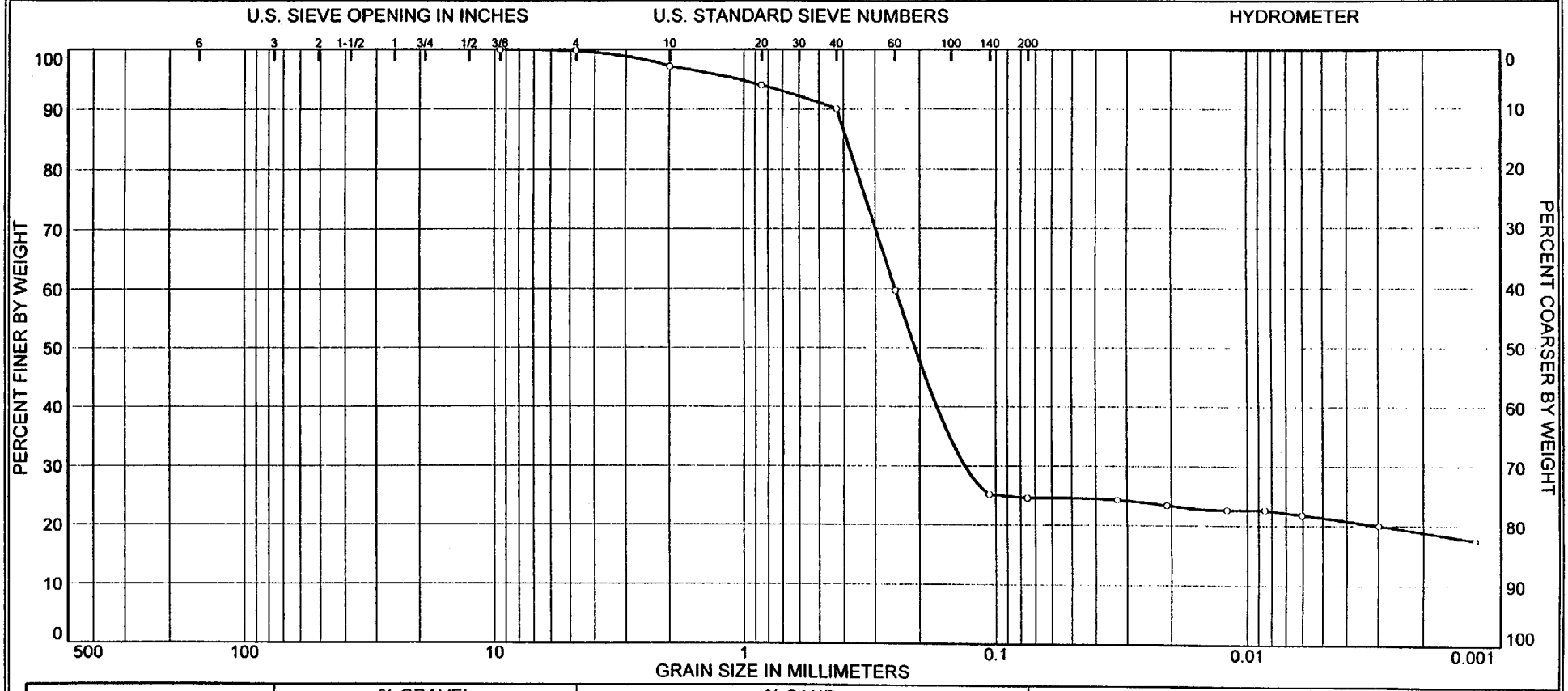
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.2	2.6	7.1	65.5	3.3	21.3

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	13A-1	76.5-77.0'	8/22/00	SM	Brown Silty sand	37.6	36	27

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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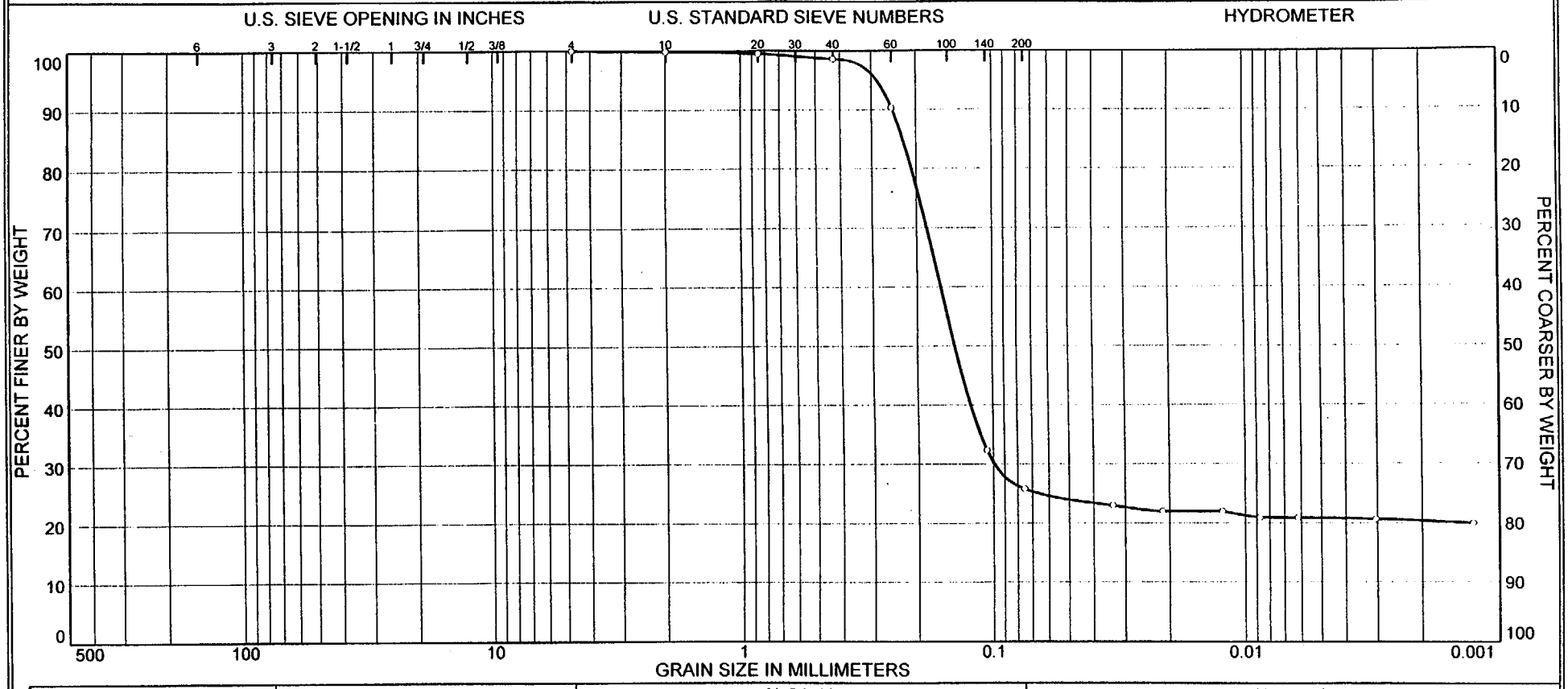
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	1.3	72.8	4.9	20.9

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	13B	77.5-79.0'	9/13/00	SC	Tan Brown Clayey sand	33.2	58	26

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Project MOX Fuel Fabrication Facility

Project No. 5016003963 | Plate

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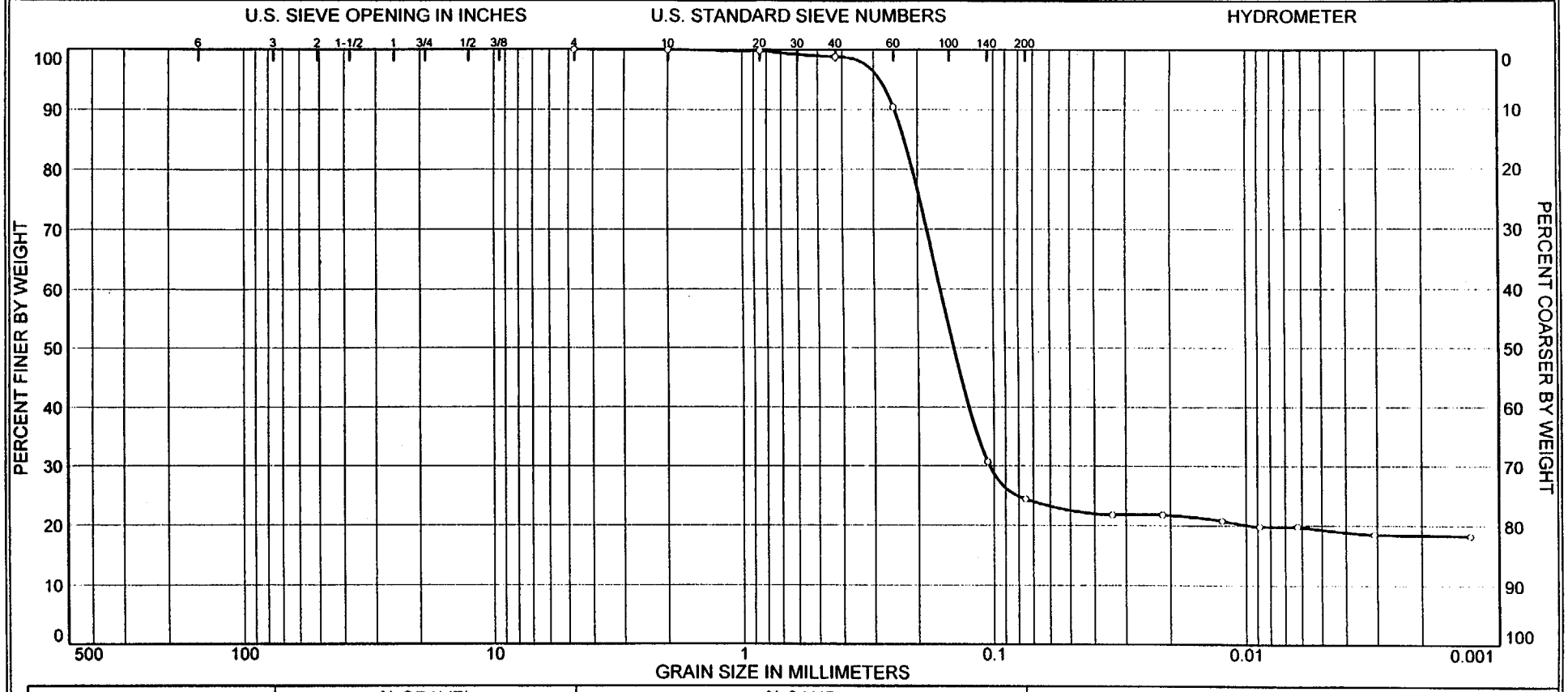
111

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	1.2	74.4	5.1	19.3

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	13B (consol sample)	77.5-79'	9/25/00		Tan Silty sand			

Client Duke Cogema Stone & Webster (DCS)

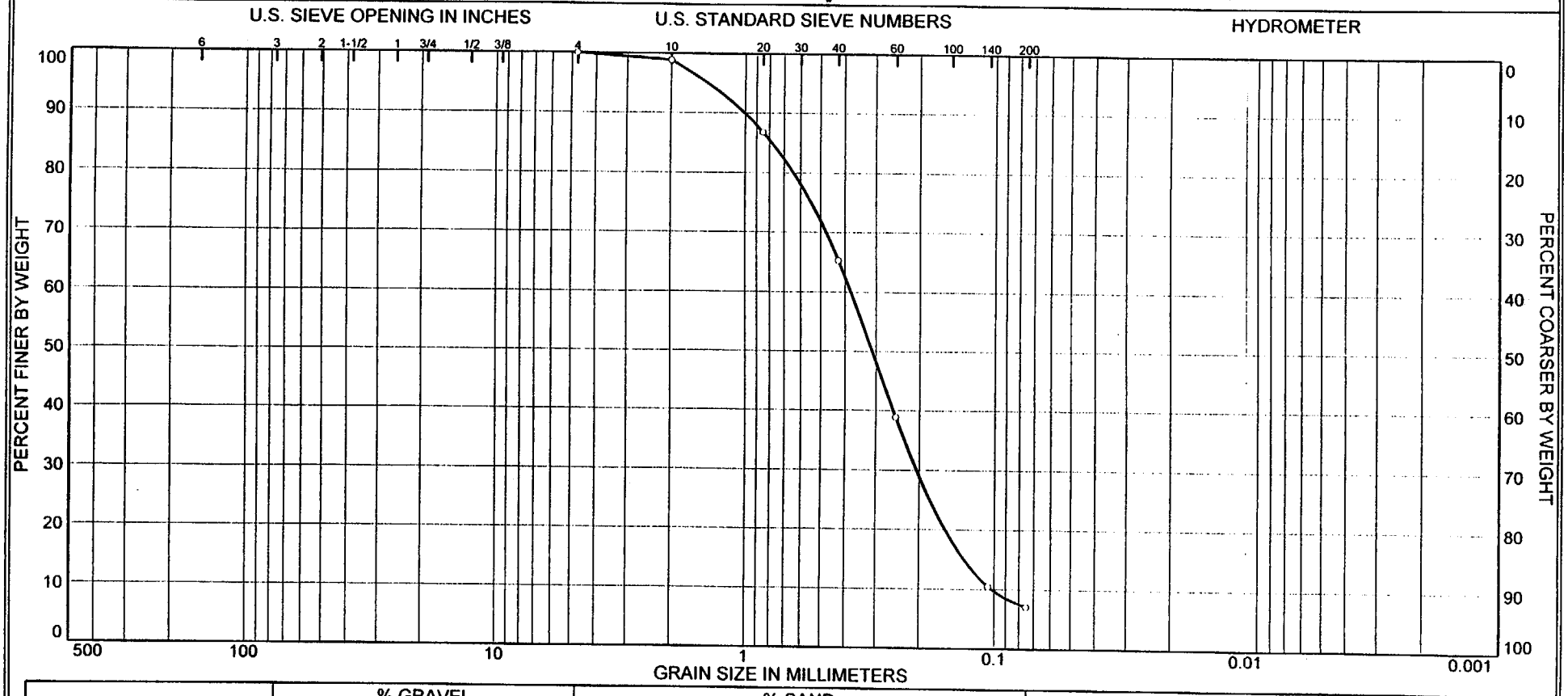
Project MOX Fuel Fabrication Facility

Project No. 5016003963 Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC Reviewed by: HJ

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.1	33.6	58.2	7.1	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	14	82-82.5 Ft.	8/17/00		Tan Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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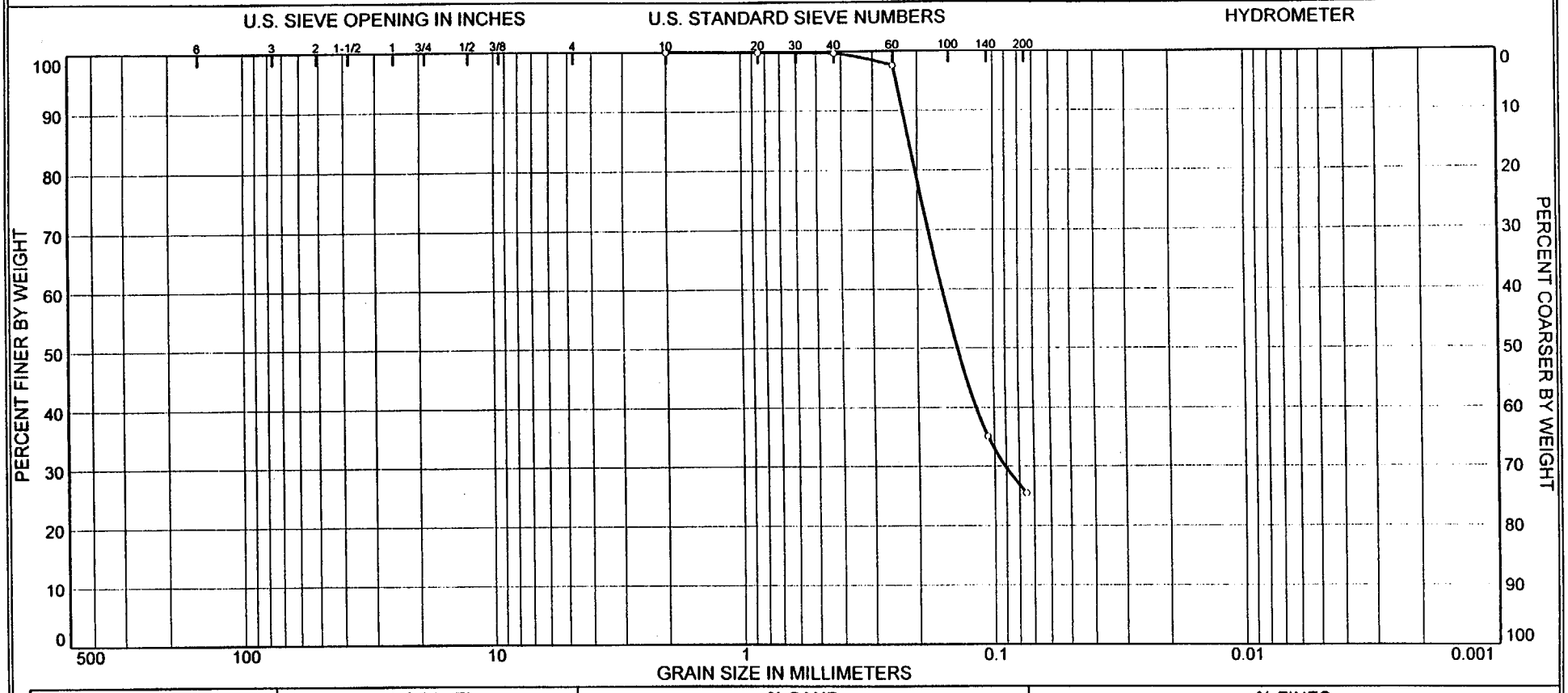

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	0.3	74.2	25.5	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	17A	95.5-96.5'	8/17/00		Brown Silty sand	35.2		

Client Duke Cogema Stone & Webster (DCS)

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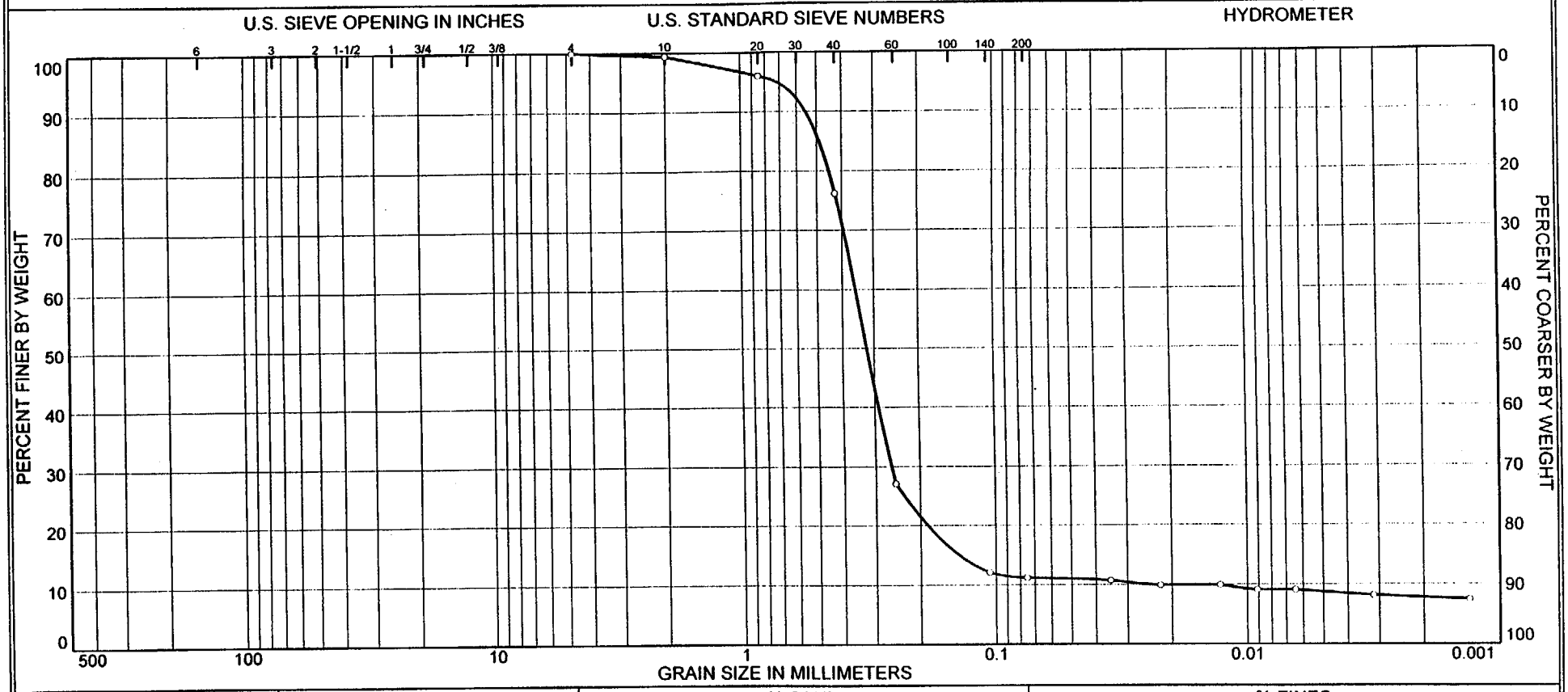

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.6	23.2	65.0	2.4	8.8

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	17B Bot	98-100'	9/25/00	SP-SC	Tan Poorly graded sand with clay		51	23

Client Duke Cogema Stone & Webster (DCS)

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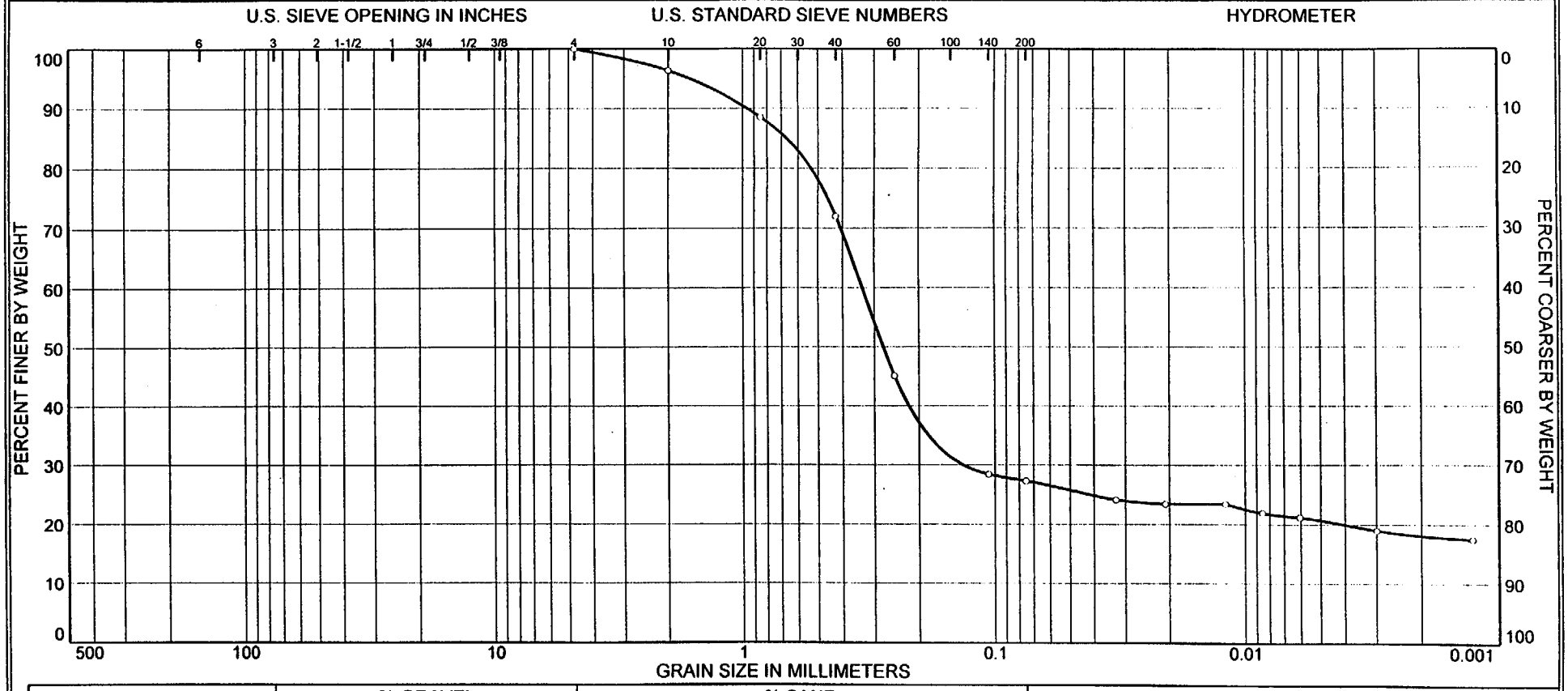

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	3.7	24.3	44.7	6.6	20.7

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	17B	98-100'	02/09/01		Brown Clayey Sand			
		Dynamic							
		Tests							

Client Duke Cogema Stone & Webster (DCS)

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Project No. 5016003963 Plate

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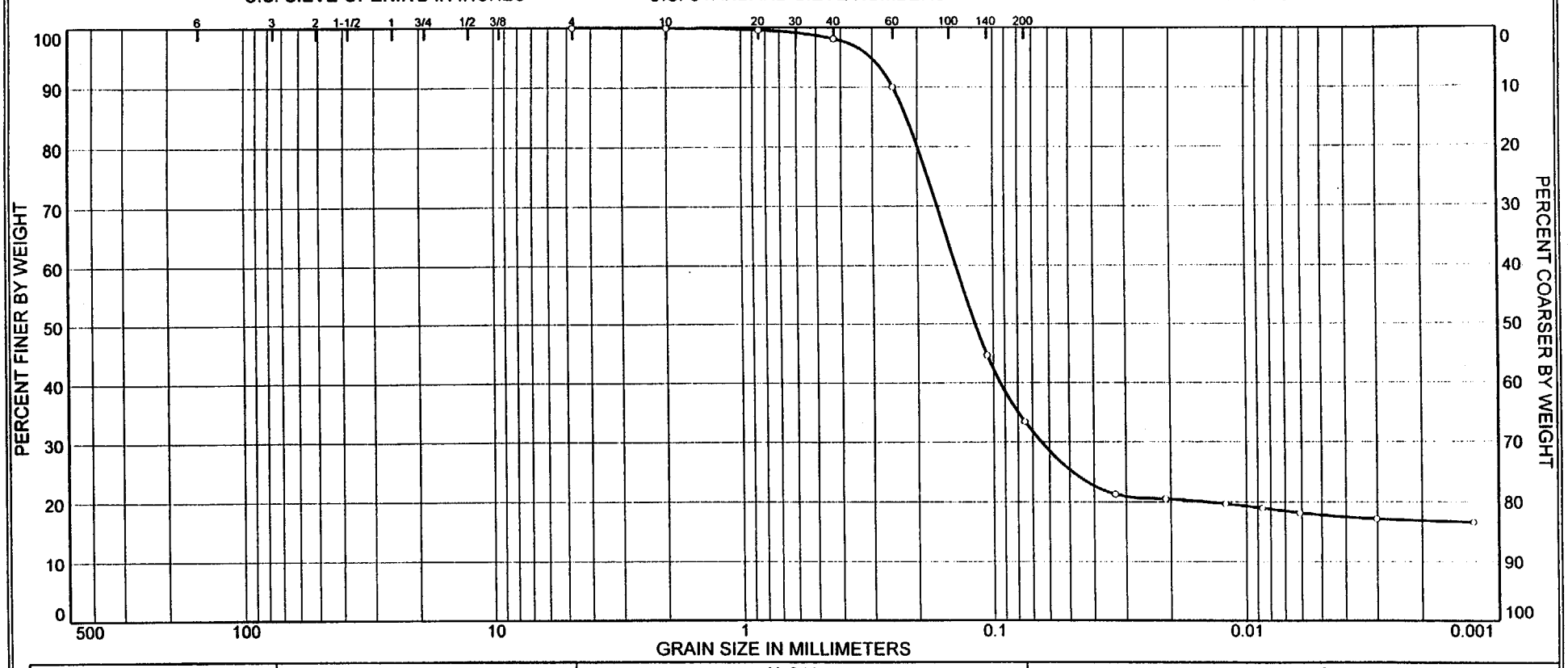
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	1.9	64.7	15.6	17.8

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	18A	100.5-102.0'	8/23/00	SC	Tan Brown Clayey sand	39.7	49	25

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Project No. 50160-0-3963 | Plate

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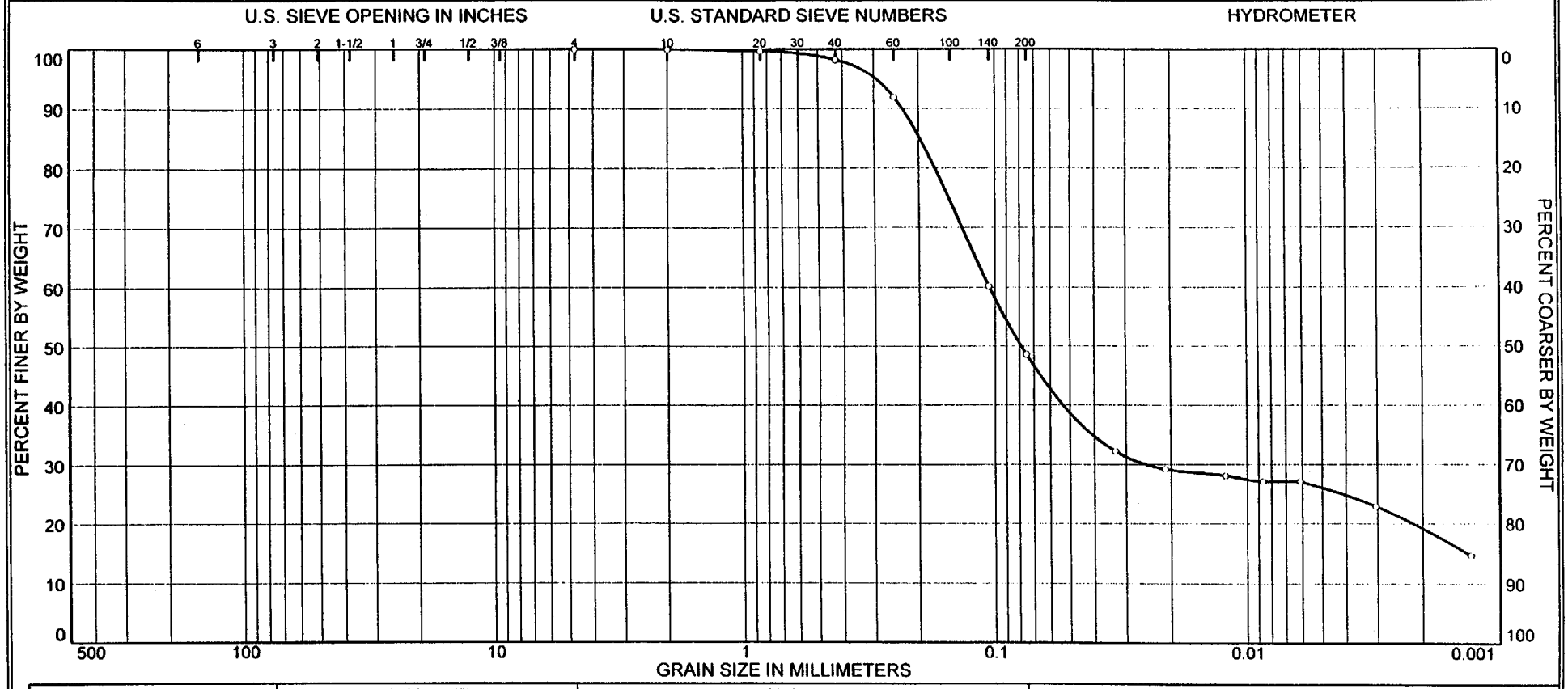

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	1.8	49.6	22.6	26.0

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	18B Bot.	103-105'	9/25/00	SC	Tan Clayey sand		57	22

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 5016003963 Plate

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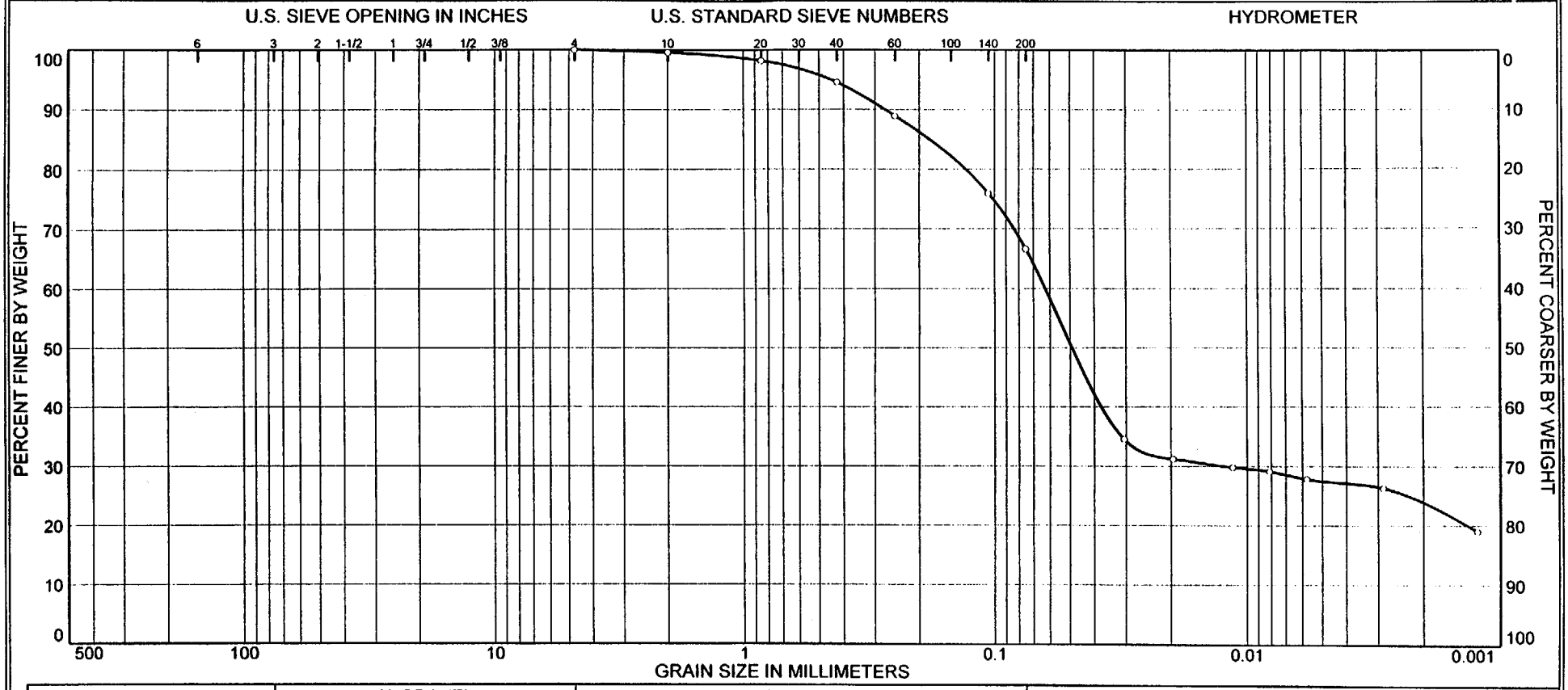

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.4	5.1	27.9	39.2	27.4

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-6	19	106.5-107.5'	8/23/00	CH	Tan Brown Sandy fat clay	34.6	58	30

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 Plate

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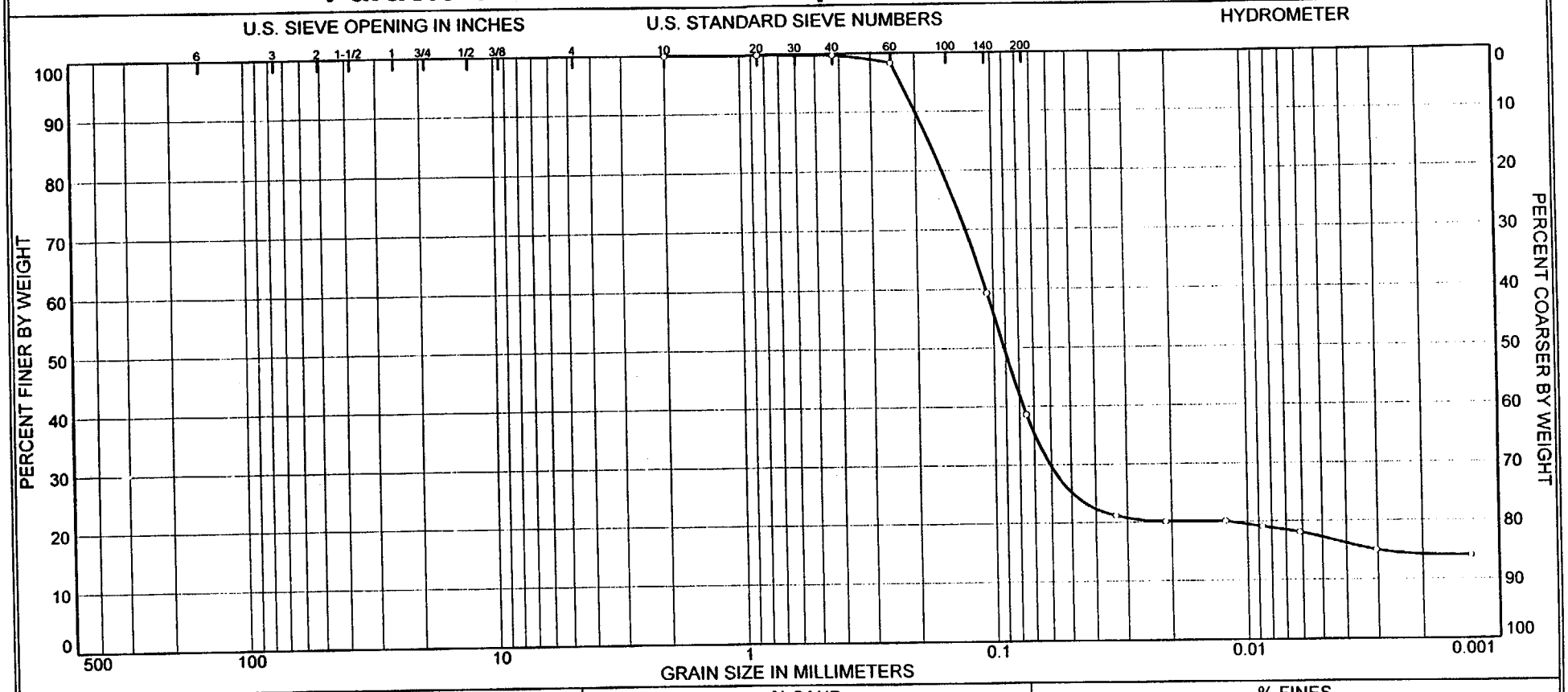


% COBBLES	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.3	61.1	21.4	17.2

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
Boring BH-6	20	111-113'	8/31/00		Tan Brown Silty sand	32.0		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

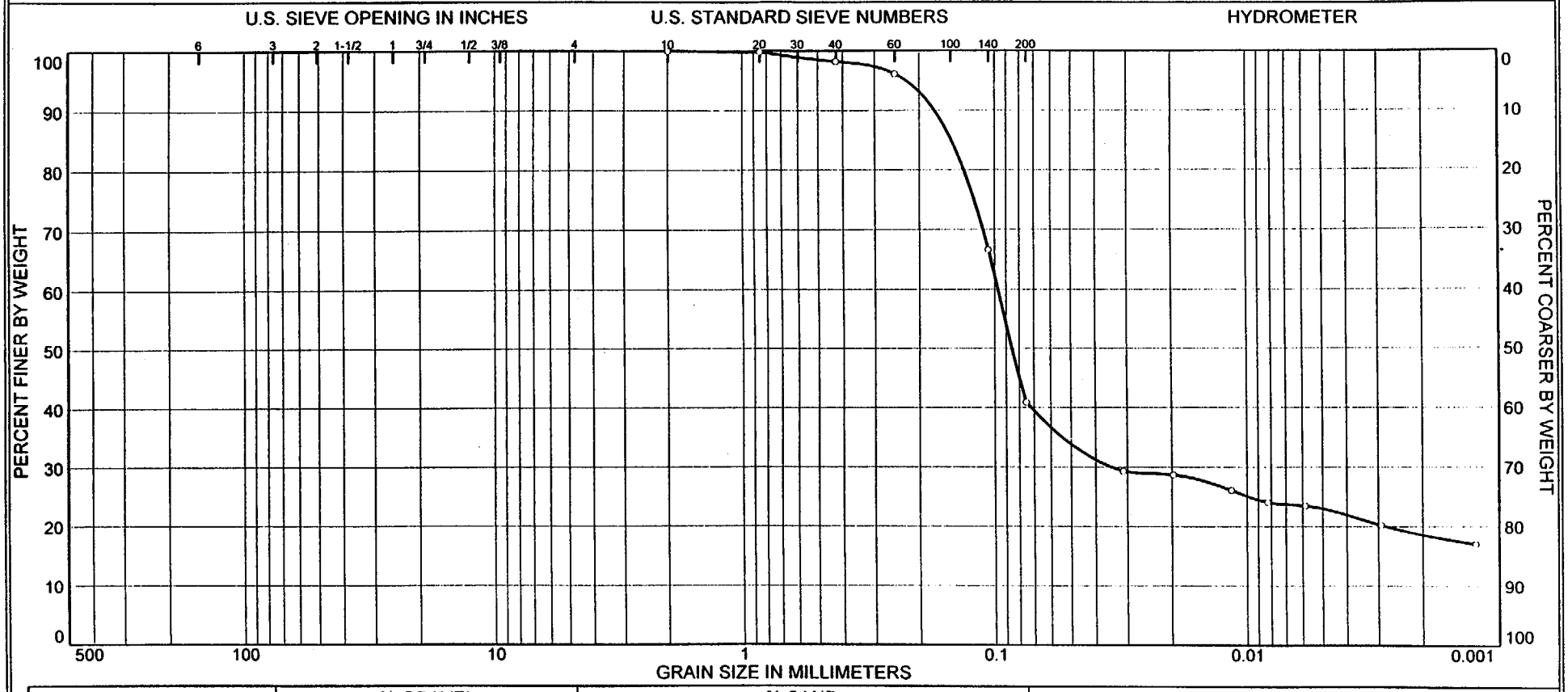
Tested by: WFL Reviewed by: HJ

Grain Size & Atter[illegible] Limits Summary

Project: **MOX Fuel Fabrication Facility** **LAW Project No:** **50160-0-3963**

Source of Sample	Sample No.	Depth	Material Description	Sand (%)	Silt (%)	Clay (%)	Fines (%)	Natural Moisture (%)	LL	PL	PI
Boring BH-7											
	3	13-14'	Red Brown Silty sand	59.1	17.9	23	40.9	20.3			
	5	23-24'	Tan Silty sand	81.2			18.8				
	6B (top)	30-31.6'	Tan Clayey sand	78.2	3.3	10.8	14.1		31	20	11
	8A	38-39'	Red Brown & Tan Silty sand	83.2			16.8				
	8B (top)	40-41.2'	Tan Clayey sand	74.7	3.5	13.8	17.3		36	19	17
	9	43-44.2'	Red Brown Silty sand	74.4			25.6				
	10	48-49.1'	silt	93.2			6.8				
	11	53-54'	Brown Poorly graded sand with	93			7				
	12	58-59.4'	Brown Poorly graded sand with	91.6			8.4				
	14B (top)	71-71'	Tan Silty sand	54.4	10.9	34.7	45.6		109	68	41
	16A-1	78-78.5'	Tan Silty sand	82.5			17.5				
	17	83-84.4'	Tan Brown Clayey sand	83.3	2.5	14.2	16.7	32.5	62	28	34
	18	88-89.5'	Brown Poorly graded sand with	89.3			10.7	33			
	19-2	93.2-94'	Brown Poorly graded sand with	93.6			6.4				
	20B Bot	100-102'	Tan Sandy elastic silt	30.9	19.4	49.7	69.1		93	43	50
	21	103-104.5'	Tan Brown Clayey sand	71.9	10.8	17.3	28.1	30.1	74	31	43
	23	113-114.5'	Tan Brown Poorly graded sand	88.1	4.3	7.6	11.9	35.3			
	25	123.124.5'	Tan Silty sand	87.4			12.6				
	26	128-129.5'	Brown Clayey sand	75	5.5	19.5	25				
	27	133-133.5'	Tan Brown Silty sand	62.6			37.4	32.6			

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	1.8	57.3	17.9	23.0

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	3	13-14 Ft.	8/17/00		Red Brown Silty sand	20.3		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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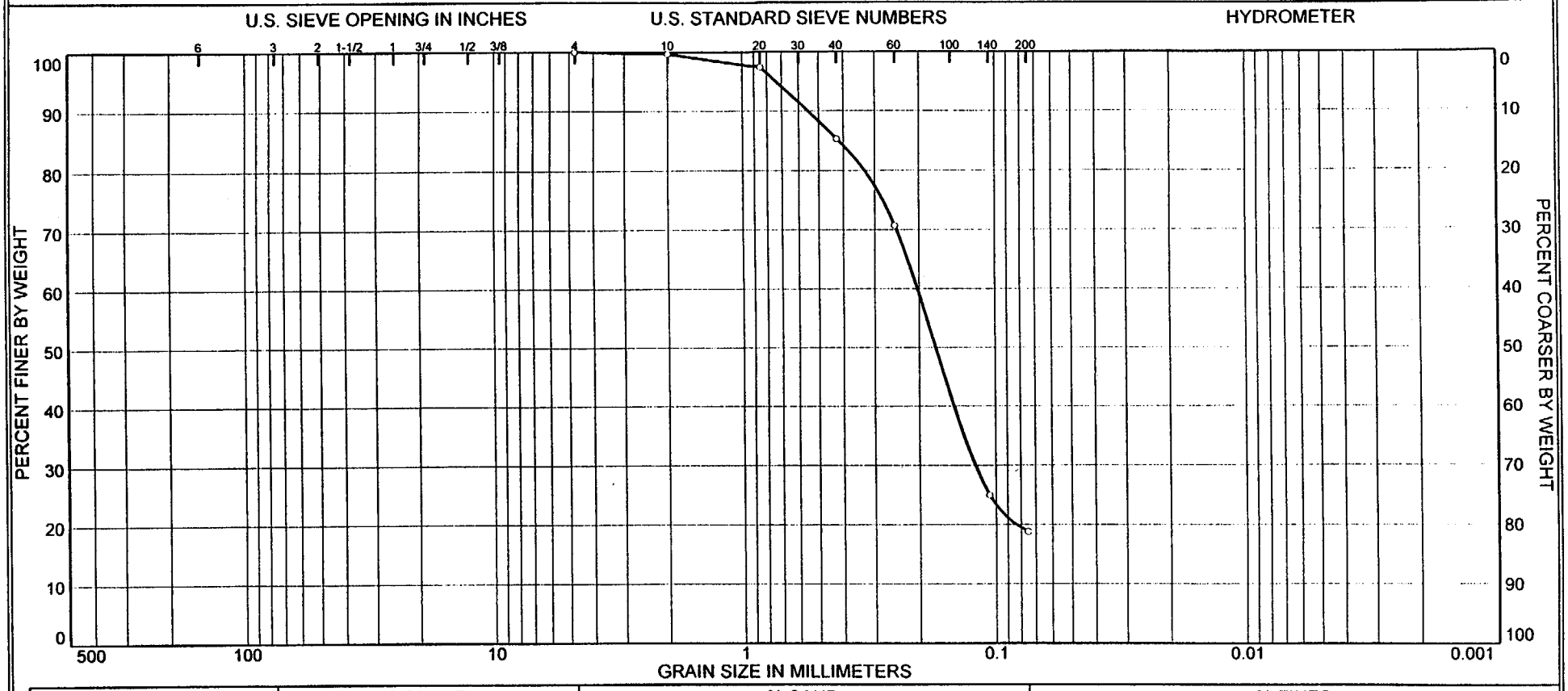

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.3	14.4	66.5	18.8	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	5	23-24 Ft.	8/17/00		Tan Silty sand			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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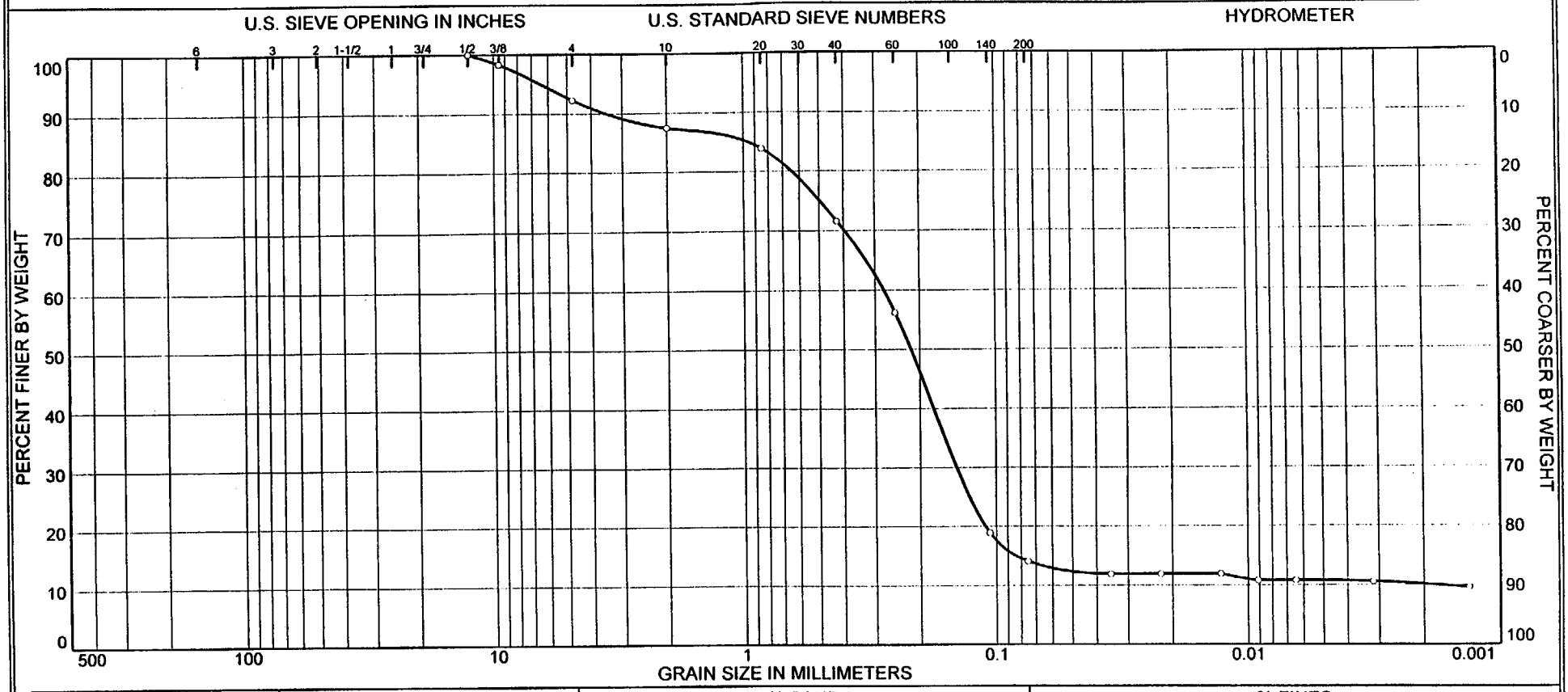

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	7.7	4.8	15.9	57.5	3.3	10.8

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	6B (top)	30-31.6'	9/25/00	SC	Tan Clayey sand		31	20

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 5016003963 Plate

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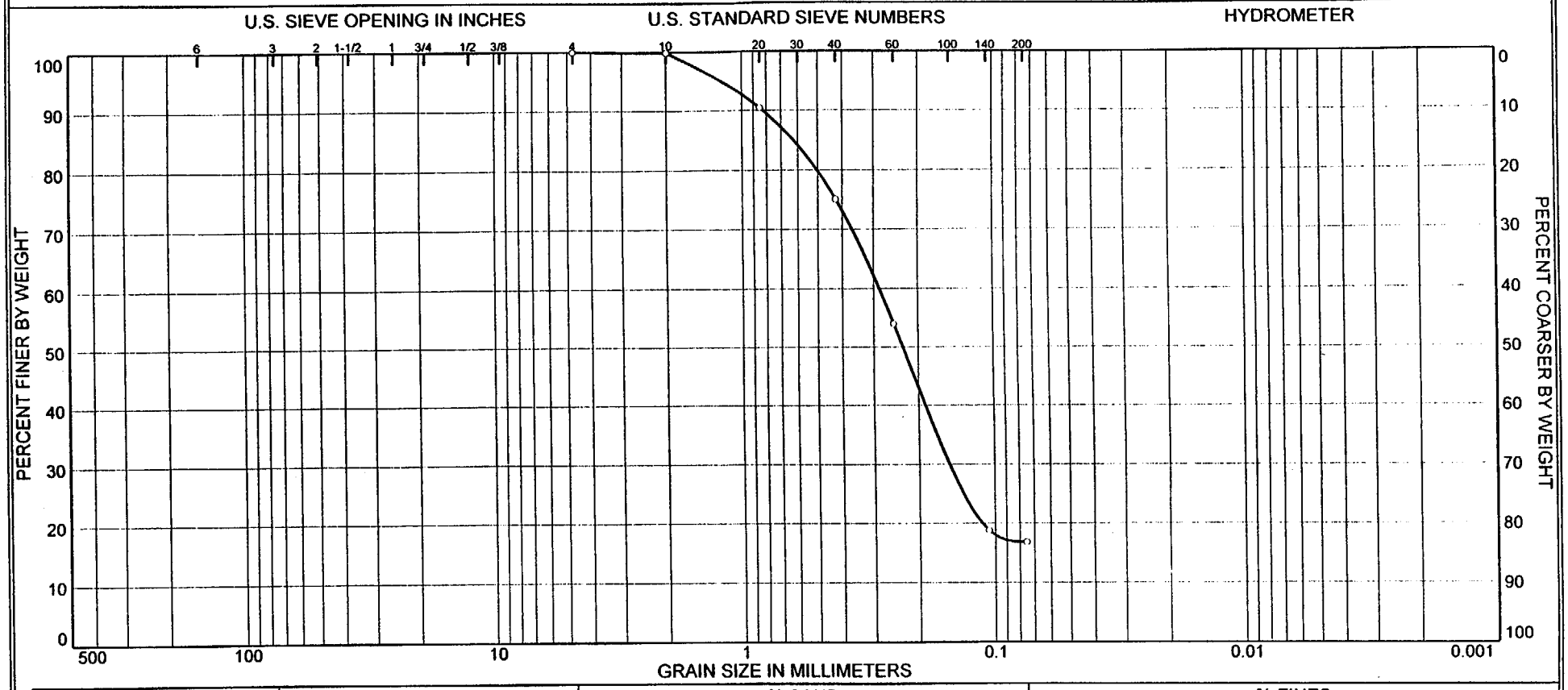

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	24.8	58.3	16.8	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	8A	38-39 Ft.	8/17/00		Red Brown & Tan Silty sand			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

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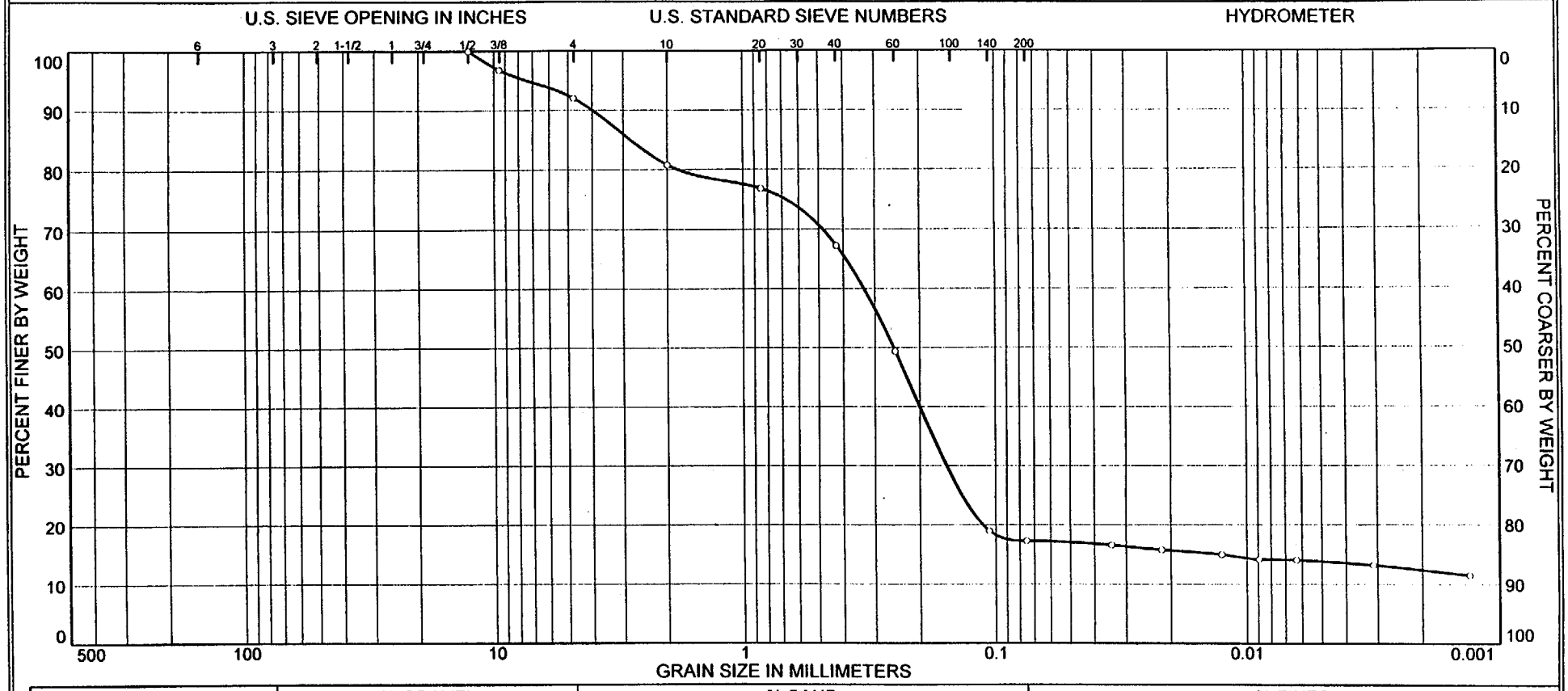
25

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	8.0	11.2	13.6	49.9	3.5	13.8

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	8B (top)	40-41.2'	9/2500	SC	Tan Clayey sand		36	19

Client Duke Cogema Stone & Webster (DCS)

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Project No. 5016003963 | Plate

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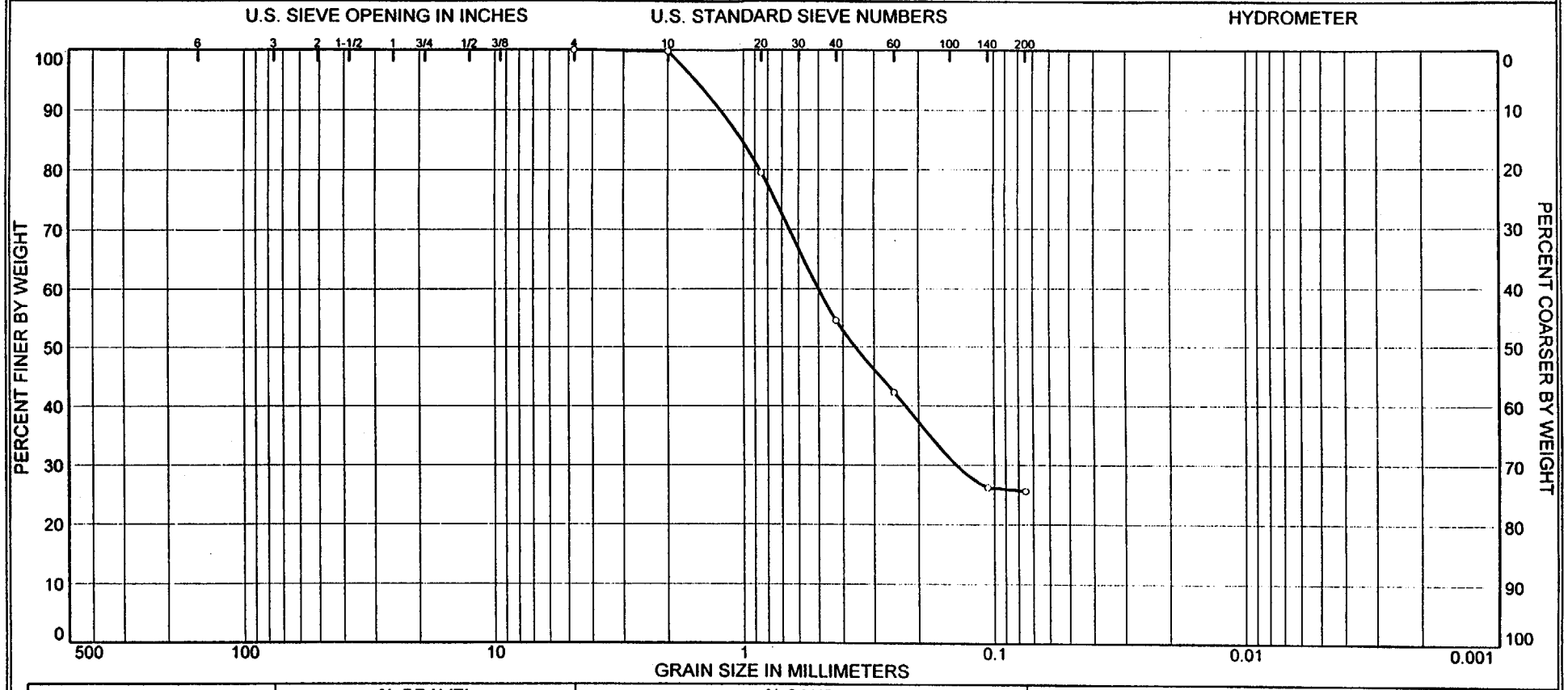

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.2	45.2	29.0	25.6	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	9	43-44.2'	8/23/00		Red Brown Silty sand			

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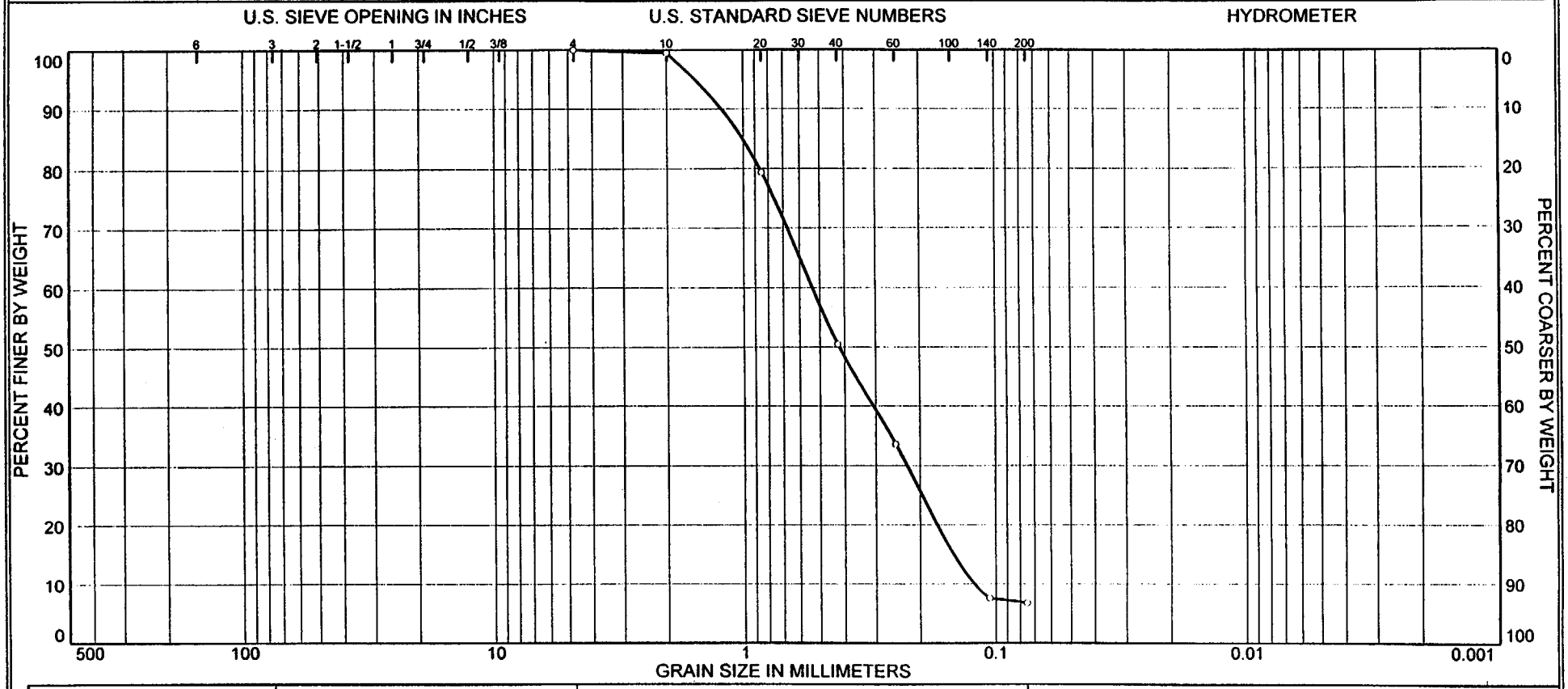

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.5	49.0	43.7	6.8	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	10	48-49.1 Ft.	8/17/00		Brown Poorly graded sand with silt			

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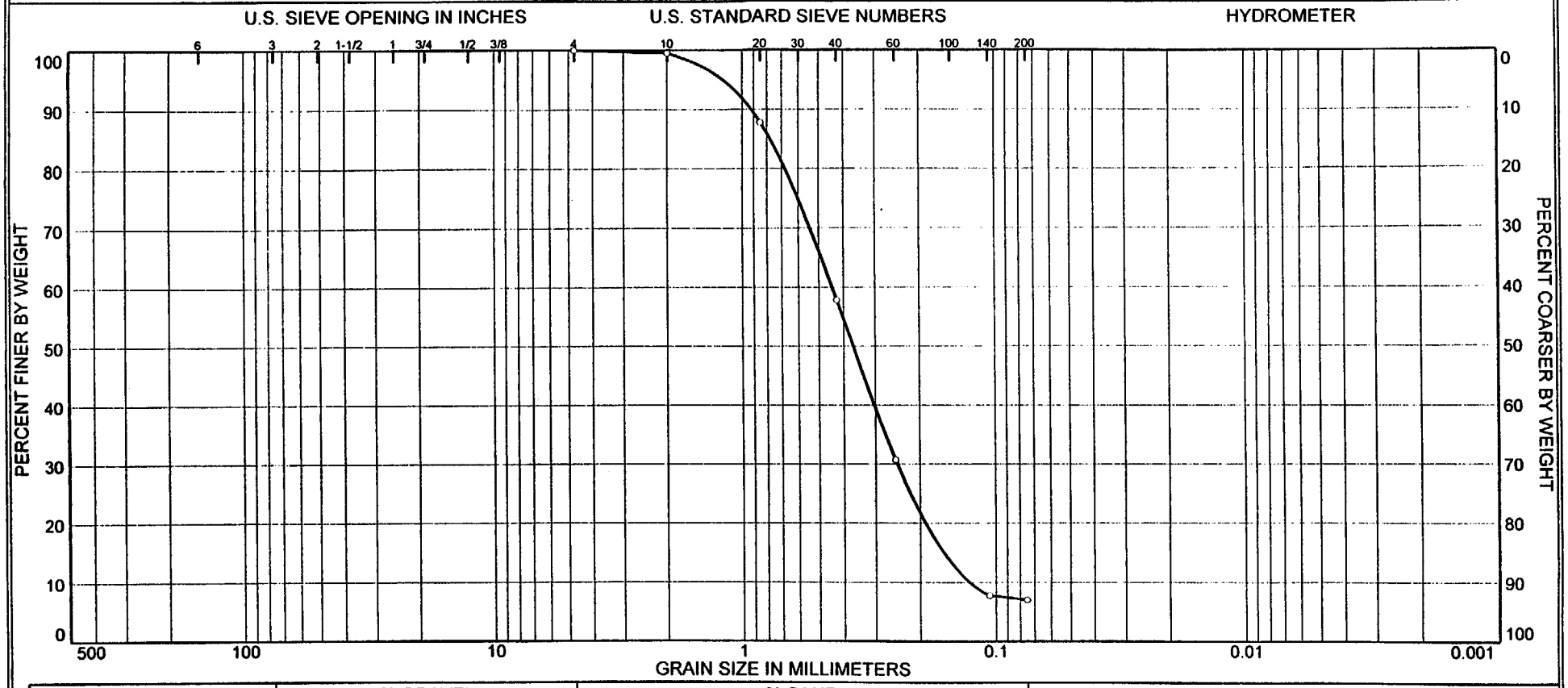

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.5	41.7	50.8	7.0	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	11	53-54'	8/23/00		Brown Poorly graded sand with silt			

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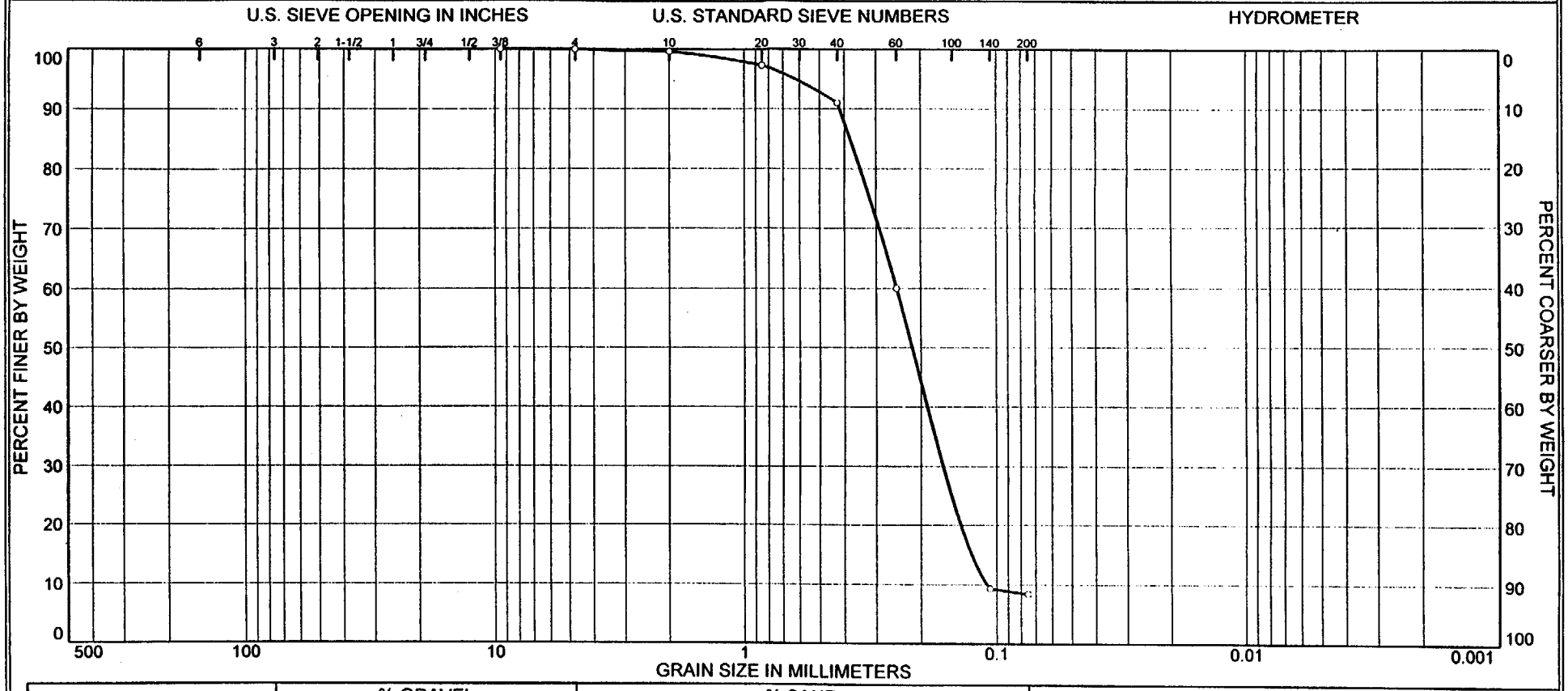

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.4	8.6	82.6	8.4	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	12	58-59.4 Ft.	8/17/00		Brown Poorly graded sand with silt			

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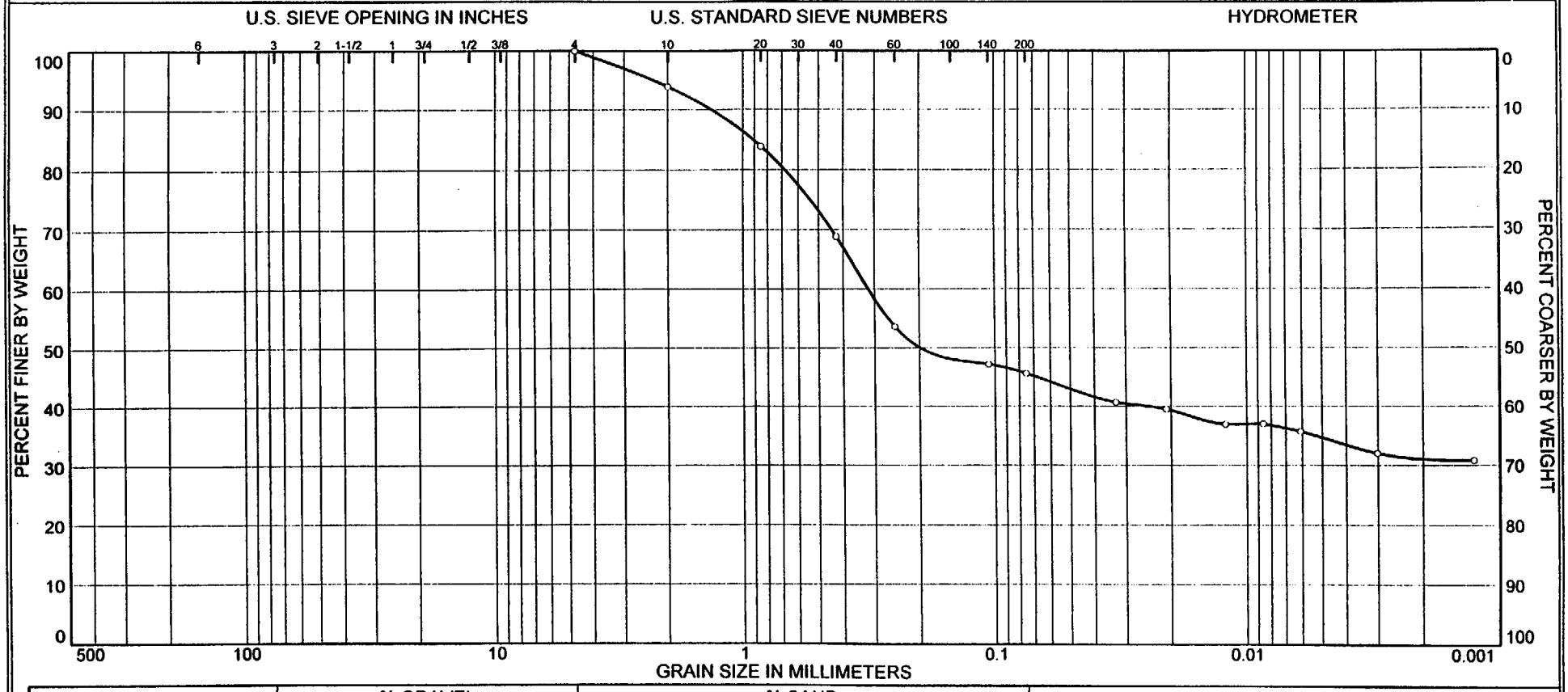

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	6.1	25.1	23.2	10.9	34.7

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	14B (Top)	71-71'	10/9/00	SM	Tan Silty sand		109	68

Client Duke Cogema Stone & Webster (DCS)

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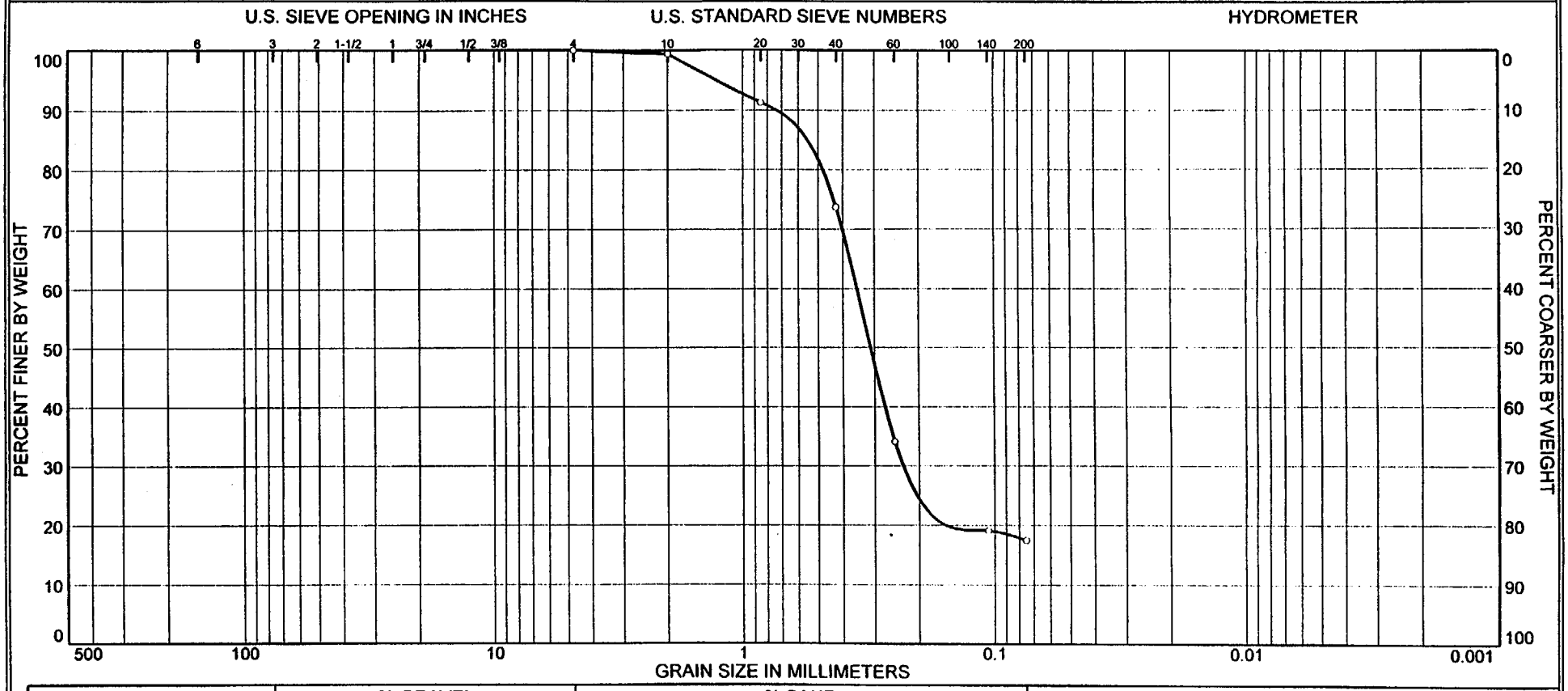
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.6	25.7	56.2	17.5	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	16A-1	78-78.5 Ft.	8/17/00		Tan Silty sand			

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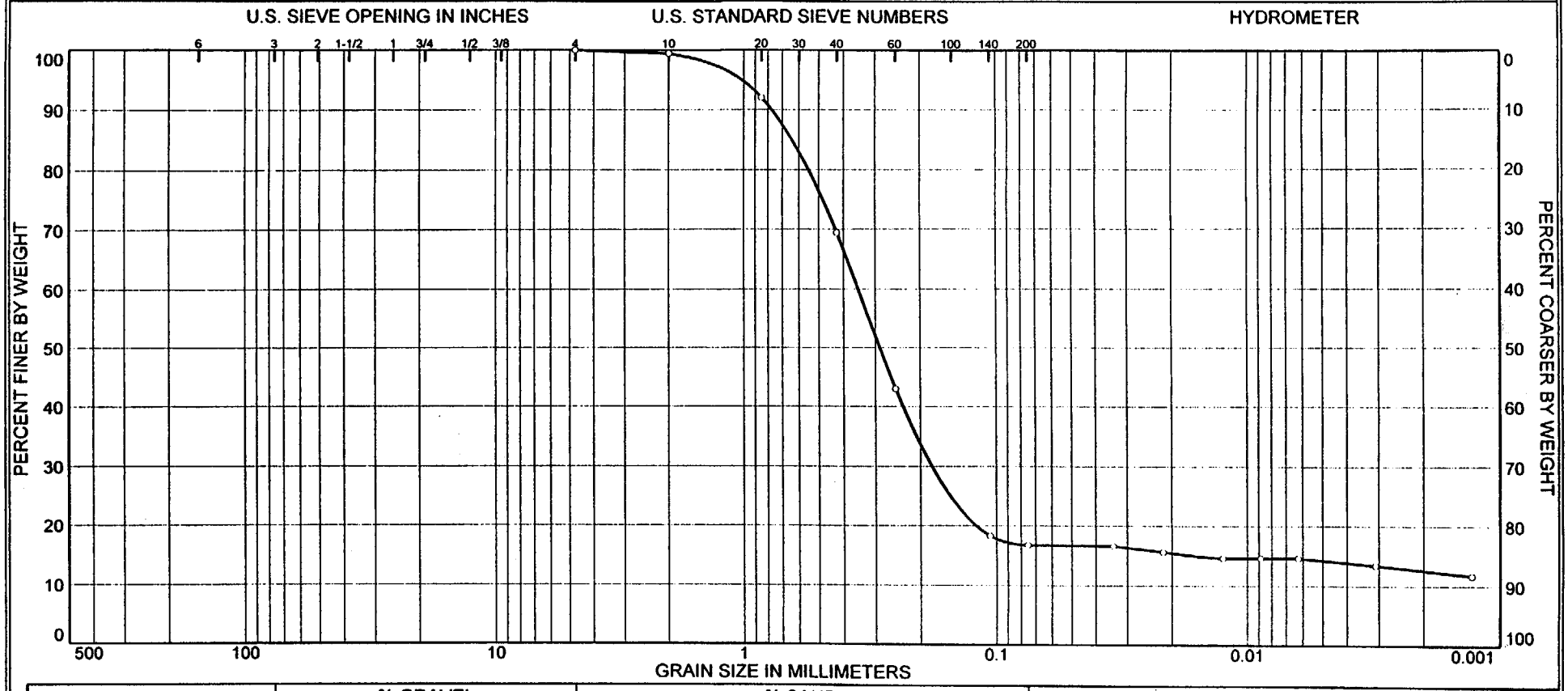
Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: SC reviewed by: HJ

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.6	30.0	52.7	2.5	14.2

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	17	83-84.4'	8/22/00	SC	Tan Brown Clayey sand	32.5	62	28

Client Duke Cogema Stone & Webster (DCS)

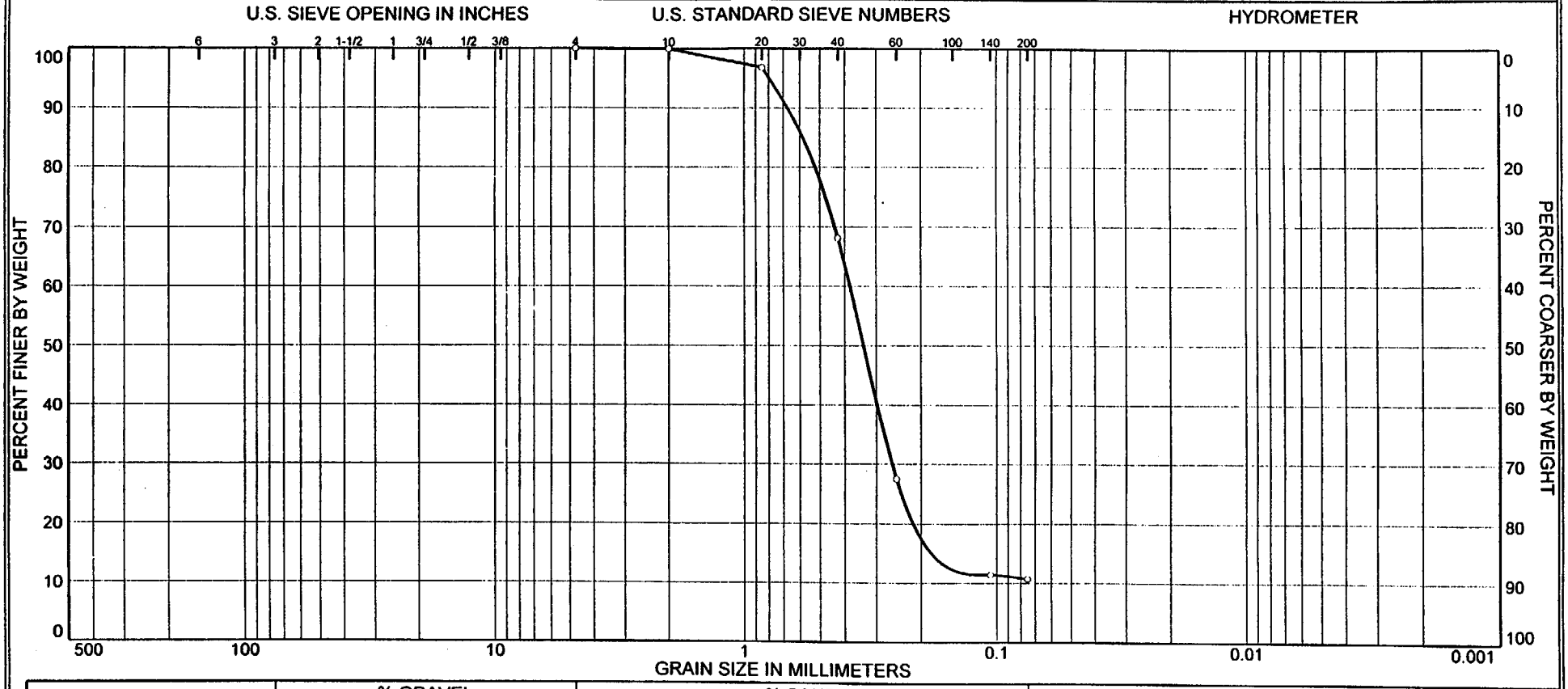
Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

○ Tested by: WFL/SC/JTM Reviewed by: HJ

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	31.9	57.4	10.7	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	18	88-89.5 Ft.	8/17/00		Brown Poorly graded sand with silt	33.0		

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Project No. 50160-0-3963 | Plate

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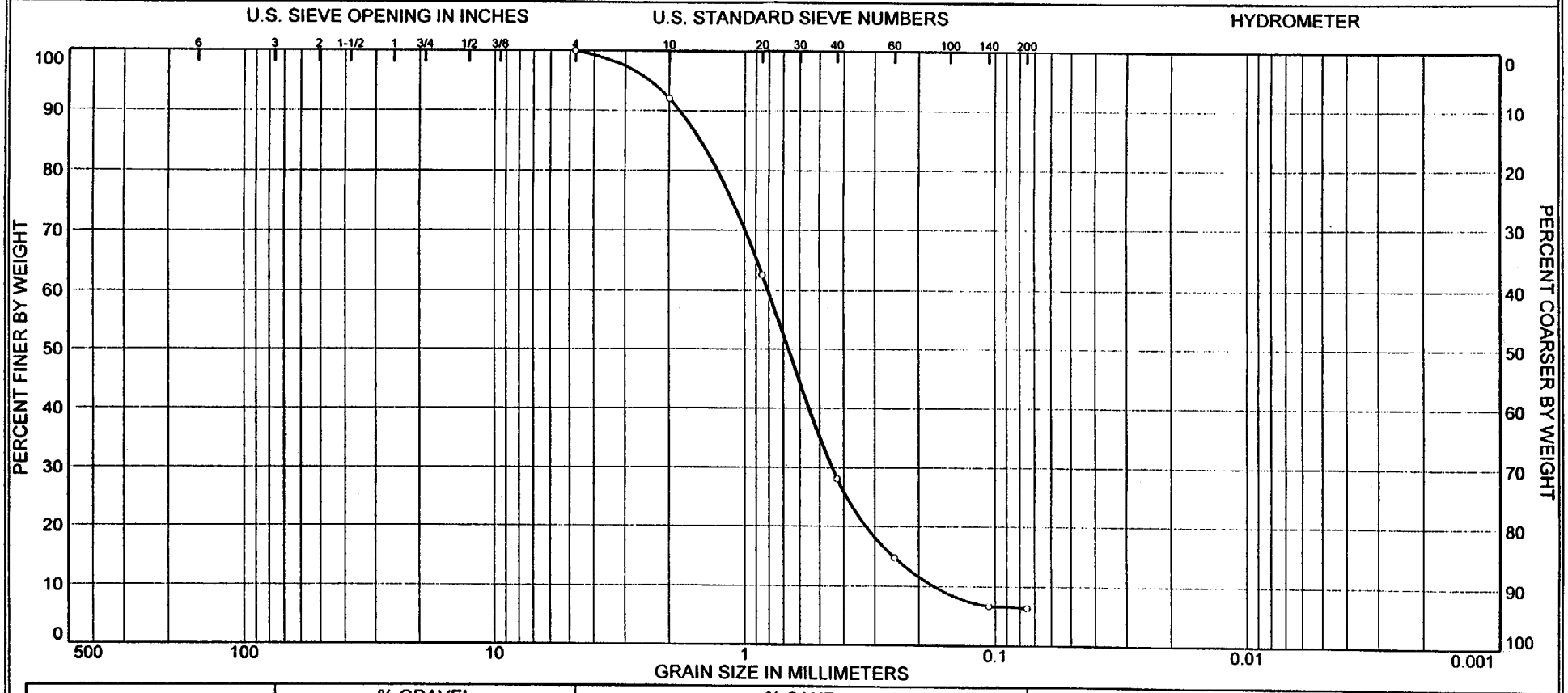

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	8.0	63.9	21.7	6.4	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	19-2	93.2-94 ft.	8/17/00		Brown Poorly graded sand with silt			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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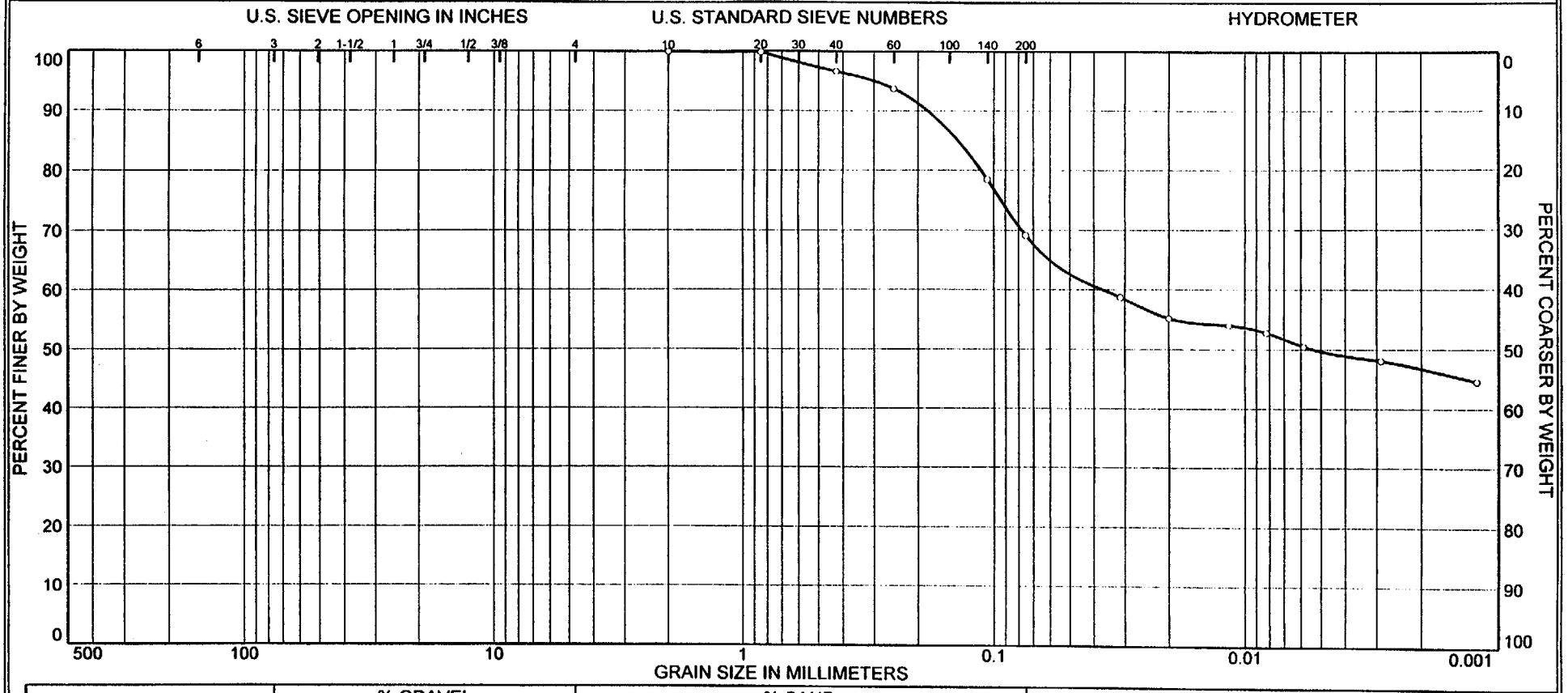
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	3.4	27.5	19.4	49.7

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	20B Bot	100-102'	10/9/00	MH	Tan Sandy elastic silt		93	43

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 5016003963 | Plate

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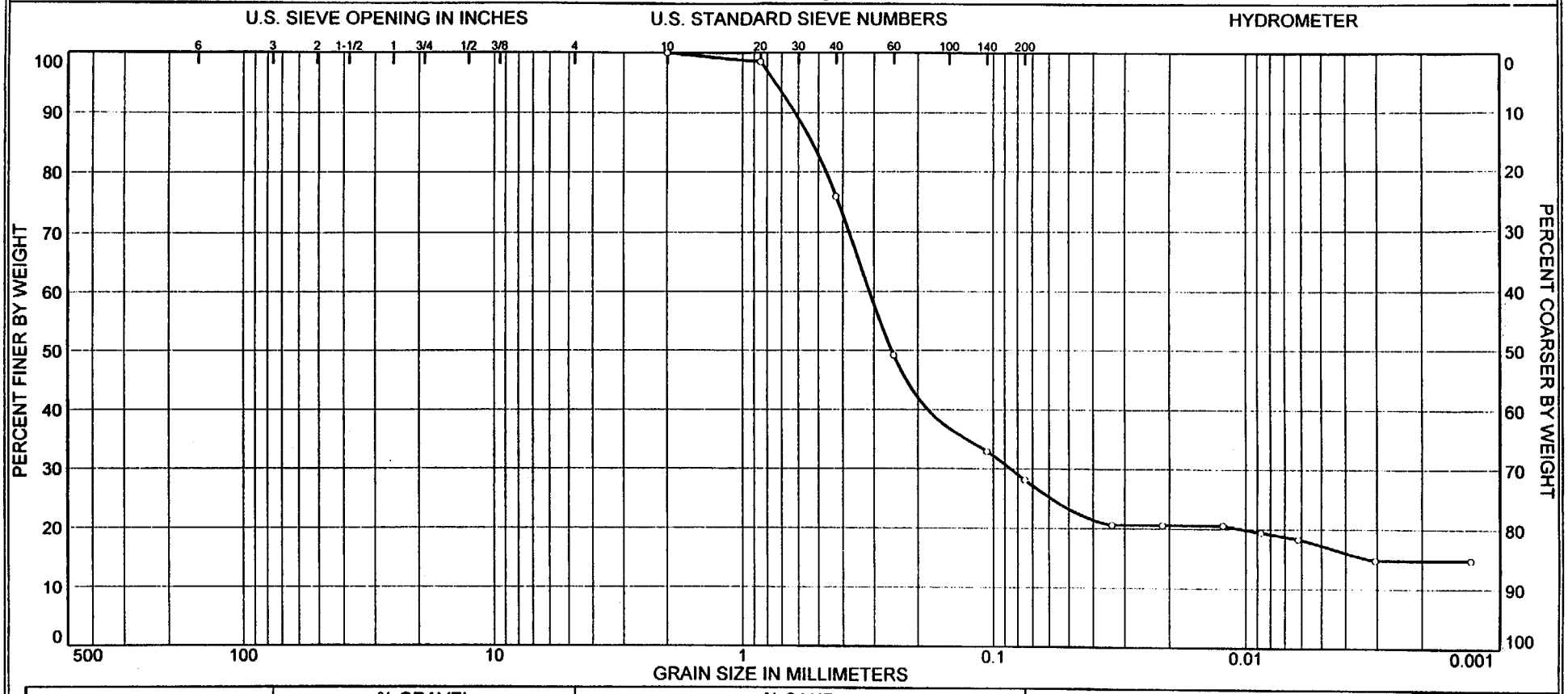
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	24.1	47.8	10.8	17.3

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	21	103-104.5'	8/29/00	SC	Tan Brown Clayey sand	30.1	74	31

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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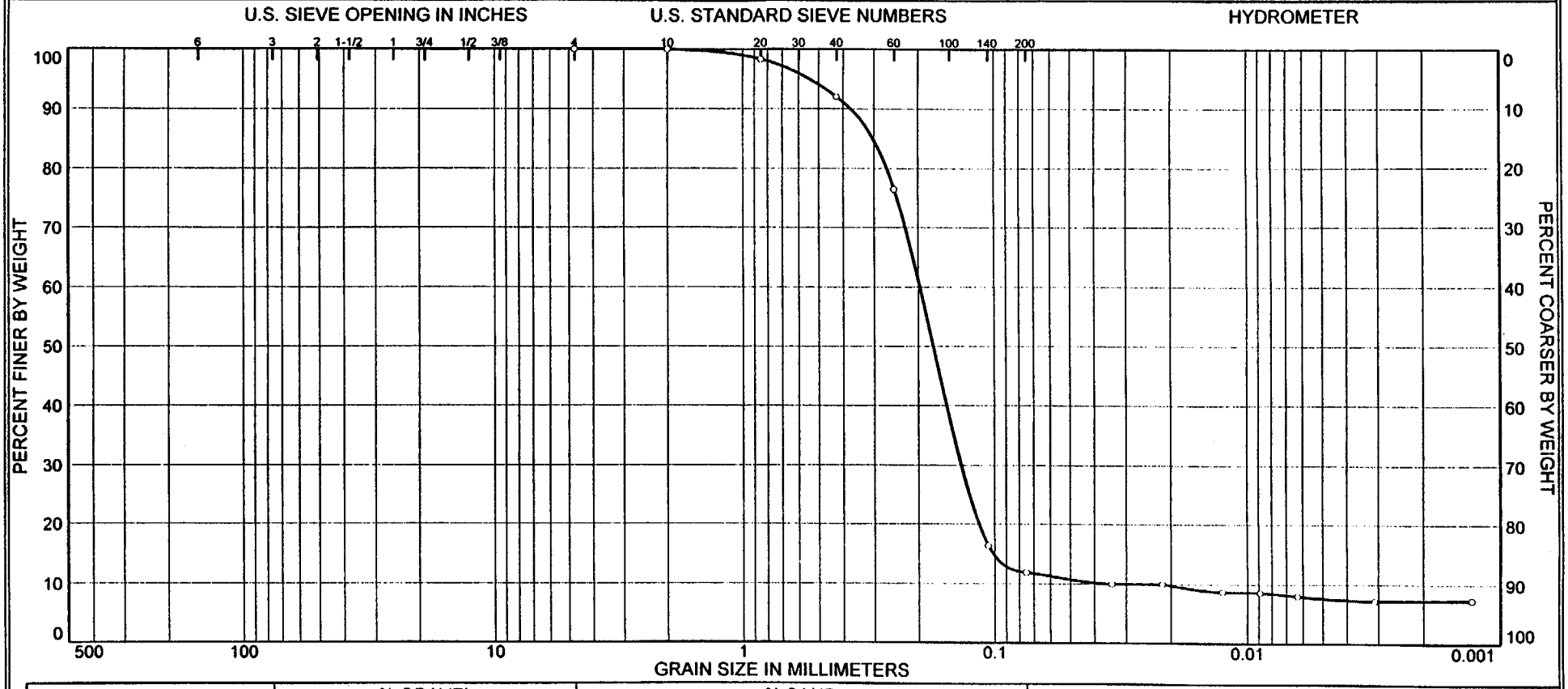

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	8.0	80.1	4.3	7.6

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	23	113-114.5	8/17/00		Tan Brown Poorly graded sand with silt	35.3		

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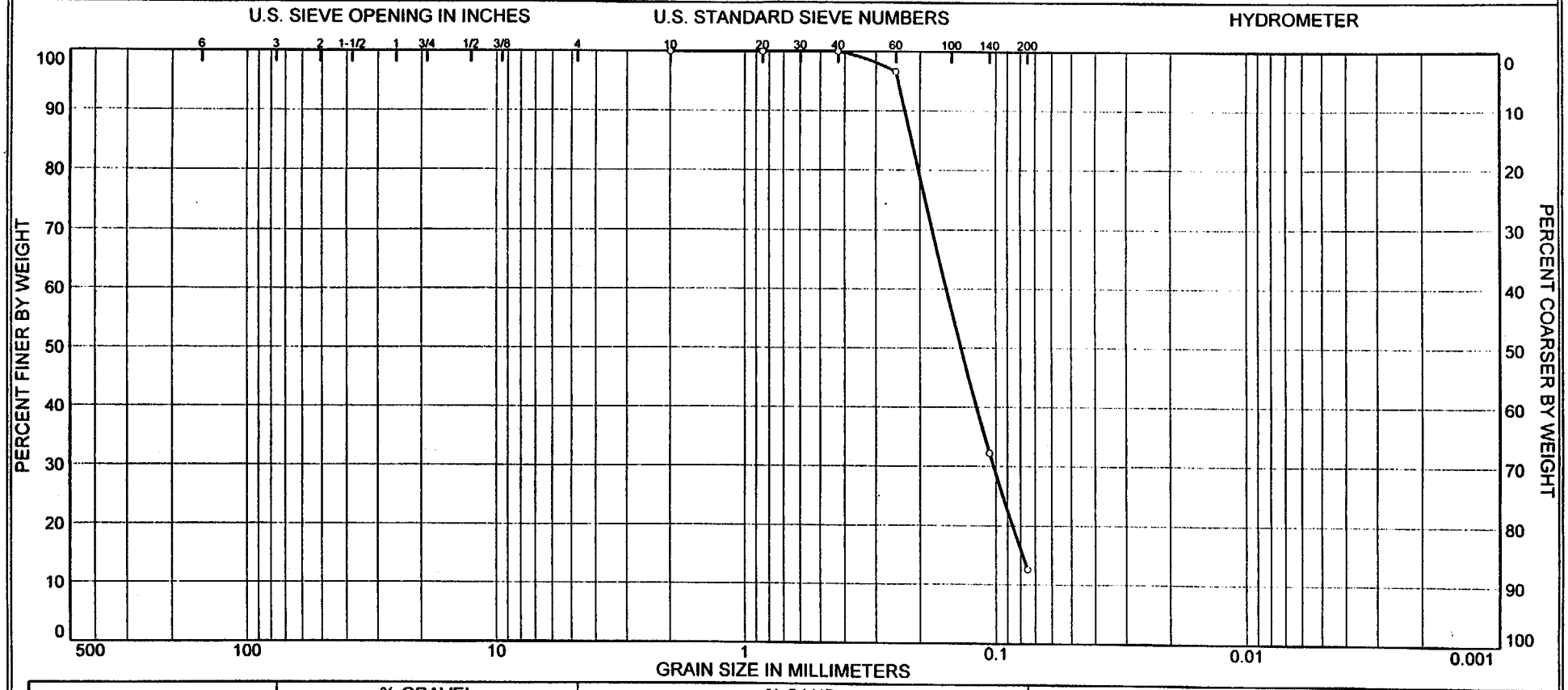

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	0.0	87.4	12.6	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	25	123.124.5'	8/23/00		Tan Silty sand			

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Project No. 50160-0-3963 | Plate

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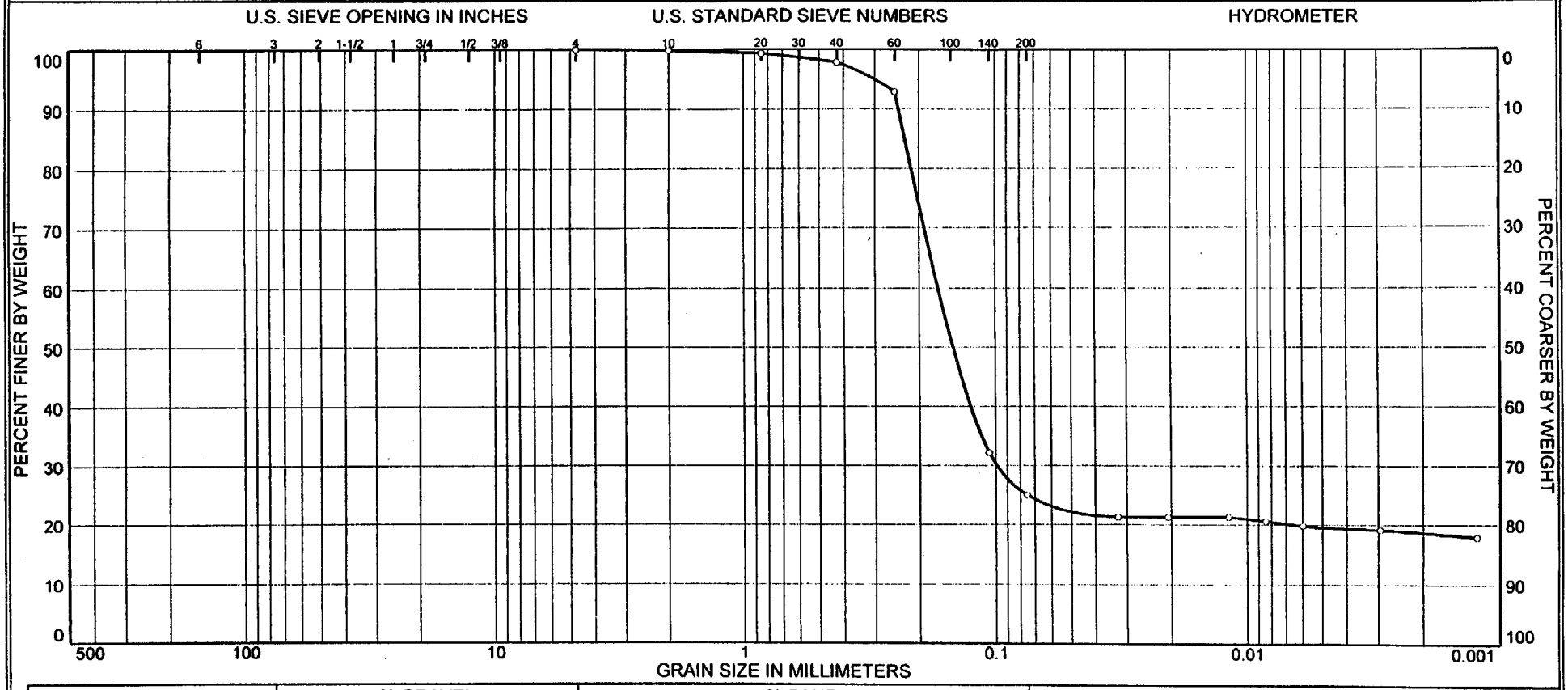
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	2.1	72.8	5.5	19.5

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	26	128-129.5	8/17/00		Brown Clayey sand			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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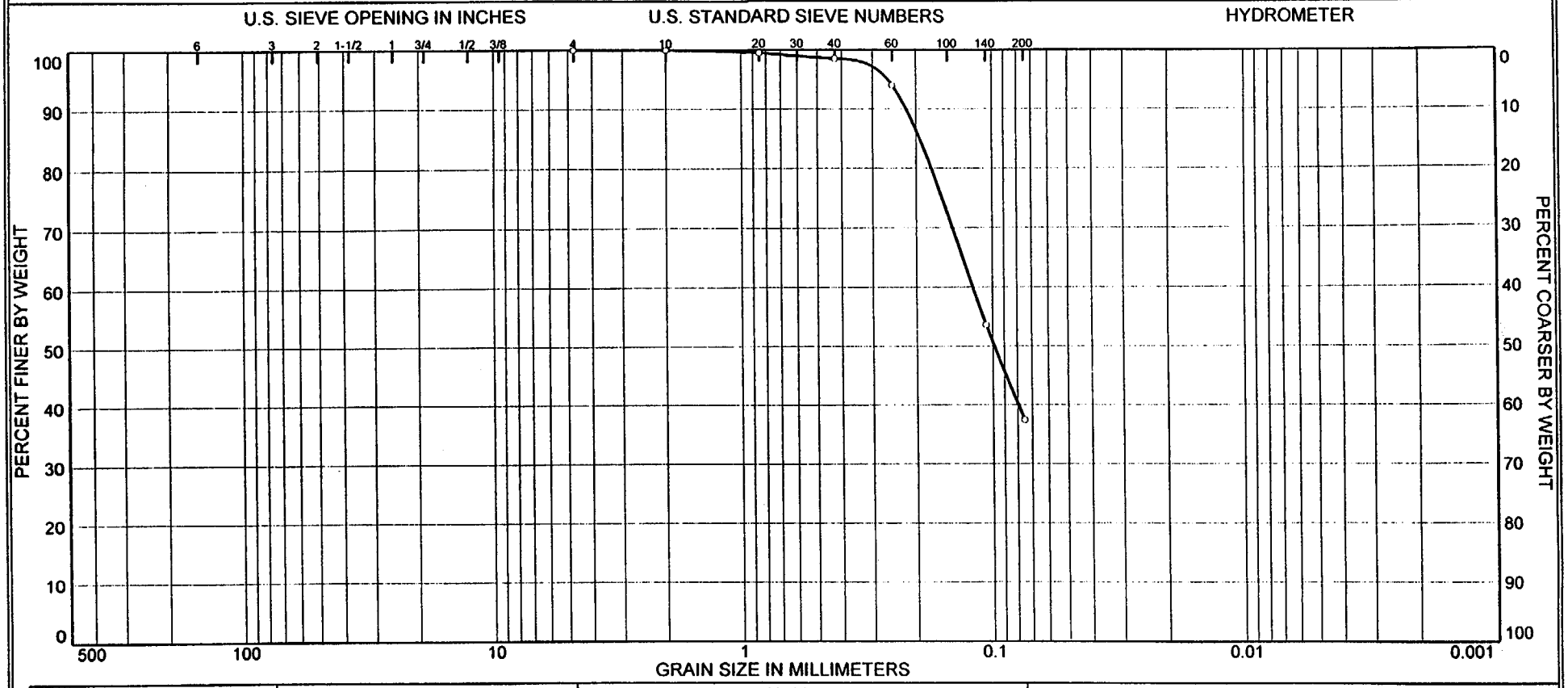
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	1.5	61.1	37.4	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-7	27	133-133.5'	8/23/00		Tan Brown Silty sand	32.6		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

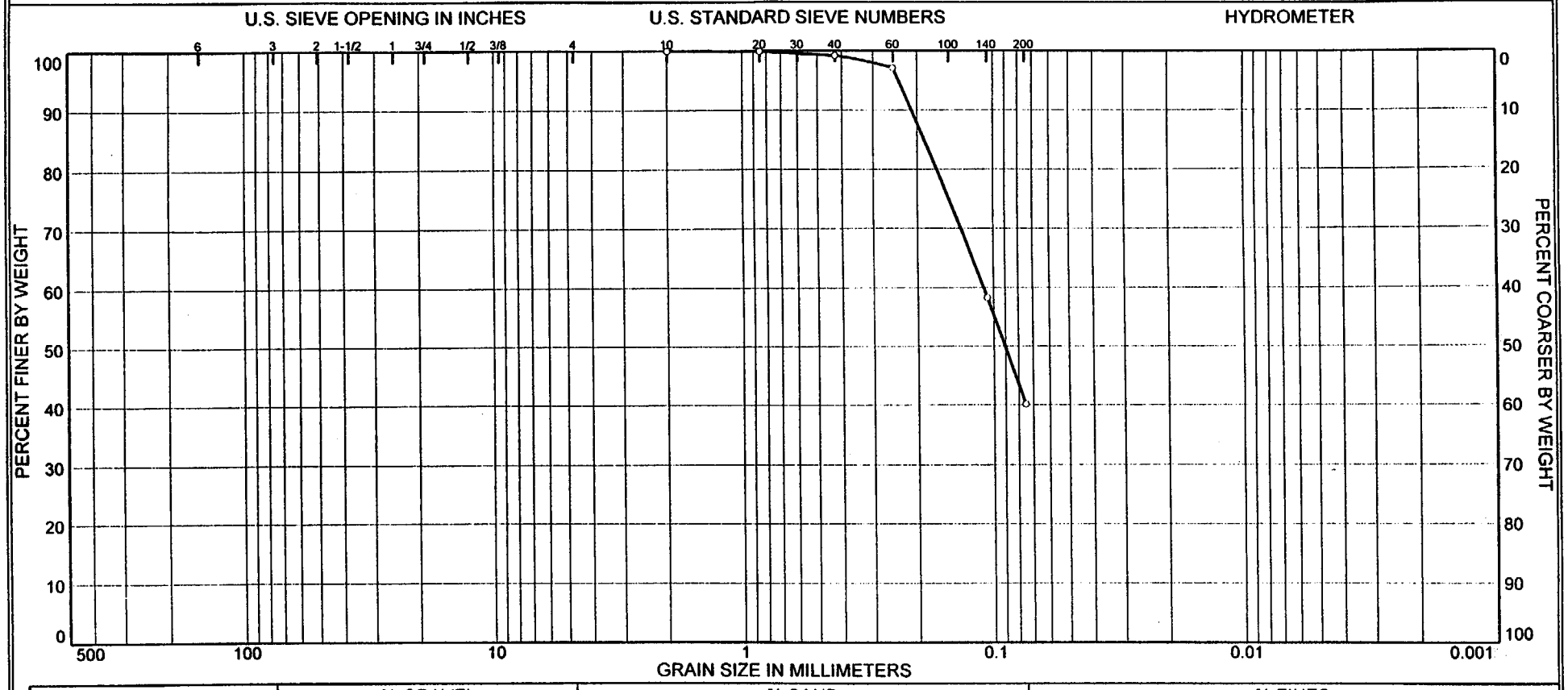
○ Tested by: SC Reviewed by: HJ

Grain Size & Atter[illegible] Limits Summary

Project: **MOX Fuel Fabrication Facility** **LAW Project No:** **50160-0-3963**

Source of Sample	Sample No.	Depth	Material Description	Sand (%)	Silt (%)	Clay (%)	Fines (%)	Natural Moisture (%)	LL	PL	PI
Boring BH-8	3	13-14.5'	Red Brown Silty sand	59.9			40.1	14.9			
	5	23-24.5'	Tan Silty sand	85.8			14.2				
	7	36-37.5'	Tan Silty sand	80.9			19.1				
	9	46-47.5'	Red Brown Poorly graded sand with silt	90.1			9.9	19			
	12	61-62.5'	Tan Poorly graded sand with silt	93.7			6.3				
	16	81-82.5'	Tan Brown Silty sand	85			15	31.5			
	18	91-92.5'	Tan Silty sand	87.2	2	10.8	12.8	35.1			
	20 (composite)	101.5-102.5'	Brown Silty sand	86.9			13.1				
	21 (composite)	106.3-107.5'	Tan Brown Clayey sand	61	12.2	26.8	39	37.3	102	32	70
	24 (composite)	121-122.5'	Tan Poorly graded sand with silt	88.7			11.3	26.3			
	26 (composite)	131.5-132.5'	Brown Silty sand	75.8			24.2				
	27	136-137.5'	Brown Clayey sand	58.6	22.1	19.3	41.4	35.4	56	26	30

Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	0.8	59.1	40.1	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-8	3	13-14.5'	8/23/00		Red Brown Silty sand	14.9		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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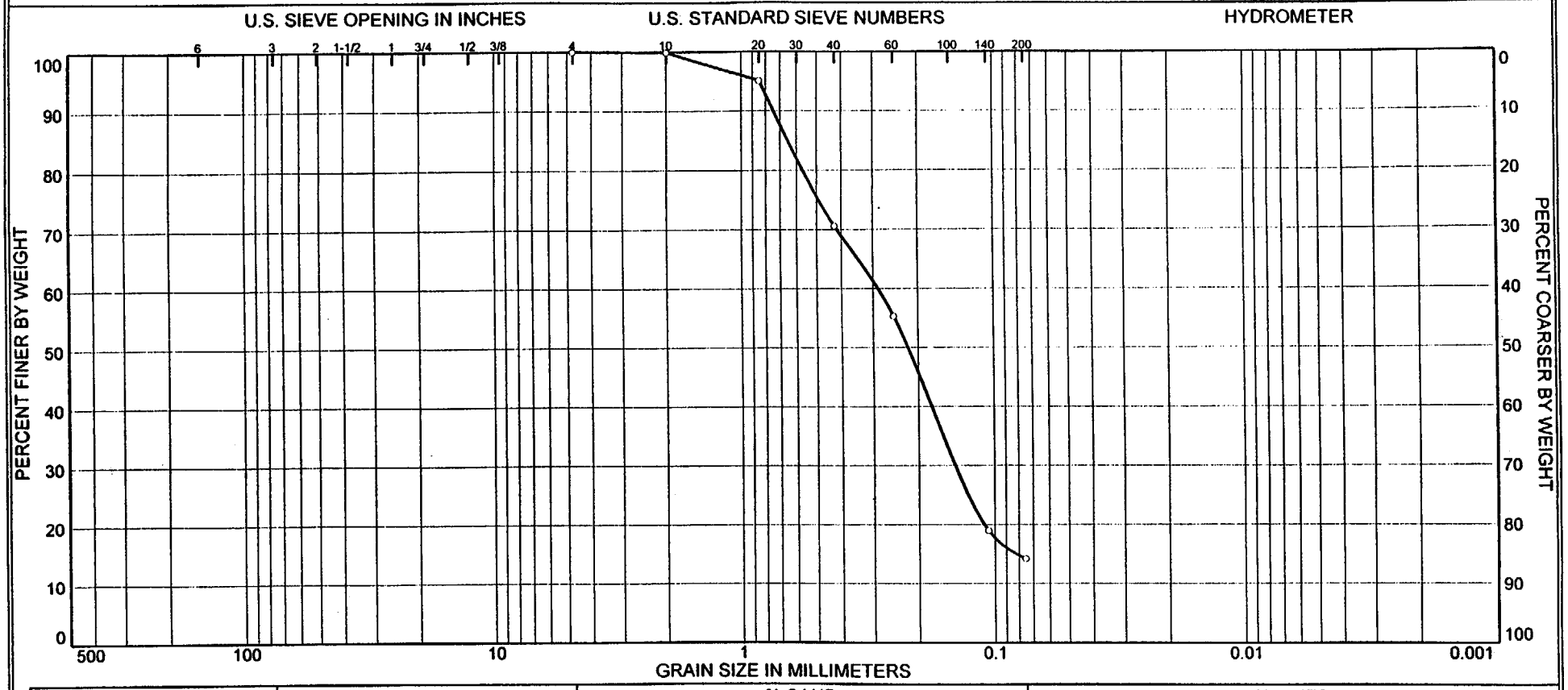
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	29.3	56.4	14.2	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-8	5	23-24.5'	8/23/00		Tan Silty sand			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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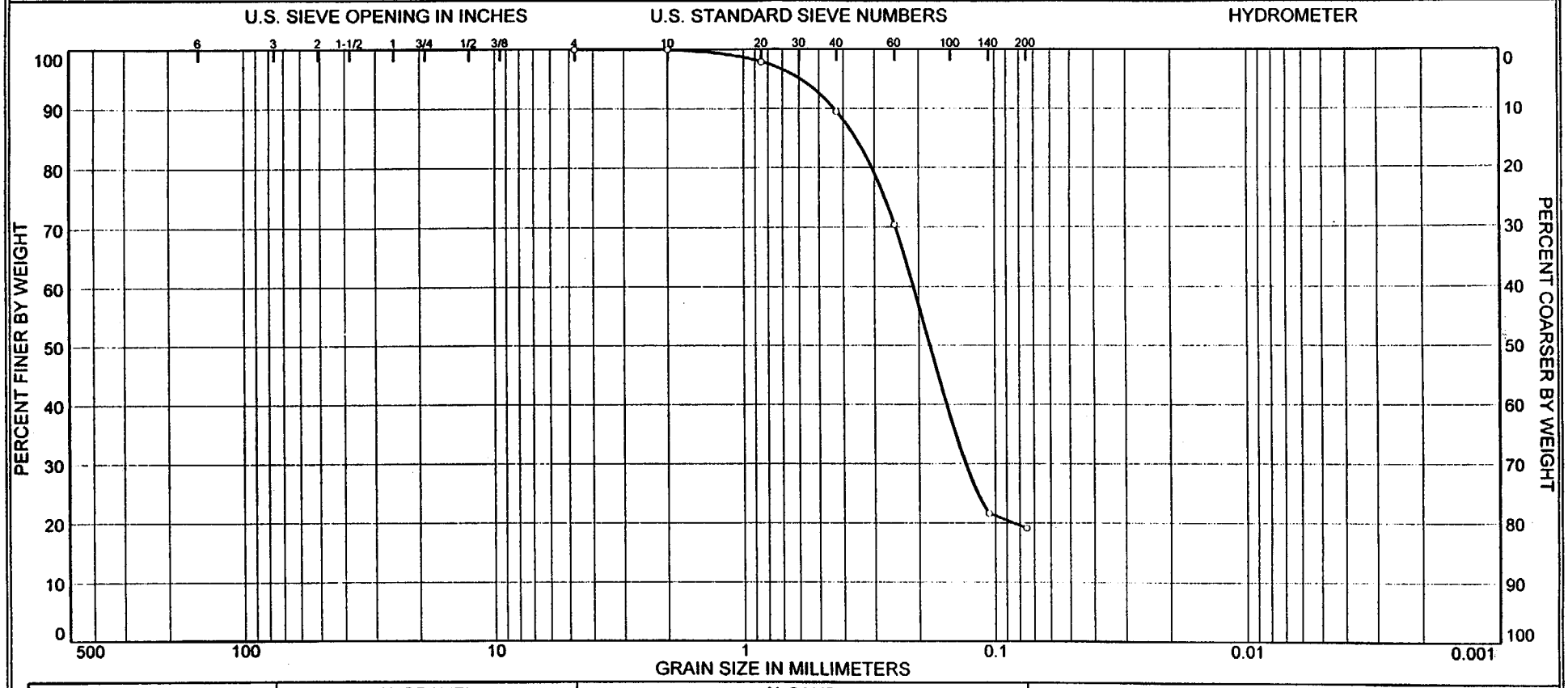

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	10.5	70.4	19.1	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-8	7	36-37.5 Ft.	8/17/00		Tan Silty sand			

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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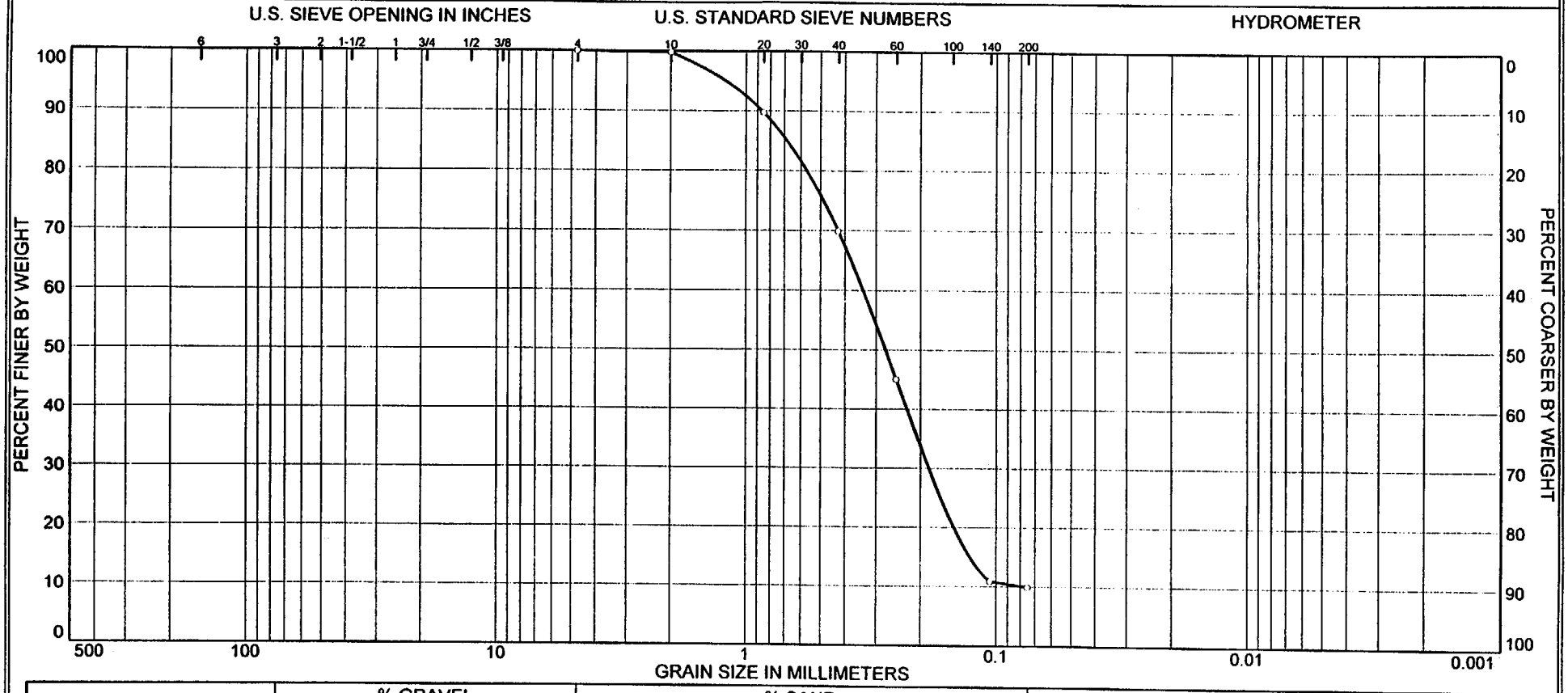

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.2	29.9	60.0	9.9	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-8	9	46-47.5'	8/23/00		Red Brown Poorly graded sand with silt	19.0		

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Project MOX Fuel Fabrication Facility

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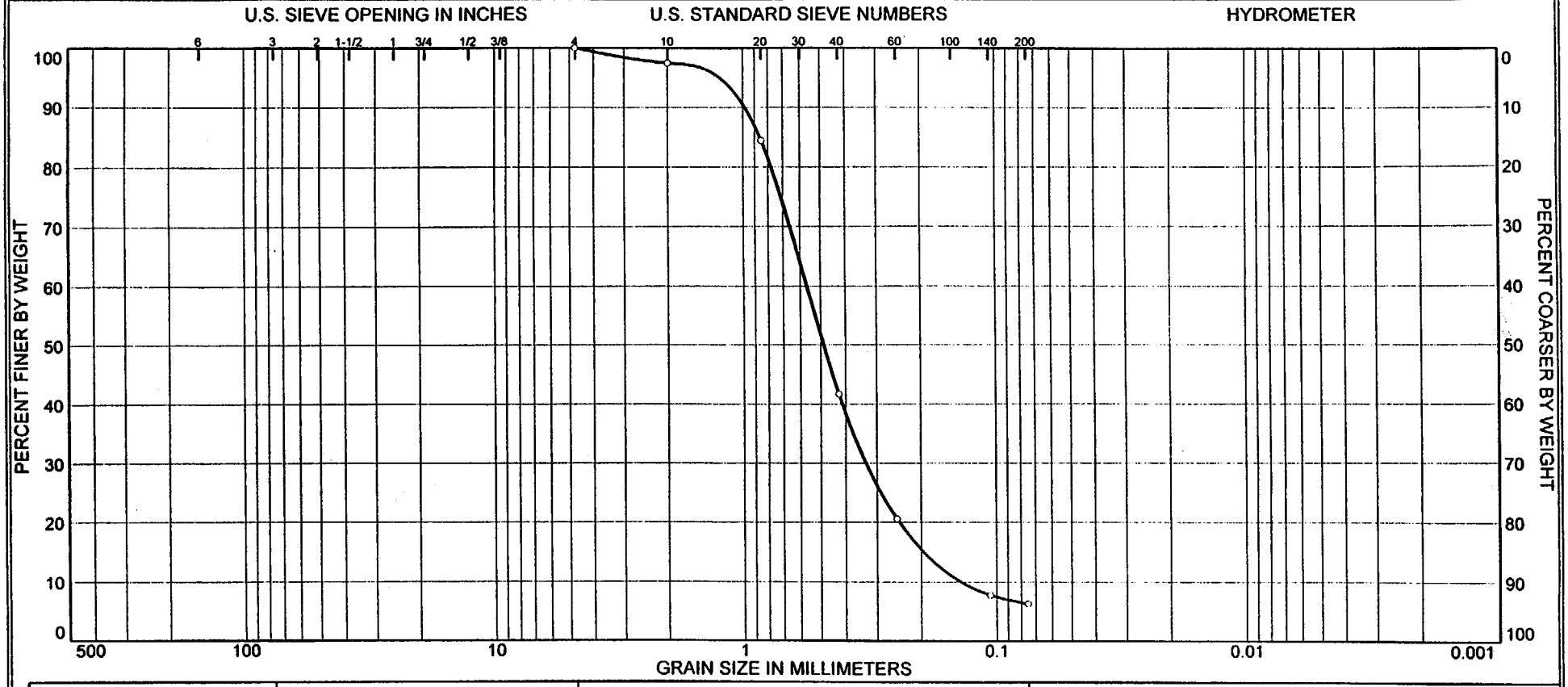

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	2.5	55.8	35.4	6.3	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-8	12	61-62.5 Ft.	8/17/00		Tan Poorly graded sand with silt			

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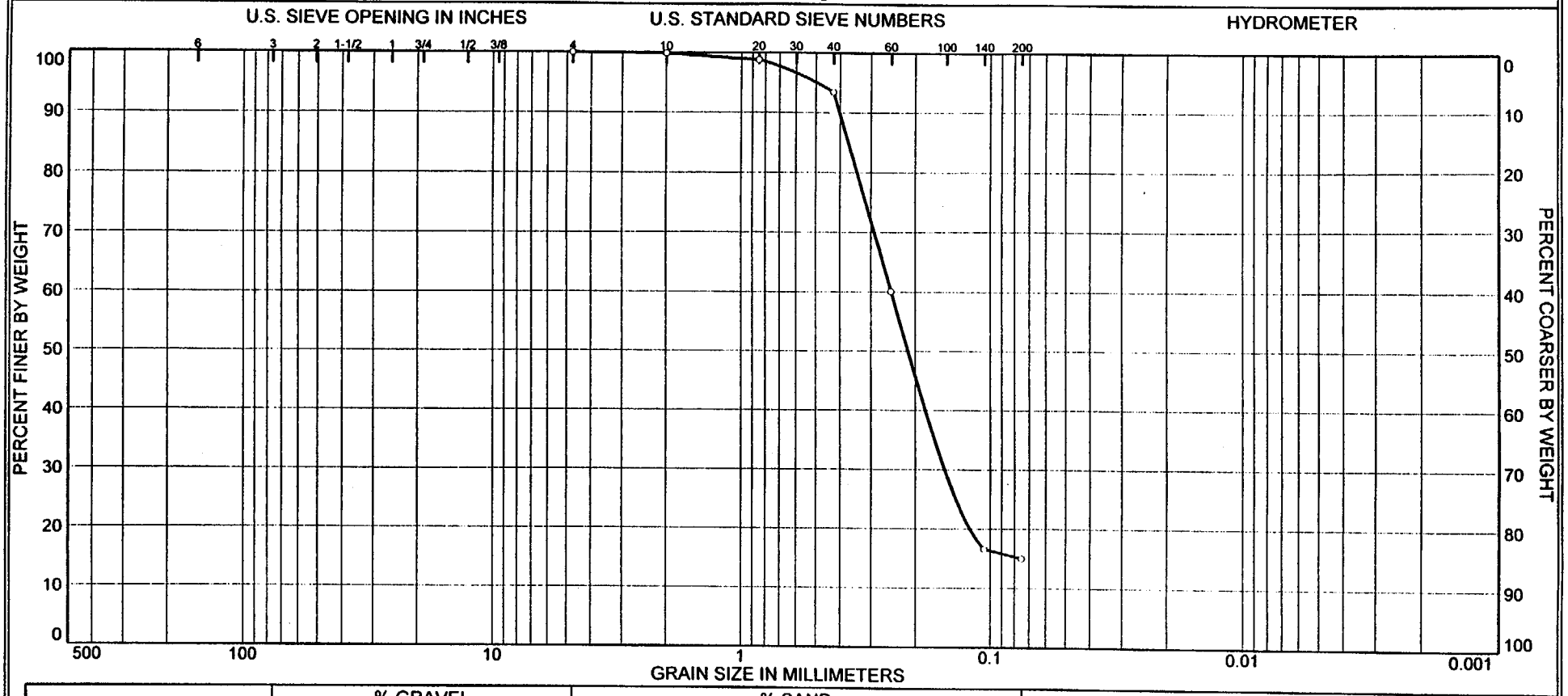

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	6.5	78.4	15.0	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-8	16	81-82.5'	9/7/00		Tan Brown Silty sand	31.5		

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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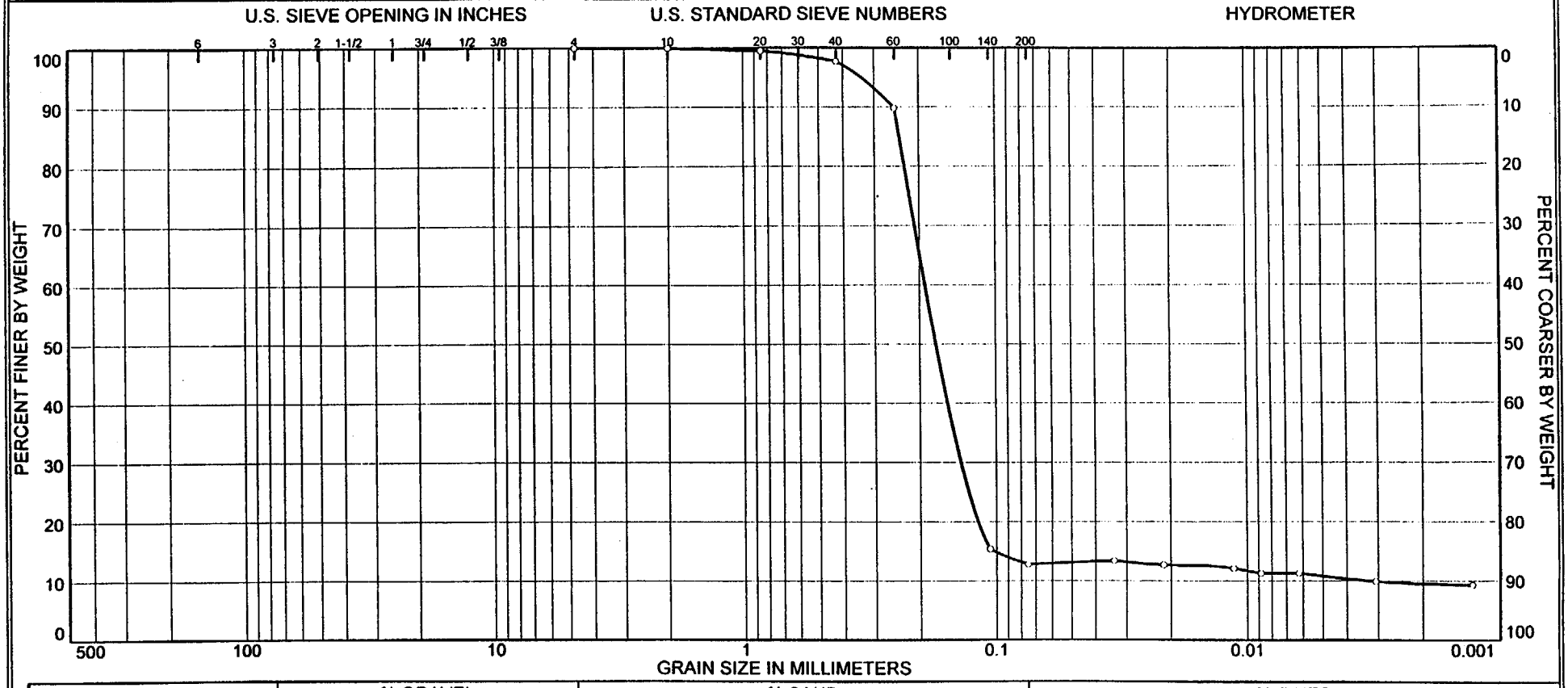

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	2.3	84.9	2.0	10.8

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-8	18	91-92.5 Ft.	8/17/00		Tan Silty sand	35.1		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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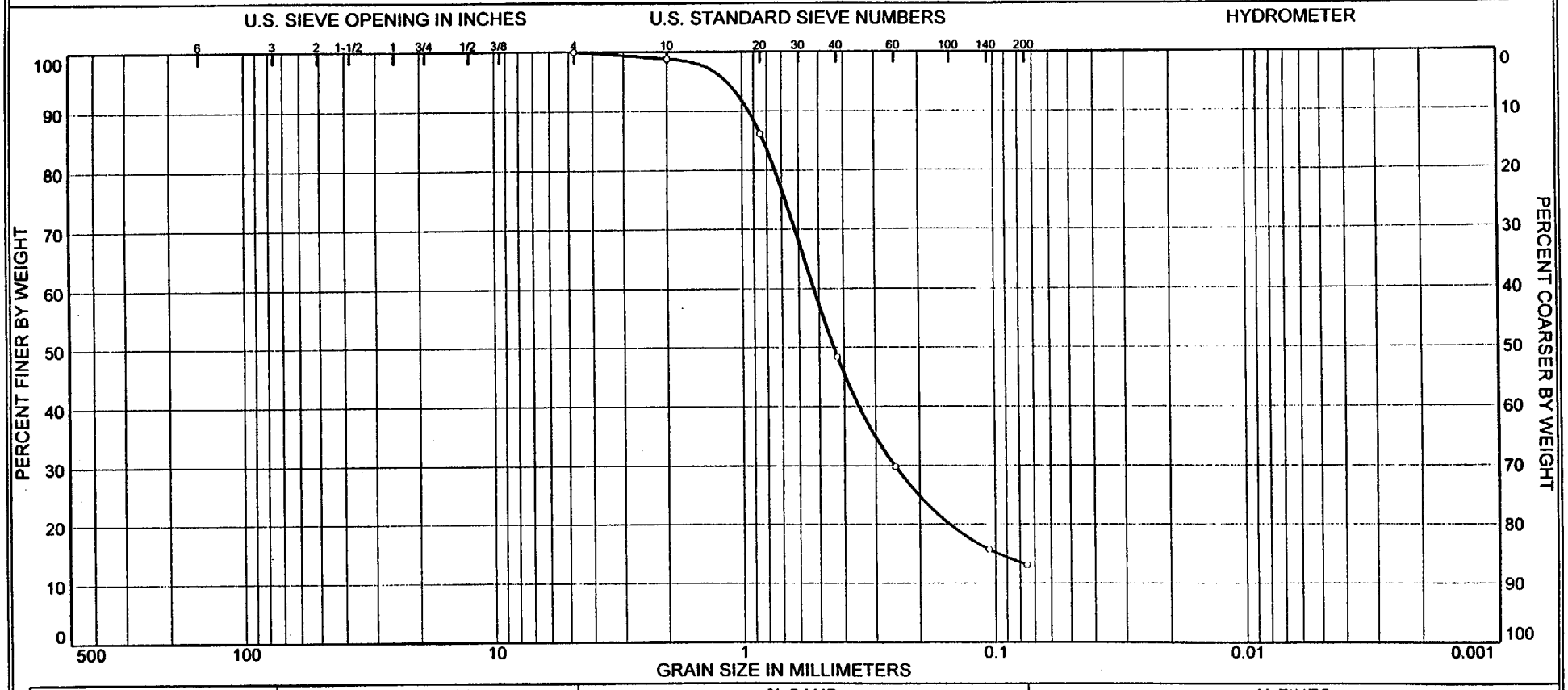

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.2	50.4	35.3	13.1	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-8	20	101.5-102.5'	8/23/00		Brown Silty sand			
		(Composite)							

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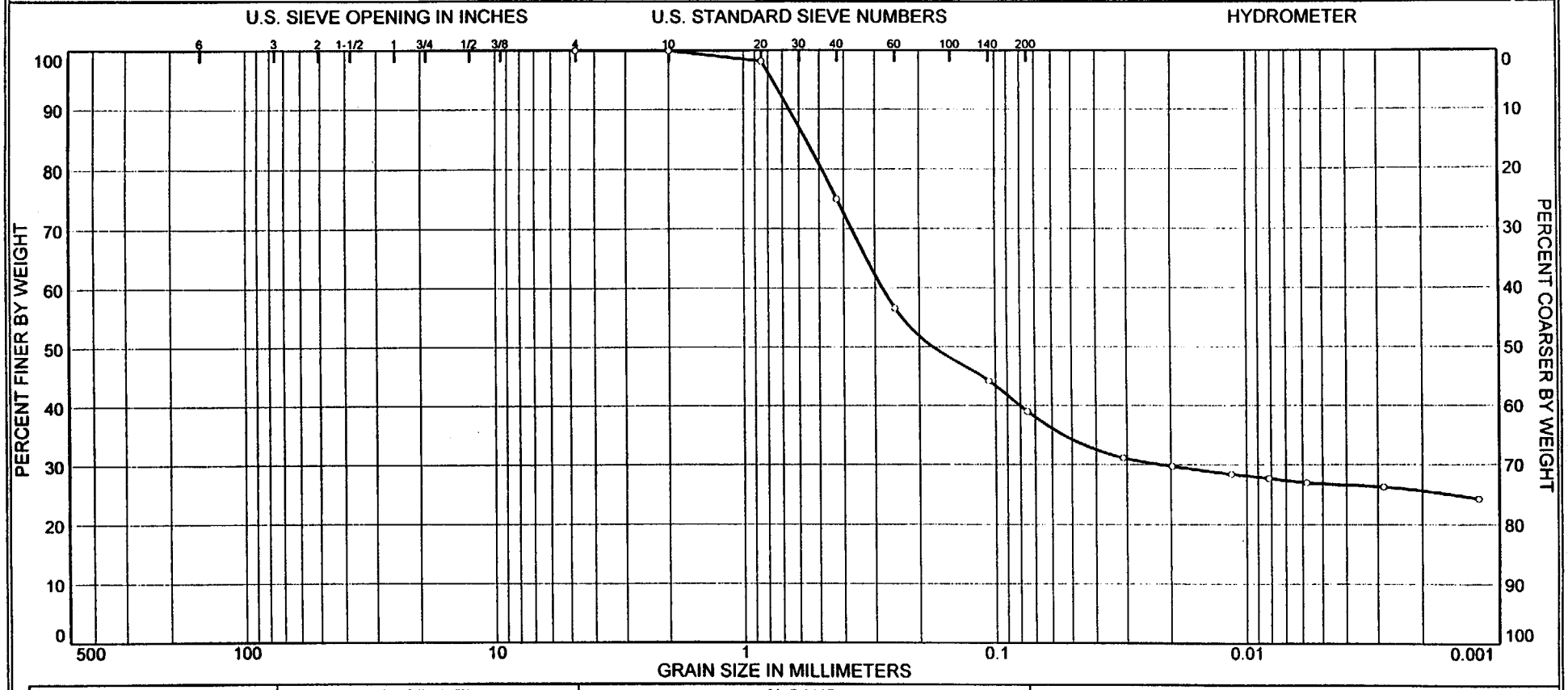

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	25.0	36.0	12.2	26.8

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-8	21 (composite)	106.3-107.5	8/22/00	SC	Tan Brown Clayey sand	37.3	102	32

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Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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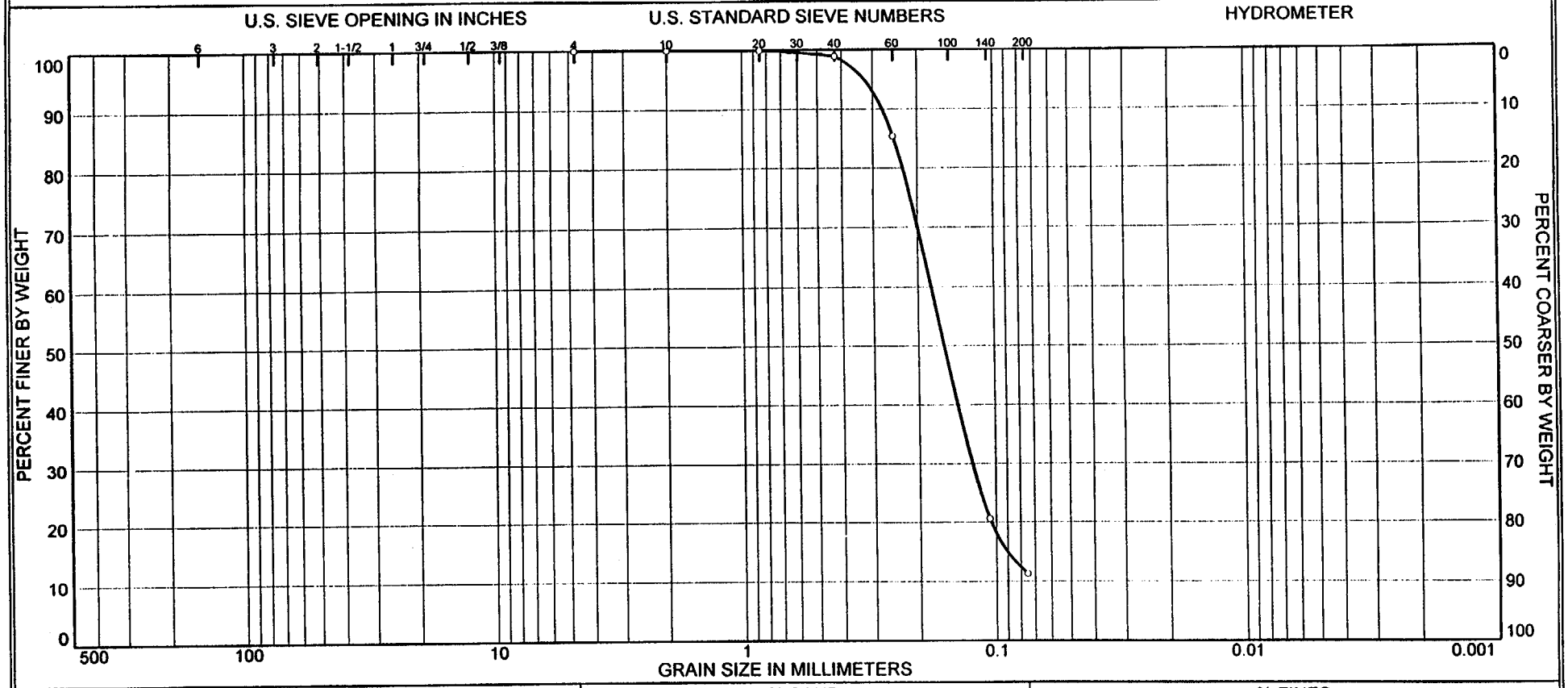

	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	1.1	87.6	11.3	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-8	24 (composite)	121-122.5'	8/23/00		Tan Poorly graded sand with silt	26.3		

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 Plate

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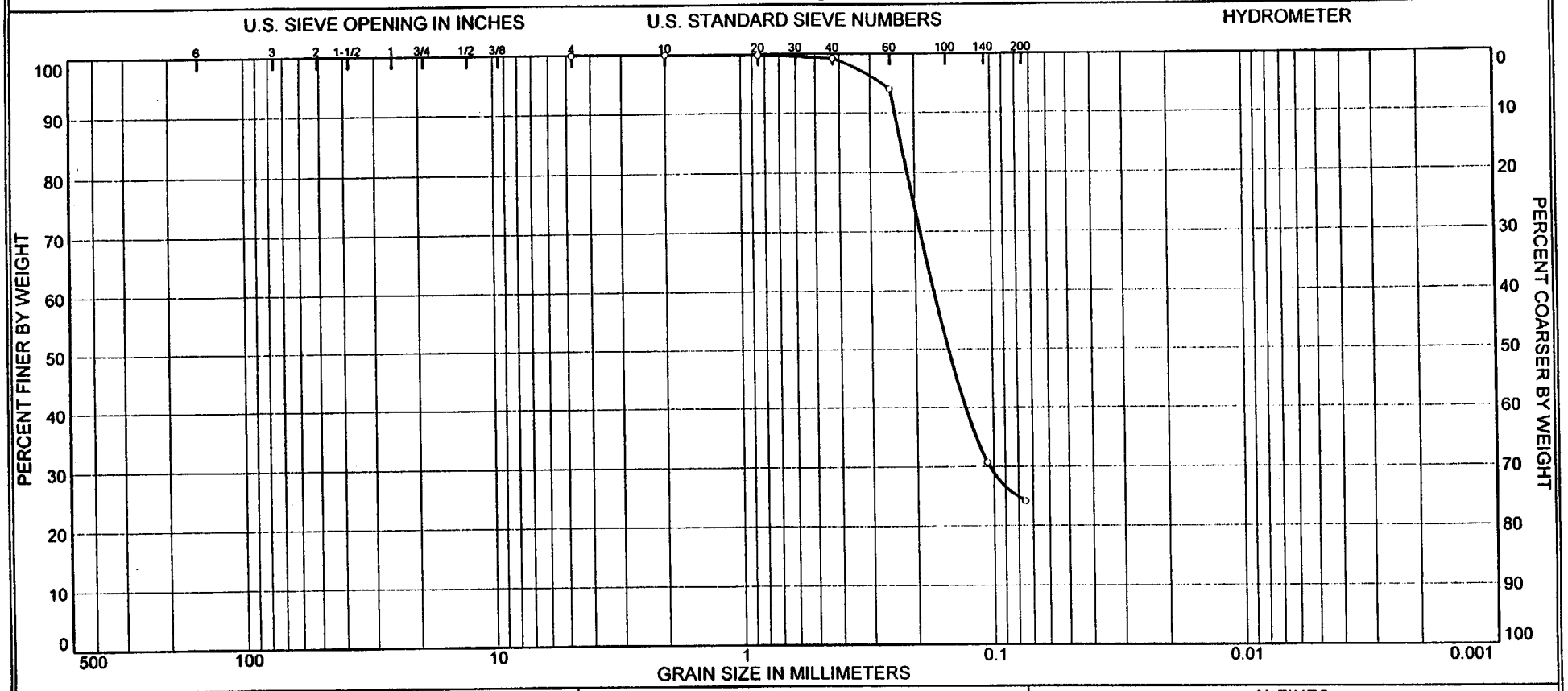
Particle Size Distribution Report ASTM D422/D1140



	% COBBLES	% GRAVEL		% SAND			% FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.0	0.8	75.0	24.2	

	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
○	Boring BH-8	26 (composite)	131.5-132.5'	8/17/00		Brown Silty sand			

Client Duke Cogema Stone & Webster (DCS)

Project MOX Fuel Fabrication Facility

Project No. 50160-0-3963 | Plate

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