

Port of New Orleans Deepening Feasibility Study

Appendix A: Engineering

Annex 1

Dredge Material Grain Size Curves

March 2020

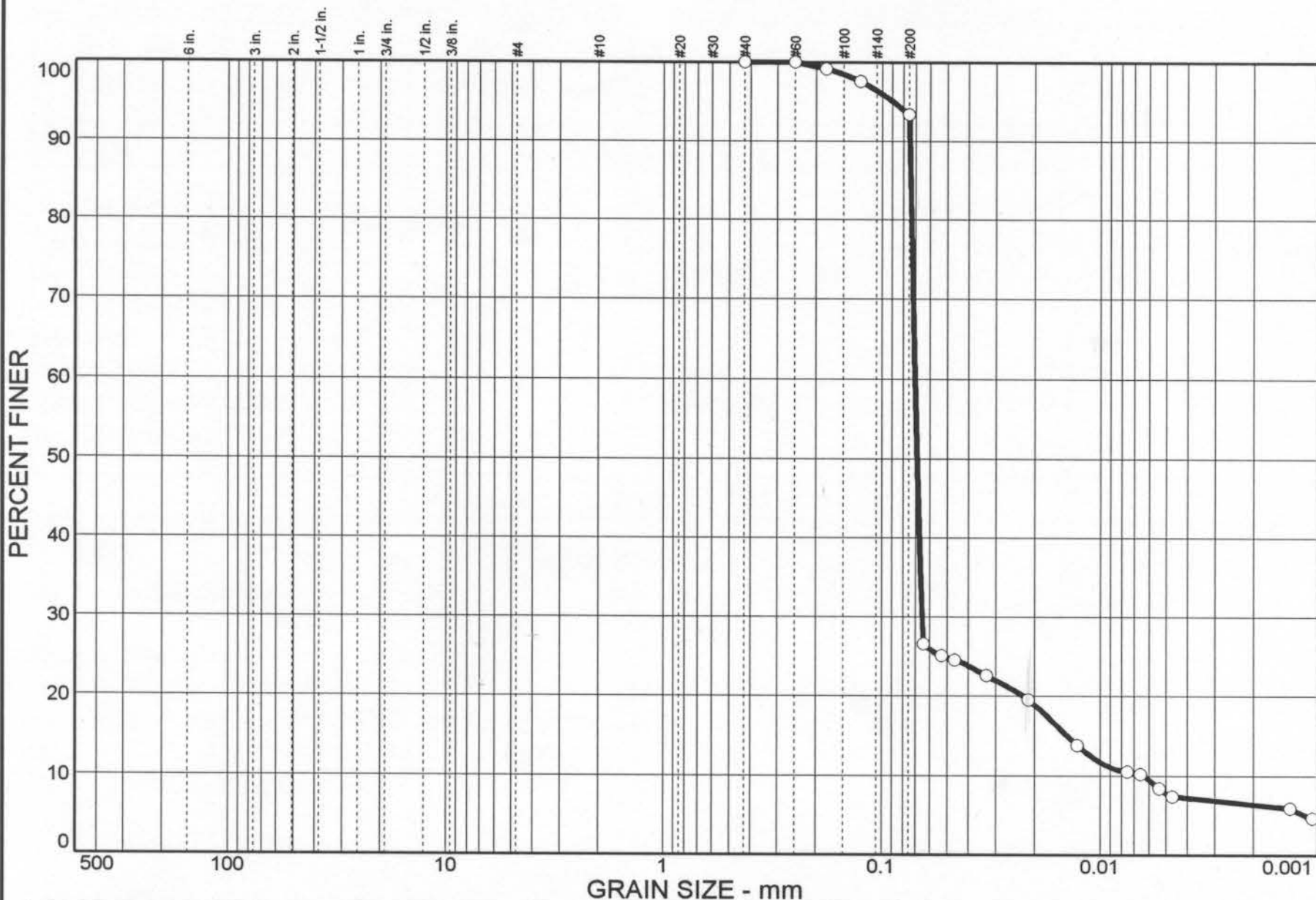
DREEDGED MATERIAL DATA
U.S. Army Corps of Engineers, New Orleans District

3/5/2020

Caution: X, Y location may not be accurate. Data submitted by contractors is not verified and is sometimes in error.
 For use in the database, some conversions, corrections, and other manipulation of data have been performed in an effort to plot the data points in reasonably correct positions.
 Note that Contract (Project) names do not indicate all dredging and sampling came from that channel.

| Project Name | Contract Number | Sample Type | Sample Number | Sample Location X | Sample Location Y | Sample Date | Sample Time | Corrected Depth Below Water Surface (ft NGVD) | Visual Class. | D50 (mm) | Cu | Cc | Minimum Density (pcf) | Maximum Density (pcf) | Maximum Porosity (est) | Minimum Porosity (est) | Minimum Estimated Phi Angle (degrees) | Maximum Estimated Phi Angle (degrees) | Station | Remarks |
|---|------------------|-------------|---------------|-------------------|-------------------|-------------|-------------|---|---------------|----------|-------|------|-----------------------|-----------------------|------------------------|------------------------|---------------------------------------|---------------------------------------|---------|------------|
| MISSISSIPPI RIVER, NEW ORLEANS HARBOR No. 002 | DACW29-96-C-0052 | Before | BD-003 | 3667960.4 | 514931 | 6-Aug-96 | 1000 | -37.8 | ML | 0.02 | 26.98 | 1.78 | 86.80 | 102.50 | 0.48 | 0.38 | | | 67+00 | adjusted x |
| MISSISSIPPI RIVER, NEW ORLEANS HARBOR No. 002 | DACW29-96-C-0052 | After | AD-003 | 3667960.4 | 514931 | 11-Aug-96 | 1000 | -39.22 | SP | 0.15 | 1.55 | 1.20 | 86.80 | 102.50 | 0.48 | 0.38 | | | 67+00 | adjusted x |
| MISSISSIPPI RIVER, NEW ORLEANS HARBOR No. 002 | DACW29-96-C-0052 | Before | BD-004 | 3669169.6 | 515553.5 | 9-Aug-96 | 1130 | -40 | ML | 0.02 | | | | | | | | | 78+00 | |
| MISSISSIPPI RIVER, NEW ORLEANS HARBOR No. 002 | DACW29-96-C-0052 | After | AD-004 | 3669164.6 | 515553.5 | 11-Aug-96 | 1030 | -39.22 | SP | 0.16 | 1.54 | 1.11 | | | | | | | 78+00 | |
| Miss River, New Orleans Harbor, Cutterhead Dredge | DACW29-02-C-0018 | Before | BD-7 | 3668737 | 515396 | 27-Jan-02 | 100 | -37.28 | CH | 0.07 | 11.09 | 9.51 | | | | | | | 73+18.7 | |
| NEW ORLEANS HARBOR | DACW29-95-C-0022 | Before | BD-7 | 3667449.9 | 515596.1 | 6-Feb-96 | 1340 | -40 | ML | 0.05 | 12.90 | 6.90 | | | | | | | 192+00 | |
| NEW ORLEANS HARBOR | DACW29-95-C-0022 | After | AD-6 | 3667889 | 515333 | 6-Feb-96 | 1305 | -41 | SM | 0.11 | | | | | | | | | 196+00 | |
| Miss. River, New Orleans Harbor Cutterhead Dredge Rental No. 3-2004 Orleans and Jefferson | W912P8-04-C-0053 | Before | BD-4 | 3669758.4 | 515559.6 | 6-Sep-04 | 1642 | -31.68 | CH | 0.06 | 55.13 | 1.63 | | | | | | | 83+85 | |
| Mississippi River, New Orleans Harbor, Cutterhead Dredge Rental No. FY-2008 | W912P8-08-C-0056 | Before | BD-4 | 3668390 | 515388 | 10-Jun-08 | 1530 | -37.88 | SP | 0.16 | 1.31 | 0.96 | 84.92 | 98.47 | 0.49 | 0.40 | 27 | 33 | 70+00 | Range 0 |
| MISSISSIPPI RIVER, NEW ORLEANS HARBOR No. 002 | DACW29-96-C-0052 | Before | BD-001 | 3669402.3 | 515320.5 | 10-Jul-96 | 630 | -30 | SP | 0.16 | 1.33 | 1.00 | | | | | | | 79+00 | |
| MISSISSIPPI RIVER, NEW ORLEANS HARBOR No. 002 | DACW29-96-C-0052 | After | AD-001 | 3669371 | 515361.7 | 20-Jul-96 | 1205 | -44.6 | | | | | | | | | | | 79+00 | No Sample |
| MISSISSIPPI RIVER, NEW ORLEANS HARBOR No. 002 | DACW29-96-C-0052 | Before | BD-002A | 3666961.8 | 514737.2 | 3-Aug-96 | 2000 | -37 | ML | 0.03 | | | | | | | | | 56+00 | |
| MISSISSIPPI RIVER, NEW ORLEANS HARBOR No. 002 | DACW29-96-C-0052 | Before | BD-002B | 3667065.2 | 515538 | 3-Aug-96 | 2030 | -38.5 | ML | 0.03 | | | | | | | | | 57+00 | |
| MISSISSIPPI RIVER, NEW ORLEANS HARBOR No. 002 | DACW29-96-C-0052 | After | AD-002 | 3667065.2 | 515538 | 11-Aug-96 | 930 | -39.22 | SM | 0.16 | 2.18 | 1.64 | 84.80 | 99.60 | 0.49 | 0.40 | 28 | 32 | 57+00 | |
| New Orleans Harbor | W912P8-15-C-0051 | Before | BD-6 | 3669296 | 515291 | 4-Oct-15 | 1500 | -30 | ML | 0.02 | | | | | | | | | 79+08 | |

Particle Size Distribution Report



| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|-----------|----------|--------|--------|--------|
| 0.0 | 0.0 | 6.6 | 85.6 | 7.8 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| #40 | 100.0 | | |
| #60 | 100.0 | | |
| #80 | 99.2 | | |
| #120 | 97.6 | | |
| #200 | 93.4 | | |

Soil Description
SILTY CLAY (CH)

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₈₅= 0.0738 D₆₀= 0.0703 D₅₀= 0.0688
 D₃₀= 0.0651 D₁₅= 0.0141 D₁₀= 0.0063
 C_u= 11.09 C_c= 9.51

Classification
 USCS= AASHTO=

Remarks
 ECS

* (no specification provided)

Sample No.: BD-07

Source of Sample: DACW29-02-C-0018

Date: 23MAY2002

Location: STA.73+18.7 X=EAST 3,668,737 Y=NORTH 515,396

Elev./Depth:

US Army Corps of Engineers
New Orleans District

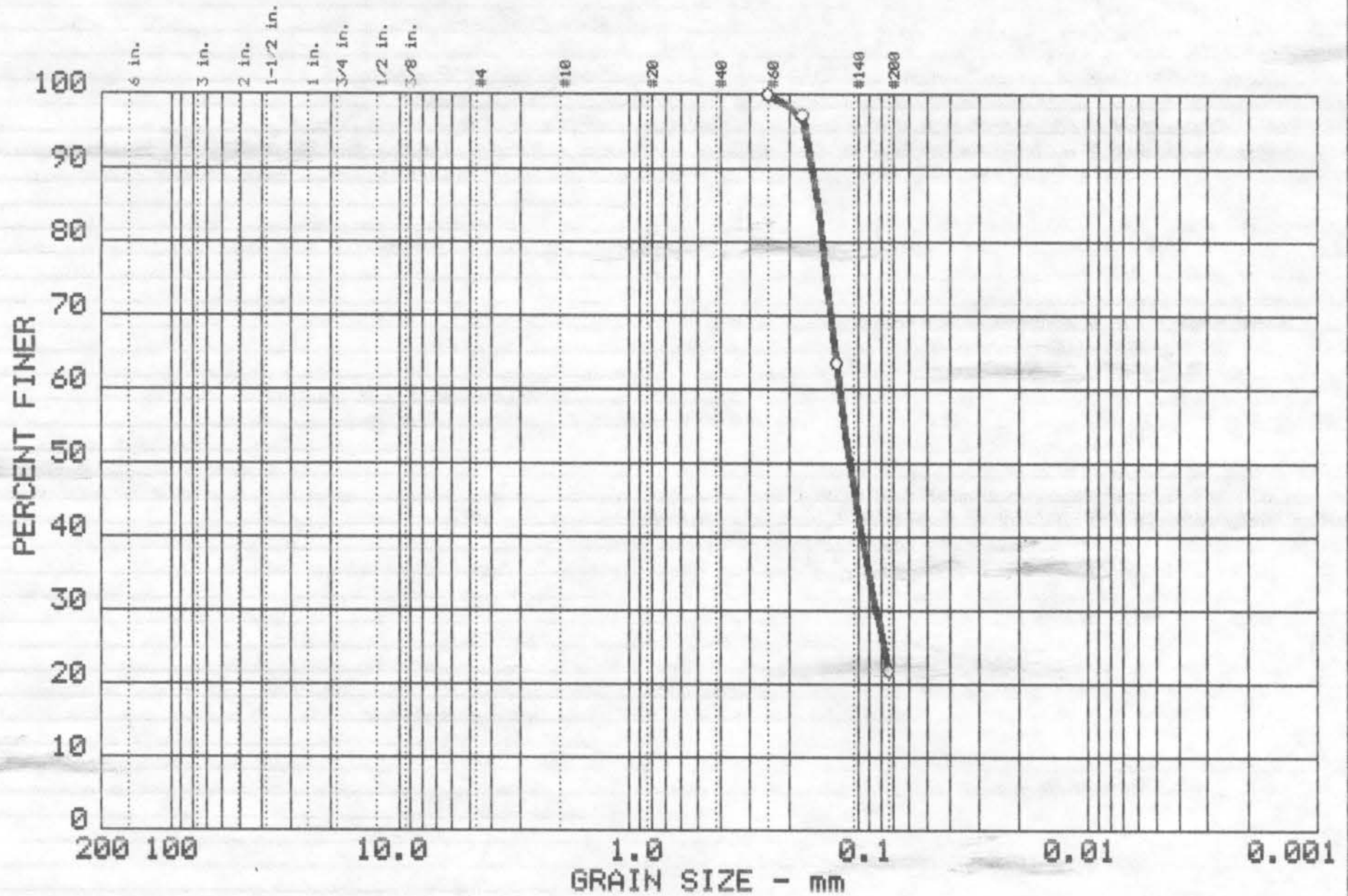
Client: DACW29-02-C-0018

Project: MISS. RIVER, NEW ORLEANS HARBOR CUTTERHEAD
DREDGE RENTAL CONTRACT NO.3-01 ORLEANS AND

Project No: DACW29-02-C-0018

Plate

GRAIN SIZE DISTRIBUTION TEST REPORT



| Test | %+75 _{mm} | % GRAVEL | % SAND | % SILT | % CLAY |
|------|--------------------|----------|--------|--------|--------|
| ○ 2 | 0.0 | 0.0 | 78.2 | 21.8 | |
| | | | | | |
| | | | | | |

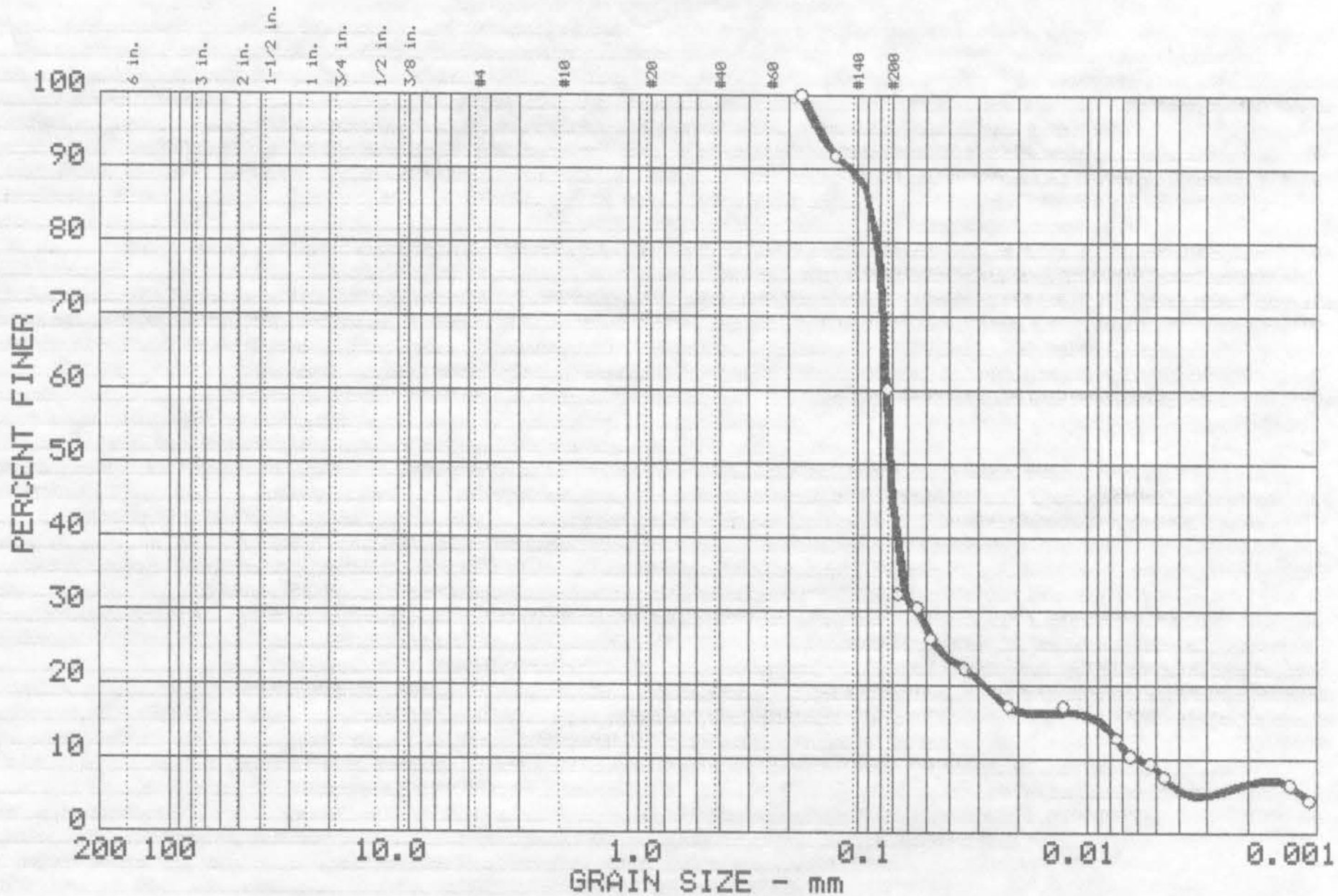
| LL | PI | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| | | 0.15 | 0.12 | 0.11 | 0.084 | | | | |
| | | | | | | | | | |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|----------------------|------|--------|
| ○ SILTY SAND | | |

Project No.: DACW29-95-C-0022
 Project: MISS. RIVER NEW ORLEANS HARBOR
 ○ Location:
 Date: 26JUL96

Remarks:
 PAN 446
 CUP 74
 TECH JMC

GRAIN SIZE DISTRIBUTION TEST REPORT



| Test | %+75 _{mm} | % GRAVEL | % SAND | % SILT | % CLAY |
|------|--------------------|----------|--------|--------|--------|
| ○ 3 | 0.0 | 0.0 | 39.8 | 51.5 | 8.7 |
| | | | | | |
| | | | | | |

| LL | PI | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| ○ | | 0.09 | | 0.07 | 0.054 | 0.0087 | 0.0057 | 6.90 | 12.9 |
| | | | | | | | | | |
| | | | | | | | | | |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|----------------------|------|--------|
| ○ ML | | |
| | | |

Project No.: BD-7
 Project: NEW ORLEANS HARBOR
 ○ Location: MISS RIVER NEW ORLEANS HARBOR

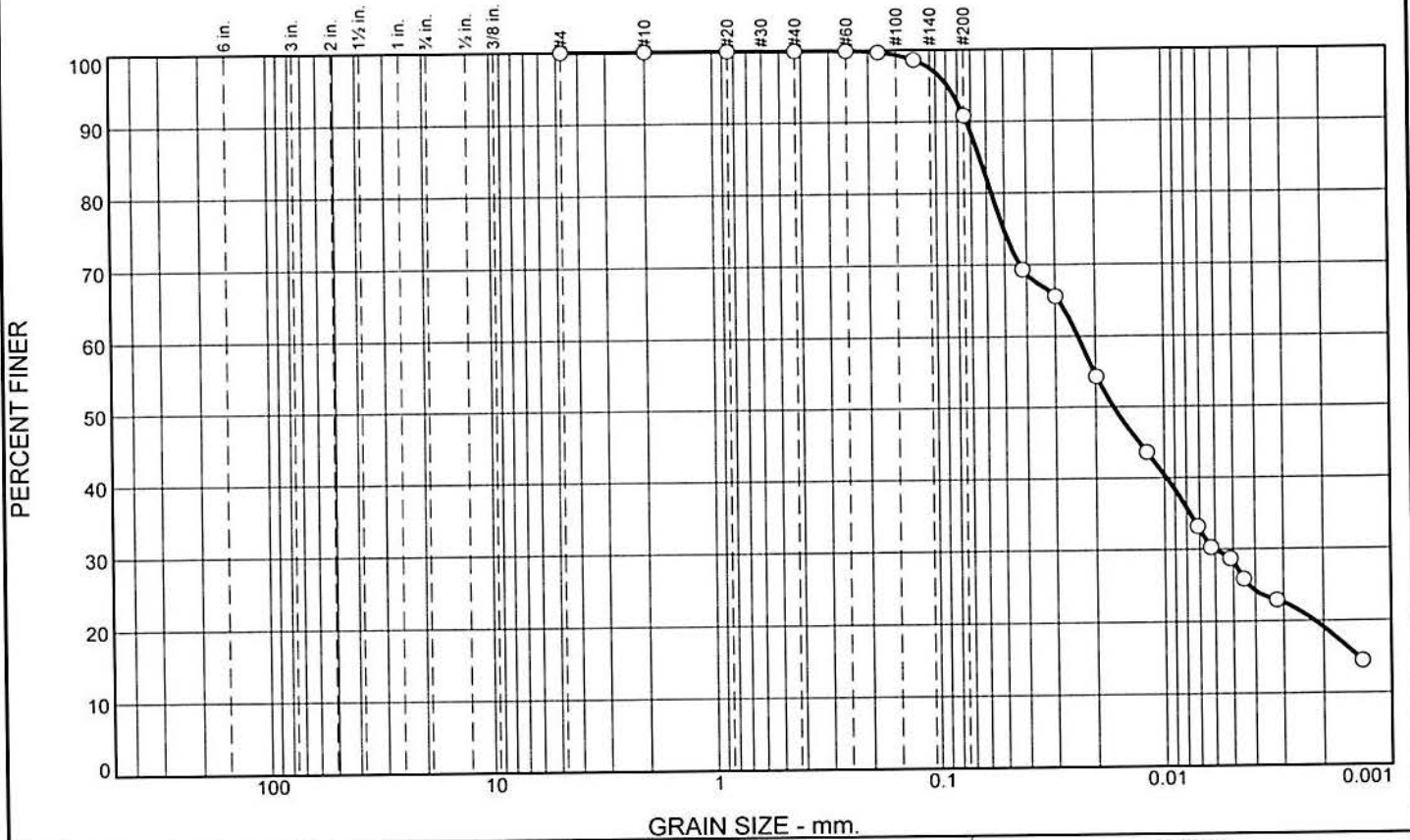
Date: 14MARCH96

GRAIN SIZE DISTRIBUTION TEST REPORT
 USCOE, NEW ORLEANS

Remarks:
 PAN 2
 CUP 80
 TECH R.L. L.B.
 BD-7 STA. 1921+00

Figure No.94

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.2 | 62.5 | 28.3 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| #4 | 100.0 | | |
| #10 | 100.0 | | |
| #20 | 100.0 | | |
| #40 | 100.0 | | |
| #60 | 99.9 | | |
| #80 | 99.7 | | |
| #120 | 98.6 | | |
| #200 | 90.8 | | |

Material Description

GR MML W/ LNS ARS CH
 C/L= 79+08
 X= 3669296
 Y= 515291

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 0.0731 D₈₅= 0.0641 D₆₀= 0.0239
 D₅₀= 0.0167 D₃₀= 0.0061 D₁₅= 0.0014
 D₁₀= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

G_s= 2.59

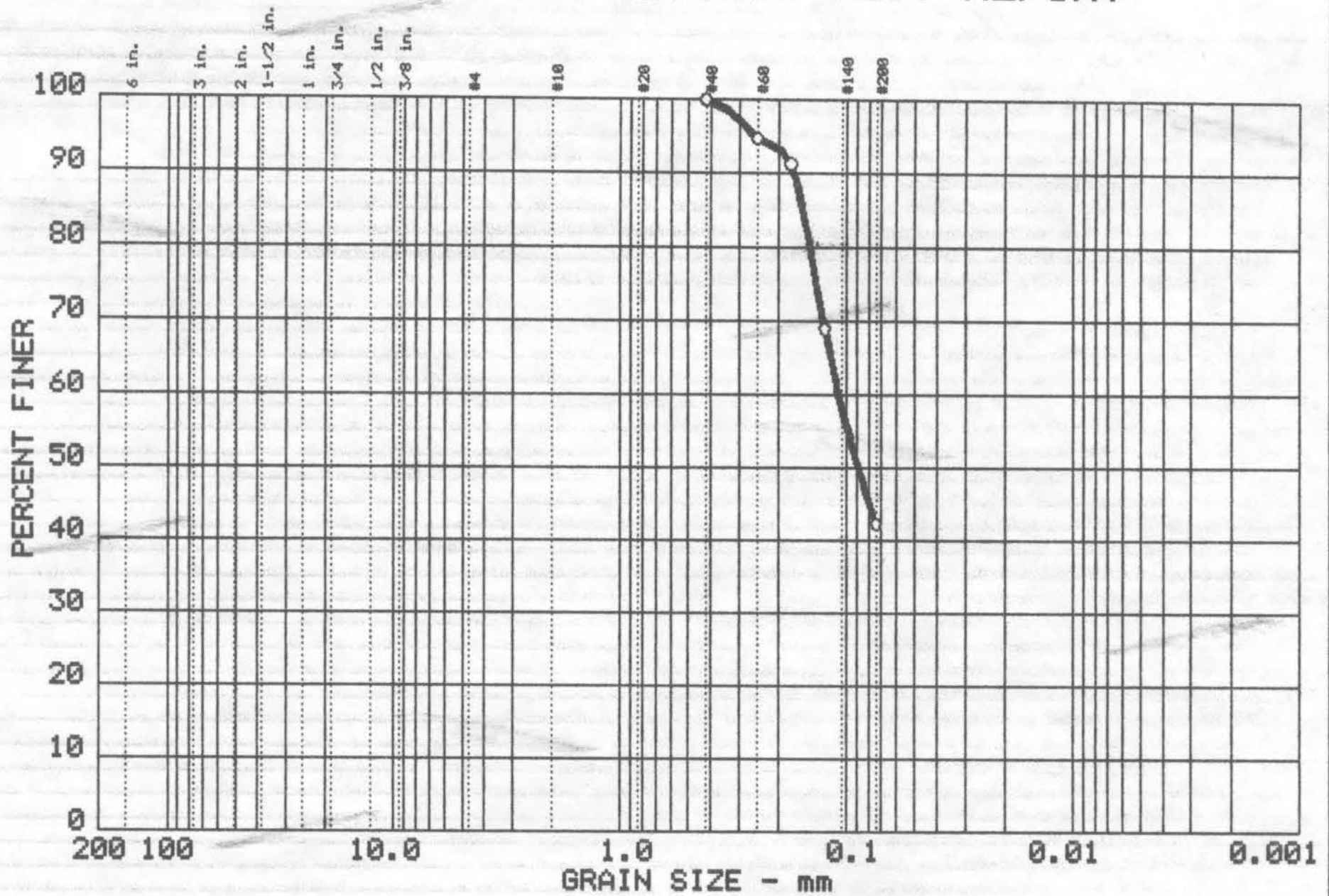
* (no specification provided)

Source of Sample: New Orleans Depth: -30.0 Ft MLG Date: 11/2016
 Sample Number: BD-06

| | | |
|-----------------------------------|---|--------|
| US Army Corps of Engineers | Client: USACE Project: New Orleans Harbor Cutterhead Rental | |
| New Orleans District | Project No: W912P8-15-C-0051 | Figure |

Tested By: JF Checked By: TSL

GRAIN SIZE DISTRIBUTION TEST REPORT



| Test | %+75 _{mm} | % GRAVEL | % SAND | % SILT | % CLAY |
|------|--------------------|----------|--------|--------|--------|
| 3 | 0.0 | 0.0 | 57.7 | 42.3 | |

| LL | PI | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| | | 0.16 | 0.11 | 0.09 | | | | | |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|----------------------|------|--------|
| SM | | |

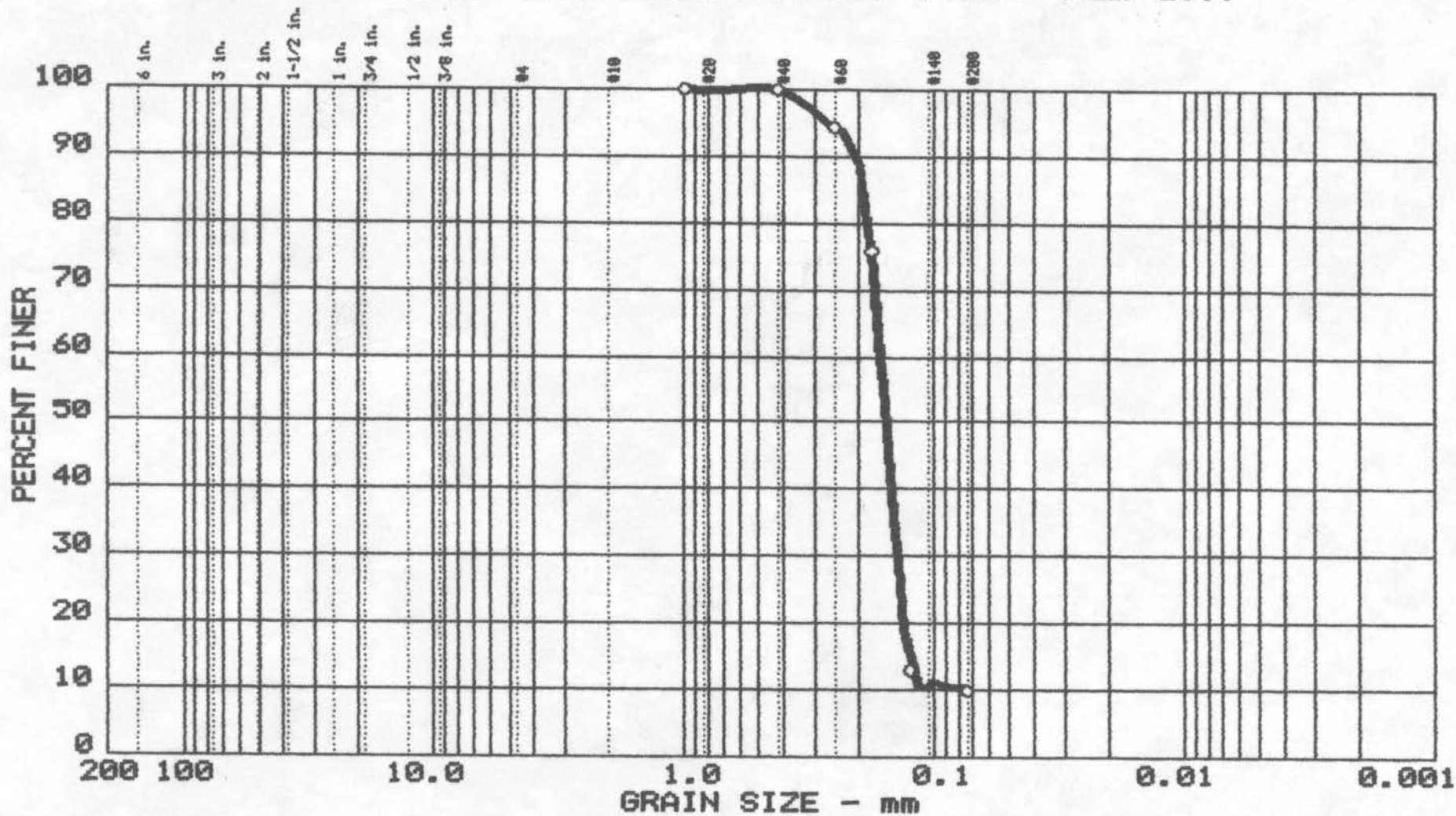
Project No.: 0052 (AD-001)
 Project: M.R.N.O. HARBOR
 Location: N.O. HARBOR
 Date: 12JULY 96

Remarks:
 PAN 329
 CUP 16
 TECH L.B. \C.T.
 X=3683887.0

GRAIN SIZE DISTRIBUTION TEST REPORT
 USCOE, NEW ORLEANS

Figure No.001

GRAIN SIZE DISTRIBUTION TEST REPORT



| Test | %+75 _{mm} | % GRAVEL | % SAND | % SILT | % CLAY |
|------|--------------------|----------|--------|--------|--------|
| ○ 12 | 0.0 | 0.0 | 90.2 | 9.8 | |

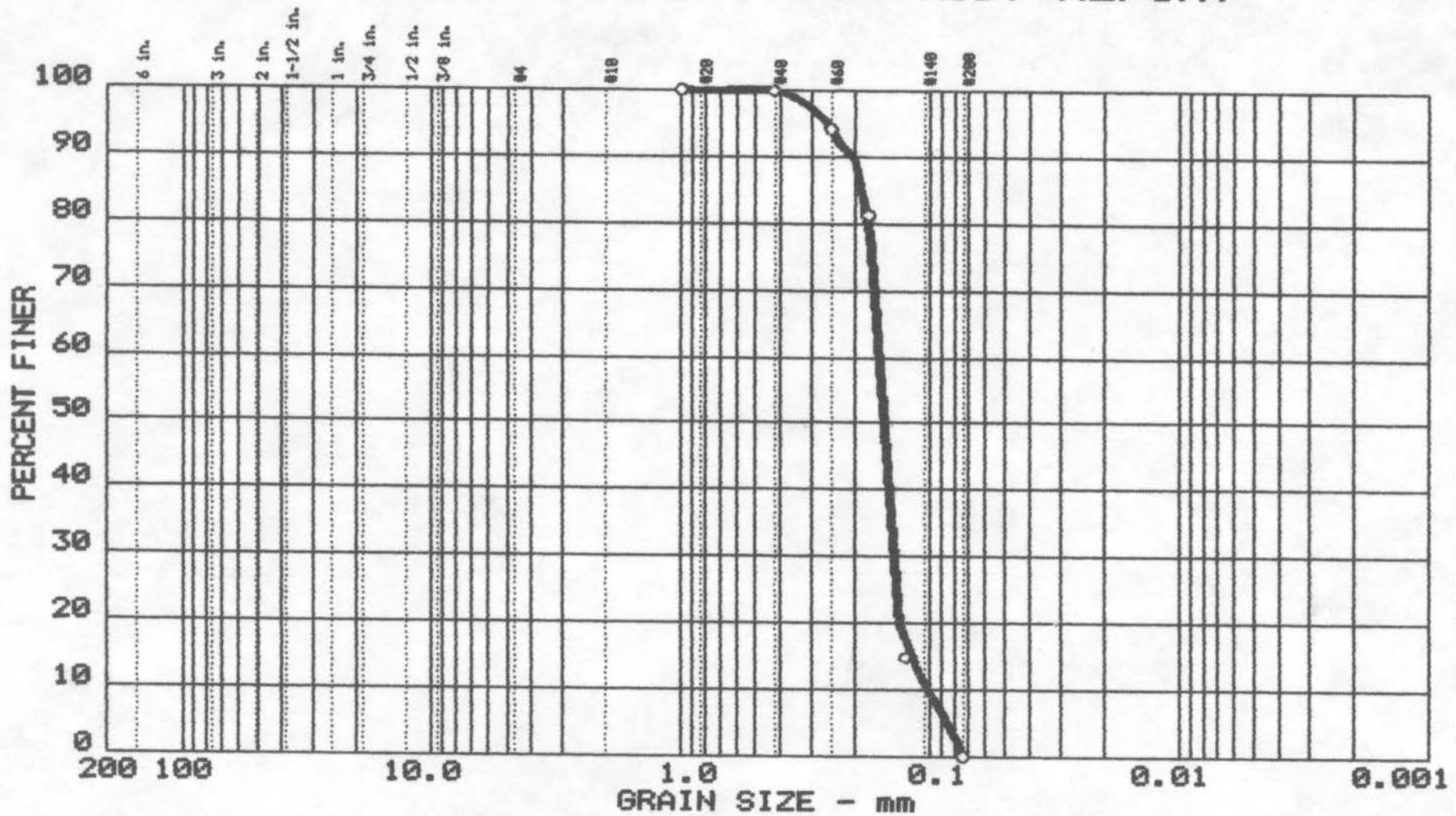
| LL | PI | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| | | 0.19 | 0.16 | 0.15 | 0.141 | 0.1276 | 0.0743 | 1.64 | 2.2 |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|----------------------|------|--------|
| ○ SM | | |

Project No.: 0052(AD-002)
 Project: M.R.N.O. HARBOR 2-96
 ○ Location: M.R.
 Date: 21 AUG 96

Remarks:
 PAN 186
 CUP 23
 TECH L.B.
 X=3667065.2

GRAIN SIZE DISTRIBUTION TEST REPORT



| Test | % +75 _{µm} | % GRAVEL | % SAND | % SILT | % CLAY |
|------|---------------------|----------|--------|--------|--------|
| ○ 12 | 0.0 | 0.0 | 99.9 | 0.1 | |

| LL | PI | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| | | 0.18 | 0.16 | 0.15 | 0.140 | 0.1249 | 0.1027 | 1.20 | 1.5 |

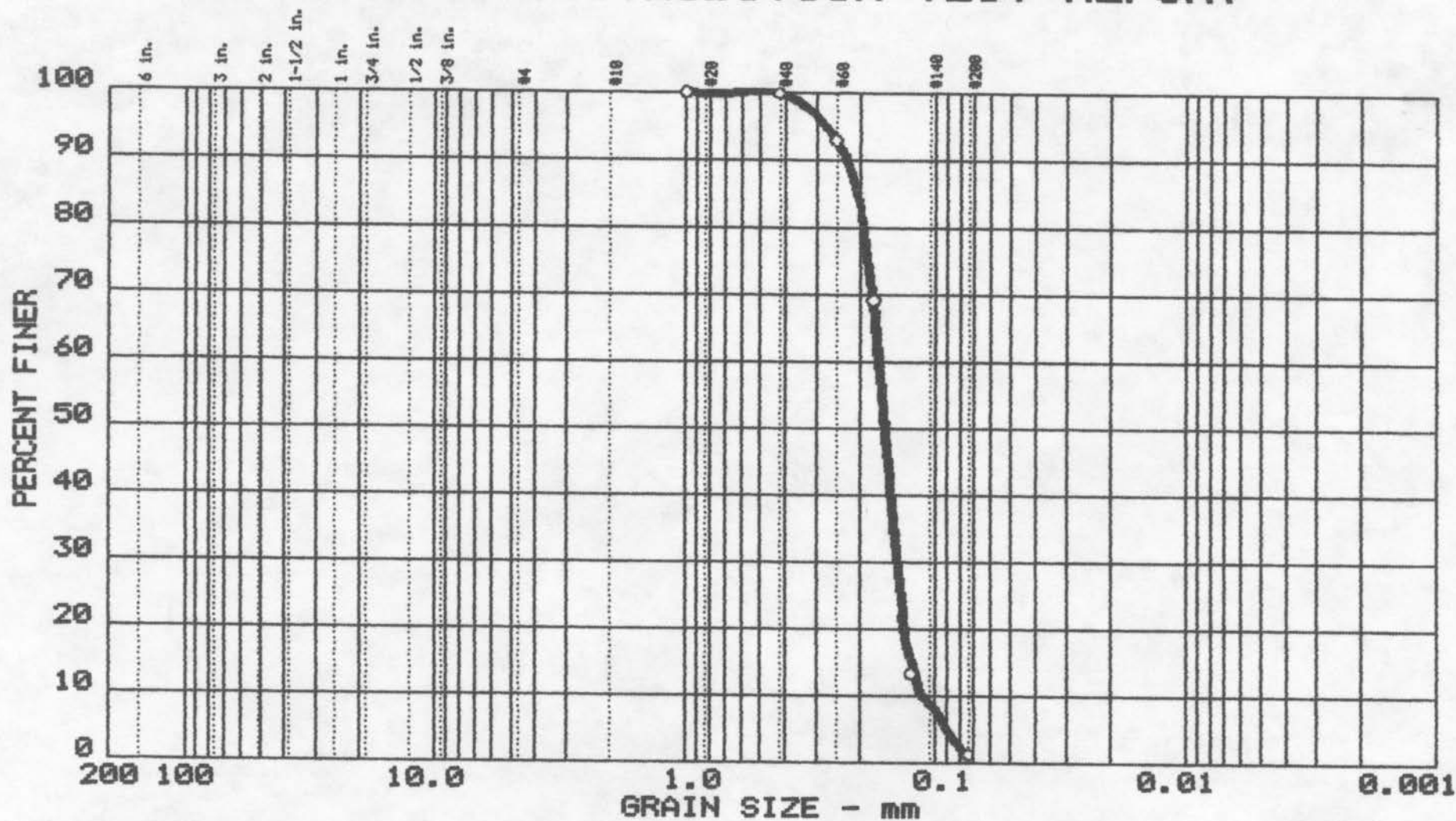
| MATERIAL DESCRIPTION | USCS | AASHTO |
|----------------------|------|--------|
| ○ SP | | |

Project No.: 0052(AD-003)
 Project: M.R.N.O. HARBOR 2-96
 ○ Location: M.R.

 Date: 21 AUG 96

Remarks:
 PAN 662
 CUP 24
 TECH L.B.
 X=3367960.4

GRAIN SIZE DISTRIBUTION TEST REPORT



| Test | % +75 _{mm} | % GRAVEL | % SAND | % SILT | % CLAY |
|------|---------------------|----------|--------|--------|--------|
| ○ 12 | 0.0 | 0.0 | 98.8 | 1.2 | |
| | | | | | |
| | | | | | |

| LL | PI | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| | | 0.21 | 0.17 | 0.16 | 0.142 | 0.1275 | 0.1085 | 1.11 | 1.5 |
| | | | | | | | | | |
| | | | | | | | | | |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|----------------------|------|--------|
| ○ SP | | |

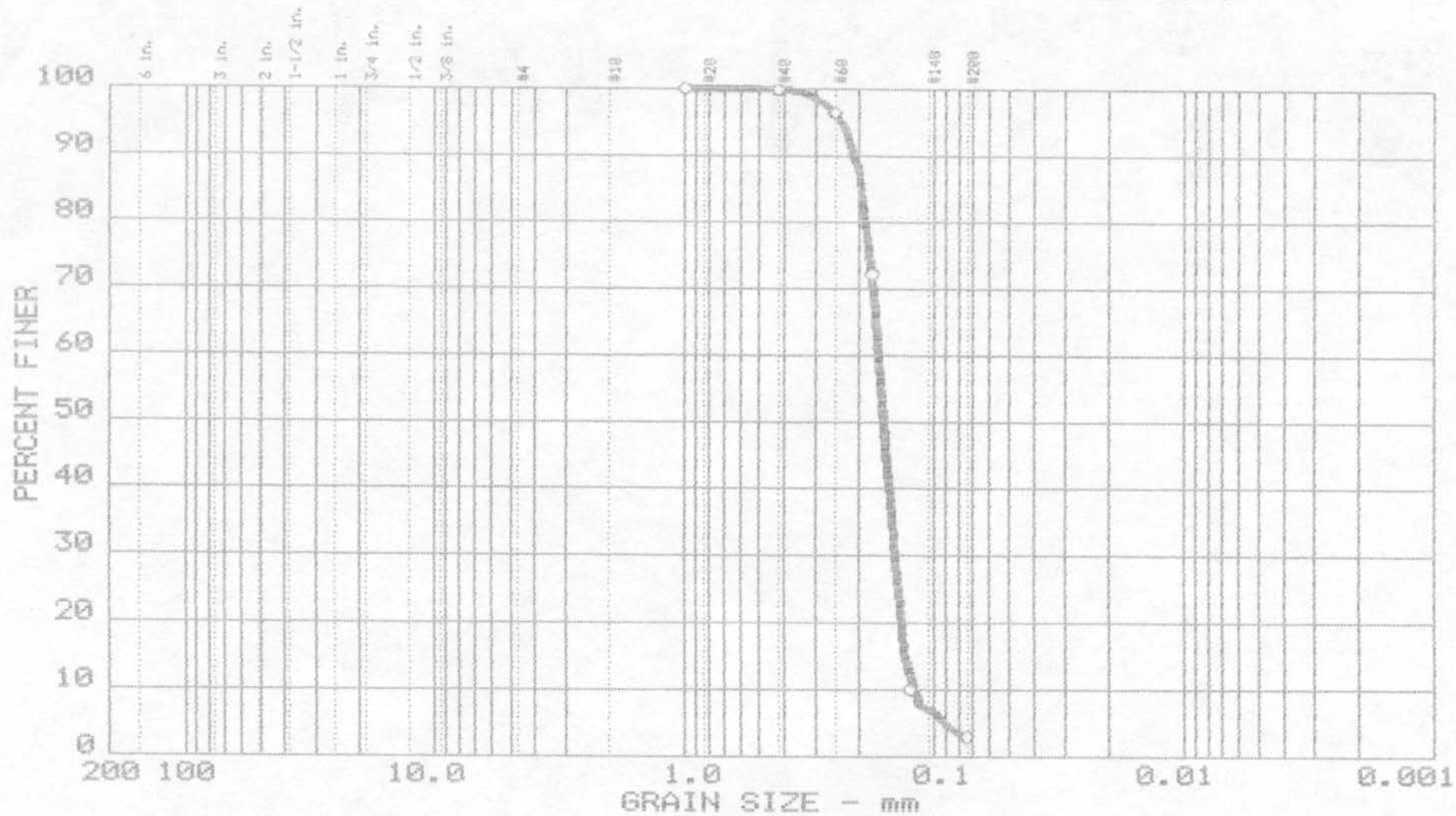
Project No.: 0052(AD-004)
 Project: M.R.N.O. HARBOR 2-96
 ○ Location: M.R.
 Date: 21 AUG 96

Remarks:
 PAN 242
 CUP AF
 TECH L.B.
 X=3669164.6

**GRAIN SIZE DISTRIBUTION TEST REPORT
 USCOE, NEW ORLEANS**

Figure No.004

GRAIN SIZE DISTRIBUTION TEST REPORT



| Test | %+75 _{mm} | % GRAVEL | % SAND | % SILT | % CLAY |
|------|--------------------|----------|--------|--------|--------|
| 12 | 0.0 | 0.0 | 97.0 | 3.0 | |

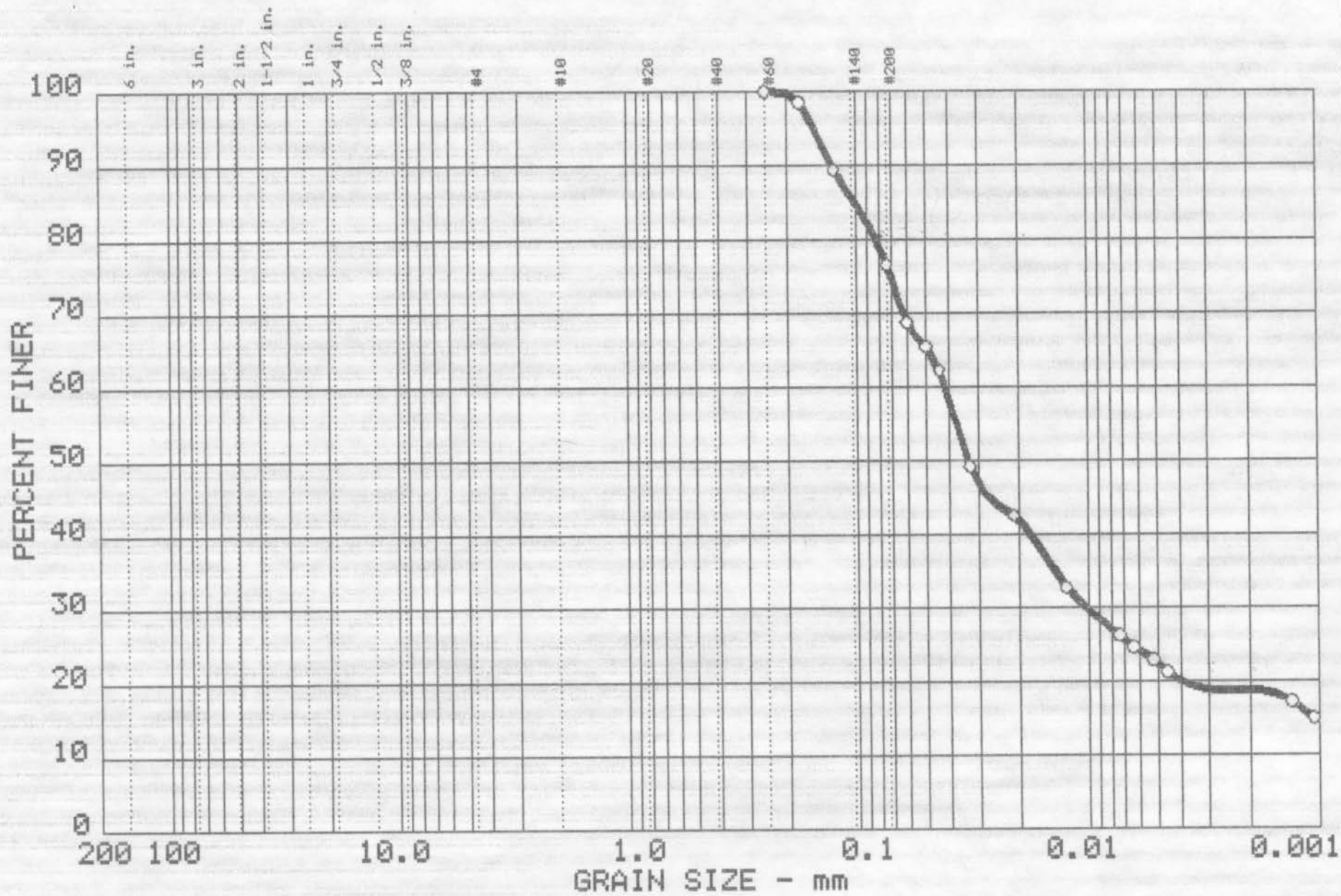
| LL | PI | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| | | 0.20 | 0.17 | 0.16 | 0.144 | 0.1312 | 0.1248 | 1.00 | 1.3 |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|----------------------|------|--------|
| SP | | |

Project No.: 0052 (BD-001)
 Project: M.R.N.O. HARBOR
 Location: N.O. HARBOR
 Date: 25 JULY 96

Remarks:
 PAN 80
 CUP 39
 TECH L.B.
 X=3669402.3

GRAIN SIZE DISTRIBUTION TEST REPORT



| Test | %+75 _{mm} | % GRAVEL | % SAND | % SILT | % CLAY |
|------|--------------------|----------|--------|--------|--------|
| ○ 7 | 0.0 | 0.0 | 23.4 | 54.2 | 22.4 |
| | | | | | |

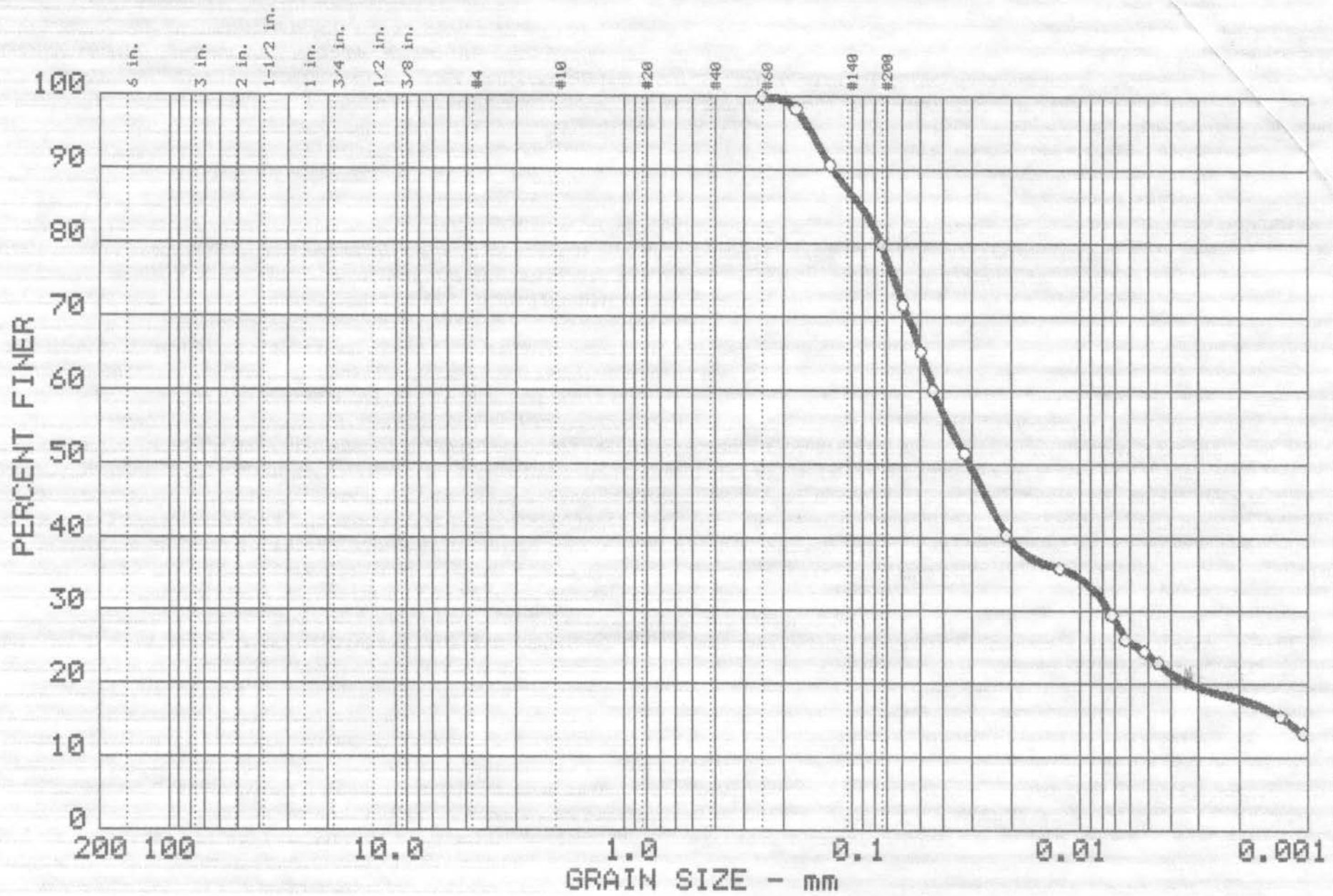
| LL | PI | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| | | 0.10 | | 0.03 | 0.010 | | | | |
| | | | | | | | | | |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|----------------------|------|--------|
| ○ ML | | |

Project No.: 0052 (BD-002A)
 Project: M.R.N.O. HARBOR
 ○ Location: M.R.
 Date: 28 AUG 96

Remarks:
 PAN 36
 CUP90
 TECH.L.B.
 X=3666961.8

GRAIN SIZE DISTRIBUTION TEST REPORT



| Test | %+75 _{mm} | % GRAVEL | % SAND | % SILT | % CLAY |
|------|--------------------|----------|--------|--------|--------|
| 8 | 0.0 | 0.0 | 20.2 | 55.7 | 24.1 |
| | | | | | |
| | | | | | |

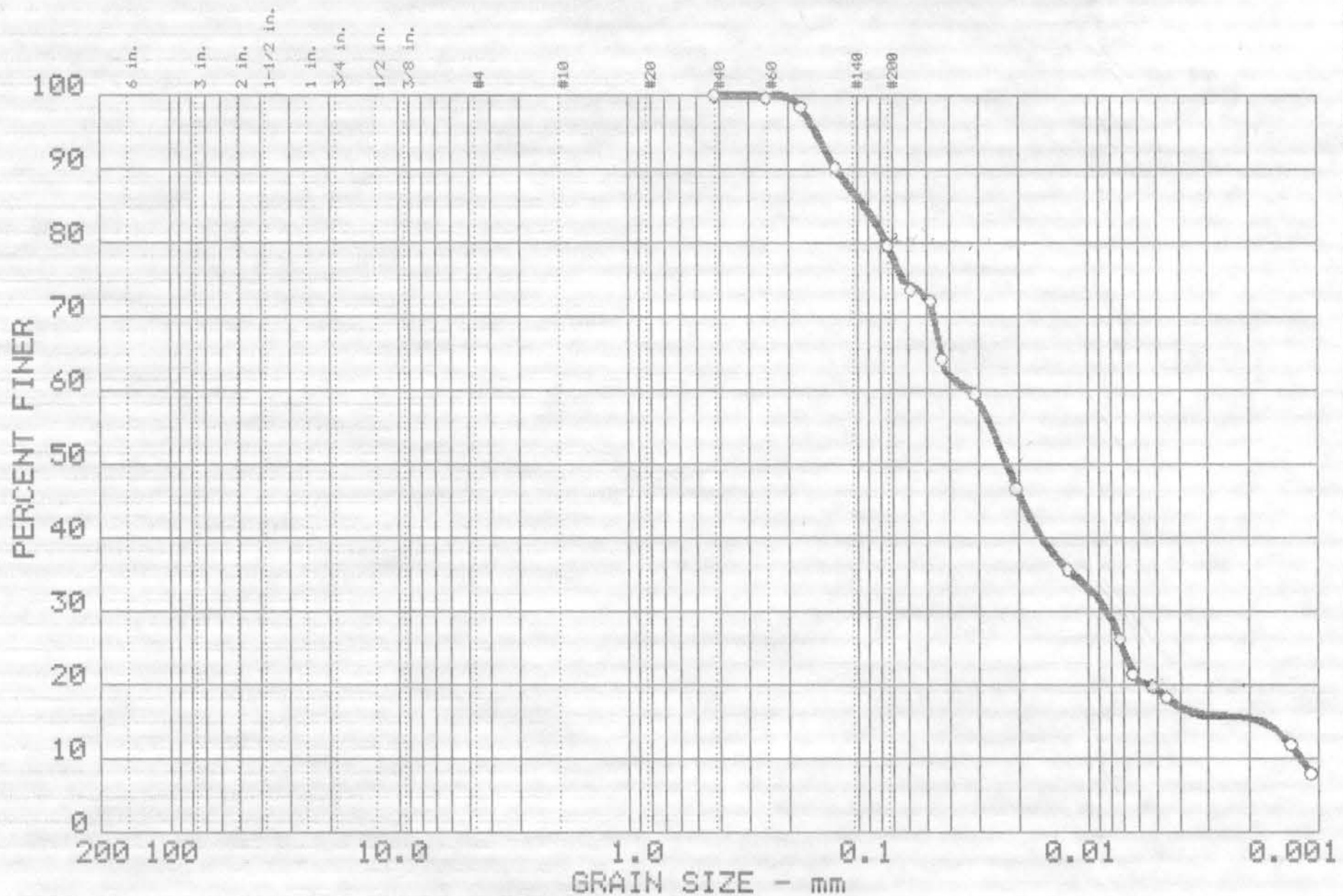
| LL | PI | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| | | 0.09 | | 0.03 | 0.007 | 0.0012 | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|----------------------|------|--------|
| ML | | |
| | | |

Project No.: 0052(BD-002B)
 Project: M.R.N.O. HARBOR
 Location: M.R.
 Date: 28 AUG 96

Remarks:
 PAN 34
 CUP 89
 TECH L.B.
 X=3667065.2

GRAIN SIZE DISTRIBUTION TEST REPORT



| Test | %+75 _{mm} | % GRAVEL | % SAND | % SILT | % CLAY |
|------|--------------------|----------|--------|--------|--------|
| ○ 2 | 0.0 | 0.0 | 20.4 | 60.2 | 19.4 |
| | | | | | |
| | | | | | |

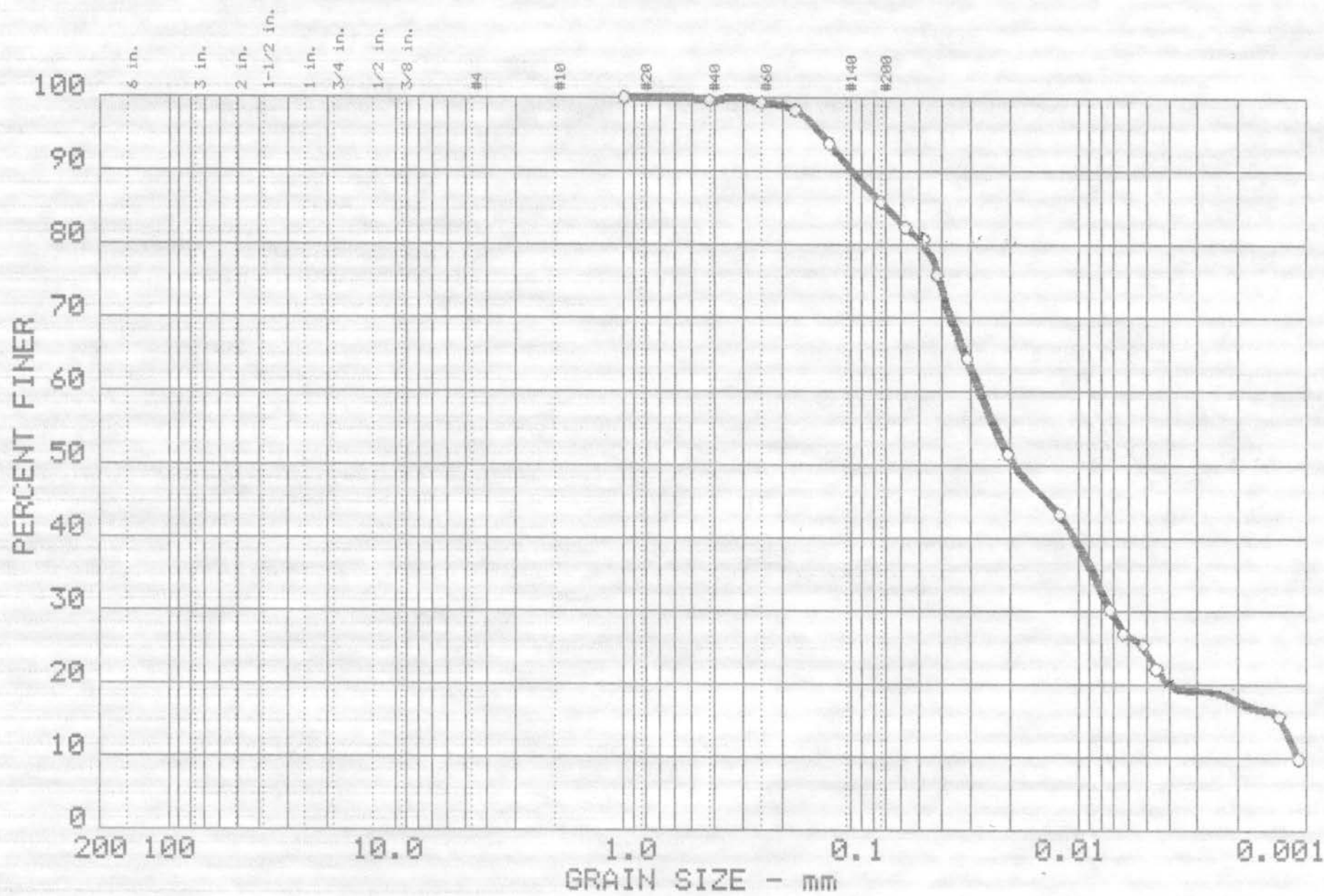
| LL | PI | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| ○ | | 0.09 | | 0.02 | 0.008 | 0.0017 | 0.0012 | 1.78 | 27.0 |
| | | | | | | | | | |
| | | | | | | | | | |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|----------------------|------|--------|
| ○ ML | | |
| | | |

Project No.: 0052
 Project: MISSISSIPPI RIVER NEW ORLEANS HARBOR
 ○ Location: X=3367960.4 Y=5.4930.0
 Date: 03DEC96

Remarks:
 PAN 2
 CUP 31
 TECH R.L.
 BD-003

GRAIN SIZE DISTRIBUTION TEST REPORT



| Test | %+75 _{mm} | % GRAVEL | % SAND | % SILT | % CLAY |
|------|--------------------|----------|--------|--------|--------|
| ○ 1 | 0.0 | 0.0 | 14.2 | 61.3 | 24.5 |
| | | | | | |
| | | | | | |

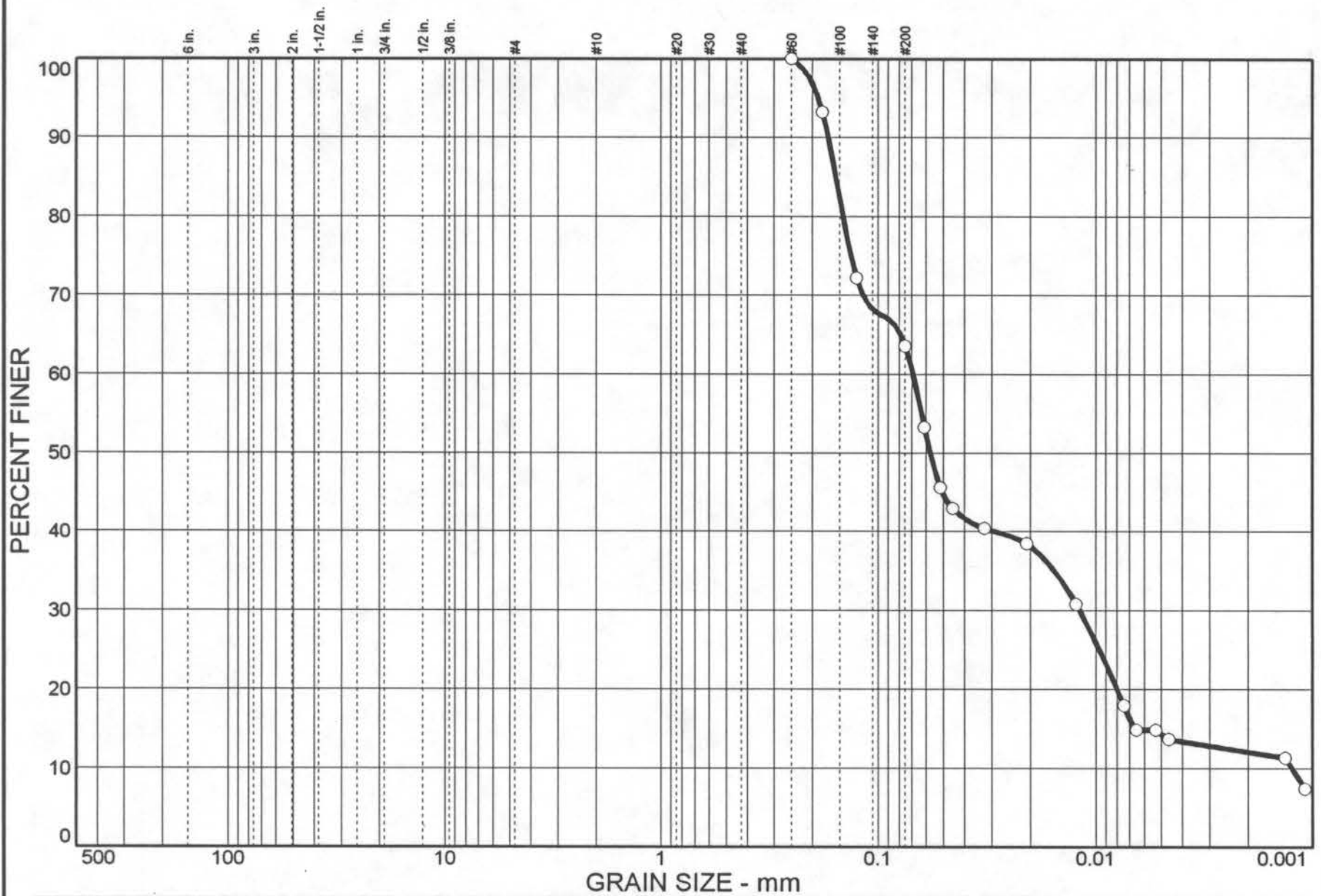
| LL | PI | D ₈₅ | D ₆₀ | D ₅₀ | D ₃₀ | D ₁₅ | D ₁₀ | C _c | C _u |
|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| | | | | 0.02 | 0.007 | 0.0013 | | | |
| | | | | | | | | | |

| MATERIAL DESCRIPTION | USCS | AASHTO |
|----------------------|------|--------|
| ○ ML | | |

Project No.: 0052
 Project: MISSISSIPPI RIVER NEW ORLEANS HARBOR
 Location: X=3669169.0 Y=515553.5
 Date: 05DEC96

Remarks:
 PAN 3
 CUP 93
 TECH R.L.
 BD-004

Particle Size Distribution Report



| | | | | |
|------------------|-----------------|---------------|---------------|---------------|
| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
| 0.0 | 0.0 | 36.4 | 49.4 | 14.2 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| #60 | 100.0 | | |
| #80 | 93.2 | | |
| #120 | 72.2 | | |
| #200 | 63.6 | | |

Soil Description

FAT CLAY (CH)

Atterberg Limits

PL= LL= PI=

Coefficients

D₈₅= 0.156 D₆₀= 0.0690 D₅₀= 0.0573
 D₃₀= 0.0119 D₁₅= 0.0066 D₁₀= 0.0013
 C_u= 55.13 C_c= 1.63

Classification

USCS= AASHTO=

Remarks

* (no specification provided)

Sample No.: BD-4
Location:

Source of Sample: ORLEANS AND JEFFERSON PARISH, LA
Date: 03NOV2004
Elev./Depth:

US Army Corps of Engineers
New Orleans District

Client: ORLEANS AND JEFFERSON PARISH, LA.
Project: MISS. RIVER NEW ORLEANS HARBOR CUTTERHEAD
 DREDGE RENTAL No. 3-2004 ORLEANS AND JEFFERSON
Project No: W912P8-04-C-0053 **Plate**

Particle Size Distribution Report



| | | | | |
|------------------|-----------------|---------------|---------------|---------------|
| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
| 0.0 | 0.0 | 98.9 | 1.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---------------|------------------|-------------------|-----------------|
| #18 | 100.0 | | |
| #40 | 99.9 | | |
| #60 | 97.2 | | |
| #80 | 72.3 | | |
| #120 | 7.6 | | |
| #200 | 1.1 | | |

Soil Description

Poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D₈₅= 0.201 D₆₀= 0.167 D₅₀= 0.158
D₃₀= 0.143 D₁₅= 0.131 D₁₀= 0.127
C_u= 1.31 C_c= 0.96

Classification

USCS= SP AASHTO=

Remarks

ECS

* (no specification provided)

Sample No.: BD-4 **Source of Sample:** **Date:** 3DEC04
Location: MISS.RIVER, NEW ORLEANS HARBOR CUTTERHEAD DREDGE **Elev./Depth:**

US Army Corps of Engineers
New Orleans District

Client:
Project: MISS. RIVER NEW ORLEANS HARBOR CUTTERHEAD DREDGE
Project No.: W912P8-08-C-0056 **Plate**