# Final Report
# Soil Sampling Program, July 1985
# Niachlor Plant Site
# Niagara Falls, New York

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Buffalo Avenue & 26th Street
Niagara Falls, New York 14302

Attention: Mr. Thomas Scarfe

**FINAL REPORT**
**SOIL SAMPLING PROGRAM, JULY 1985**
**NIACHLOR PLANT SITE**
**NIAGARA FALLS, NEW YORK**

Gentlemen:

We are pleased to present to you our final report for the July 1985 soil sampling for the Niachlor Project. This report presents the results of field and laboratory investigations, including chemical and grain-size distribution analyses. In addition, interpretation of these results with respect to soil contamination at NIACHLOR construction locations is included.

We sincerely appreciate the opportunity of working with you on this project. Please contact us if you have any questions.

Very truly yours,

WOODWARD-CLYDE CONSULTANTS

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# SOIL SAMPLING PROGRAM, JULY 1985
# NIACHLOR PLANT SITE
# NIAGARA FALLS, NEW YORK

Submitted to:

**E.I. DUPONT DE NEMOURS & CO., INC.**

Niagara Falls, New York

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## INTRODUCTION

The Soil Sampling Program was implemented by Woodward-Clyde Consultants (WCC) in support of the Environmental Impact Statement (EIS) for the NIACHLOR Project in Niagara Falls, New York. Twenty-five soil samples were collected for chemical analyses from 24 excavations during the period of July 19, 1985 to July 26, 1985, as shown on Plate 1. Plate 2 shows the locations of all test pits in the new electrolyzer area - an area of known PCB contamination. Buried concrete foundations in the electrolyzer area prevented sampling in the original design locations requested by Mr. Thomas Scarfe. The locations shown on Plate 2 were the result of probing with the backhoe bucket to find locations where the test pits could be excavated to the design depth. The chemical analyses were performed by Advanced Environmental Systems (AES), Niagara Falls, New York. A duplicate of each sample was collected and submitted for particle-size analysis at WCC's Geotechnical Testing Laboratory in Plymouth Meeting, Pennsylvania. During the excavations of each test pit, WCC collected soil samples at 1-foot intervals for jar head space analysis using an organic vapor analyzer.

## SAMPLING LOCATIONS

Soil sampling locations for the July 1985 sampling were chosen according to the NIACHLOR Soil Sampling Plan with regard to construction priorities determined by DuPont. This set of samples covered the new perimeter road, the new railboard bridge, the new sodium tank car railroad siding, and the electrolyzer building. Shallow samples were taken in all the 100 series test pits, and one deep sample was taken from Test Pit 134. Test Pits 201 through 205 were requested by Mr. Thomas Scarfe to provide data concerning the areal extent of PCB contamination present in the shallow samples from Test Pit 2 (excavated 11/28/84 for WCC's report entitled "NIACHLOR Soil Sampling, Niagara Plant, Niagara Falls, New York," dated May 3, 1985). Table 1 contains the DuPont grid locations for all the test pits.

## EXCAVATION AND SAMPLING PROCEDURES

Soil samples were collected from test pits excavated with a backhoe. Prior to any excavation, an excavation barricade and construction boundary, as shown on Plate 3, were erected to limit access in the area of the excavation and also to provide air monitoring boundaries. The top foot of soil in each of the 100 series test pits was considered "clean" and was kept separate from the material excavated below. All excavated material was placed on plastic sheeting to facilitate cover of soil and to prevent the spread of soil contaminants.

As the excavation proceeded, samples were obtained every foot for jar head space analysis. Jar head space analysis is useful as an indicator of the presence of volatile organics. When a foot interval is reached during excavation, a sample is taken by filling a glass pint jar halfway, covering with aluminum foil, and sealing with a rubber band. The jar samples remained sealed for 5 minutes; then an organic vapor analyzer was used to puncture the aluminum foil and a reading was taken. After reading all the jars, the samples were returned to the excavation and the jars decontaminated. When the bottom of excavation was reached, a sample for chemical and grain-size analyses was taken by scraping the side of the test pit with the bucket.

Once the samples were taken, the pit was then backfilled with the material taken below 1 foot. The bucket was then decontaminated by scrubbing with detergent and then rinsing with water to prevent cross-contamination between holes. Once the backhoe was cleaned and all excavation personnel decontaminated, the wash and rinse water were disposed of in the test pit. When decontamination was complete, the top foot of soil was replaced and compacted onto the previously backfilled soil by using the back of the bucket for compaction.

The design test pit depth was 4 feet in all locations, except Test Pits 134 (10 feet) and 201 through 205 (3.5 feet). If groundwater was encountered, the test pit was not deepened to ensure that the samples taken were representative of the unsaturated zone. Groundwater was encountered in Test Pits 114, 115, 116, 117, 119 (3 to 4 feet), and 134 (8 feet).

## HEALTH AND SAFETY

The site-specific health and safety plan developed by WCC for NIACHLOR is included in Appendix A. The contingency plan for possible organic vapor emissions during test pit excavation was prepared by DuPont. These plans were followed at each test pit location to ensure the health and safety of the excavation personnel, DuPont employees, and the public. Air quality was monitored with a Century Systems Organic Vapor Analyzer Model OVA-128 (OVA). During excavation, air quality was monitored at the edge of each test pit for possible organic vapor emissions. Due to the possible presence of PCBs during the excavation of Test Pits 106, 107, 108, and 201 through 205, respirators were worn throughout the excavation procedure to protect against possible PCB-laden dust inhalation that would not be detected by the OVA.

## SUBSURFACE CONDITIONS

A soil profile description for each test pit is included in Appendix B. These logs include a soil textural description and results of the OVA jar head space analyses (in ppm). The sample intervals indicated correspond to both the chemical and physical testing samples. Fill was encountered in all 24 excavations. Test Pit 134 showed fill until groundwater was encountered at 8 feet. Test Pits 106, 107, 108, 111, 113 through 120, and 128 showed fill throughout the 4-foot profile. This fill consisted mainly of gray-brown to gray-black sandy silty gravel with cinders, brick and concrete fragments, and broken glass. Fill material in Test Pit 108 consisted of a brown silty clay. Test Pits 129 through 133 had fill of varying thicknesses underlain by the natural glacial till (beige-brown gravelly sandy silty clay).

The OVA head space analyses detected the presence of volatile organic chemicals in Test Pits 106, 111, 113, 117, 119, and 129, with the highest concentration (40 ppm) found in Test Pit 129 (1 foot). This reading of 40 ppm is suspect for two reasons: the sample was taken during a heavy rain shower, which may have affected the OVA reading, and the sample contained tarry asphalt base course, which may have erroneously been detected as a volatile organic contaminant. Most concentrations detected were less than 1 ppm and only two exceeded 10 ppm (Test Pits 113 and 129).

# LABORATORY INVESTIGATIONS

## GRAIN-SIZE DISTRIBUTION ANALYSES

The results of the grain-size distribution analyses are included in Appendix C. Test Pit 128 was not sampled for grain-size analysis. These results and the field test pit logs were used for the material descriptions presented in Appendix B and the individual test pit summaries that appear in Appendix D.

## CHEMICAL ANALYSES

A number of indicator parameters were selected by DuPont based on previous chemical analytical results and the historic use of the site. These parameters are listed in Table 2. However, not all of the indicator parameters listed in Table 2 were analyzed for in every test pit. Table 3 shows the analyses performed for each test pit, excluding volatile organics, total recoverable phenols, and total chlorinated hydrocarbons, which were tested for in each sample with the exception of Test Pits 201 through 205 (PCBs only).

Volatile organic analysis results are presented in Table 4. The volatile organic parameters presented in Table 4 include all the volatile organic parameters analyzed for in this sampling period that were found in the previous NIACHLOR Soil Sampling Report (dated May 3, 1985), plus 1,1,1-trichloroethane and 1,2-trans-dichloroethylene. Table 5 contains the results of the metals testing. Table 6 contains the results of the PCB testing, other organics, total recoverable phenols and cyanide and sulfide reactivity. All volatile organic parameters listed in Table 2, but not in Table 4, were below detectable limits (BDL) in all samples. All the other organics listed in Table 2, but not in Table 6, were also below the detection limit.

**Field and Laboratory Quality Control/Quality Assurance:** Laboratory Quality Control/Quality Assurance data are included in Appendix E. This appendix includes sections on standard additions, duplicate analysis, matrix spike, and chain-of-custody forms. Duplicate analysis and matrix spike quality assurance testing were performed on every batch of samples submitted (one batch was submitted each day). At the beginning of each day, glassware was obtained from AES. After sampling, samples were kept in coolers with ice and delivered by WCC personnel to the AES laboratory each night.

**Volatile Organics:** Results of the volatile organic analyses are presented in Table 4. These results show that only 8 of the 19 test pit locations had any volatile organics found above the detection limits and that only 3 volatile organics were detected: 1,1,1-trichloroethane (Test Pits 106, 113 through 117, and 129) and trans-1,2-dichloroethane (Test Pit 134 deep) and 1,4-dichlorobenzene (Test Pit 116). The highest concentration reported was 10.24 ppm of 1,4-dichlorobenzene in Test Pit 116.

**Metals:** Metals testing results are presented in Table 5. The metals testing was concentrated at the proposed railroad siding area (Test Pits 114 through 117). The results show that the concentrations of metals found are below RCRA criteria concentrations and that the leaching potential for metals from these soils is very low.

**Total Chlorinated Hydrocarbons:** TCH results (Table 6) show levels above the detection limit in 7 of 19 test pits. Test Pit 133 (44 ppm) and Test Pit 113 (370 ppm) were the only test pit samples above 10 ppm.

**PCBs:** PCB testing was performed on samples within the planned NIACHLOR electrolyzer building excavation (Test Pits 106, 107, 108, and 201 through 205), the proposed railroad bridge (Test Pit 134), the proposed railroad siding (Test Pits 114 through 117), and Test Pit 128. Test Pit 111 was tested for PCB 1248 as a check for areal extent in the vicinity of the known PCB contamination. PCB testing results (Table 6) show that Test Pits 107 and 201 through 205 contained PCBs higher than detection limit, ranging from 26 ppm (Test Pit 201) to 71 ppm (Test Pit 205).

**Total Recoverable Phenols:** Total recoverable phenols were tested for in all test pits. The results (Table 6) show no samples above detection limits.

**Other Compounds:** Other compounds tested for include total cyanide, other organics (as listed on Table 2), and cyanide and sulfide reactivity. Table 3 outlines which test pit samples were analyzed for the other compounds listed in Table 2. The results show that Test Pits 114 through 117 contained hexachlorobenzene in low concentrations.

## DISCUSSION OF RESULTS

### COMPARISON OF VOLATILE ORGANIC AND TCH RESULTS

Table 7 contains a comparison of the volatile organics testing with TCH and jar head space analysis. The TCH and volatile organic data agree in 13 of the 20 test pits because the detection limit of 1 ppm for TCH was not exceeded by volatile concentrations found in samples where TCH was not detected. Five of the remaining seven test pits contained TCH values with the same order of magnitude as the detection limit. The two elevated TCH values (Test Pits 113 and 133) did not have a corresponding high volatile organic value. These high values are questionable because the more detailed volatile orgainc testing did not verify the high TCH value. Table 8 shows the volatile organic and TCH testing for test pits in the area of the brine polishing and sludge buildings. Test Pits 3 and 4 were excavated on November 28, 1984, and the results were presented in the WCC NIACHLOR Soil Sampling report dated May 3, 1985. Plate 4 shows the locations of both the November and December 1984 soil sampling and the July 1985 soil samples. Test Pit 4 is nearest to Test Pit 113. The results show that volatile organic totals are comparable in order of magnitude, while TCH results are very different. Table 8 demonstrates that the TCH value from Test Pit 113 is very different from any other result listed, and that the more accurate individual parameter testing should be used in any evaluation of the soils in this area.

### PCB TESTING RESULTS

The results of the PCB testing confirms the PCB contamination found in the previous NIACHLOR soil sampling program. Plate 2 shows the locations of all test pits from the NIACHLOR soil sampling program where PCBs were detected. As evidenced by this plate, the area of PCB contamination encompasses a significant portion of the new electrolyzer building area. Additional PCB testing is necessary in order to accurately determine the extent of the PCB contamination in this area. The average PCB concentration for all test pits containing PCBs on Plate 2 is 44 ppm, which is very close to the RCRA hazardous criteria of 50 ppm for PCBs .

Another factor to consider is the large amount of concrete rubble found in the test pit locations shown on Plate 2. The actual locations for Test Pits 107 and 202 through 205 differ from the originally proposed locations, as described in Appendix D, Individual Test Pit Summaries. These changes in location were necessary because the presence of buried concrete foundations in the original location prevented excavation to 3.5 feet. When the PCB contamination area has been more accurately determined, the new electrolyzer building excavation procedures will have to address these buried concrete foundations.

## PREVIOUS REPORTS

Woodward-Clyde Consultants' report entitled "Soil Sampling, NIACHLOR Project, Niagara Falls, New York," dated May 3, 1985, presented the results of the soil sampling done in November and December 1984. Plate 4 shows that there are two areas that were sampled for in both NIACHLOR sampling periods: the new brine polishing and sludge buildings and the new electrolyzer building. The test pit chemical analyses results for the new brine polishing and sludge buildings have been discussed. The test pits in the new electrolyzer building area confirm the PCB contamination, as discussed previously.

In the previous report, it was recommended that further testing be done in the area of Test Pit 7 to test for cyanide reactivity to delineate the extent of cyanide contamination. Due to the findings in Test Pit 7, it was decided that no excavation will be done in this area. The foundation grades will be raised by the placing of compacted clean fill.

## SUMMARY AND CONCLUSIONS

Based upon the results of the July 1985 soil sampling reported herein and the previous soil sampling, the following conclusions are made:

- The soils encountered were mainly fill materials consisting of sands, gravels, and building rubble.

- Chemical testing of the test pits sampled in July 1985 demonstrates that the soil in the shallow (0 to 4 feet) zone for the new entrance road, the new railroad siding, and the new sodium packages should be relatively uncontaminated, and that conventional excavation for foundations should not cause organic vapor emissions.

- The test pits sampled in the new electrolyzer building showed that PCB contamination occurs under a significant portion of the new electrolyzer building location, along with large pieces of concrete rubble. Further testing in this area is necessary to accurately determine the extent of PCB contamination.

- The overall results show that the area west of Gill Creek along the new entrance road and the area east of Gill Creek are relatively uncontaminated, with the exception of the PCBs found in Test Pits 107 and 201 through 205.

## RECOMMENDATIONS

WCC recommends that additional sampling be done to determine the areal extent of PCB-contaminated soil in the new electrolyzer building area and that further testing be undertaken in the area of Test Pit 113 to confirm that the high TCH value found is questionable.

## LIMITATIONS

The findings and conclusions presented in this report are based upon the interpretations developed from the available geologic, subsurface, and soil chemistry data. These findings and conclusions are subject to confirmation and/or revisions as additional information becomes available. Factors which influence the utilization of the data have been discussed in this report and local anomalies should be expected.

# Tables

TABLE 1
DUPONT GRID LOCATIONS
SOIL SAMPLING PROGRAM, JULY 1985
NIACHLOR PLANT SITE
NIAGARA FALLS, NEW YORK

| TEST PIT # | EASTING | NORTHING |
|---|---|---|
| 128 | E1310 | N1214 |
| 129 | E1410 | N1148 |
| 130 | E1569 | N1126 |
| 131 | E1748 | N1171 |
| 132 | E1950 | N1159 |
| 133 | E2096 | N1195 |
| 134 | E2550 | N1416 |
| 118 | E2687 | N1309 |
| 119 | E2901 | N1349 |
| 120 | E3101 | N1369 |
| 108 | E2553 | N1778 |
| 107 | E2910 | N1796 |
| 114 | E3100 | N1847 |
| 115 | E3238 | N1852 |
| 116 | E3386 | N1856 |
| 106 | E2906 | N1889 |
| 117 | E3446 | N1876 |
| 113 | E2986 | N1584 |
| 111 | E2953 | N1658 |
| 201 | E2785 | N1799 |
| 202 | E2767 | N1792 |
| 203 | E2773 | N1799 |
| 204 | E2790 | N1805 |
| 205 | E2785 | N1807 |

# TABLE 2
# CHEMICAL ANALYSES INDICATOR PARAMETERS
# SOIL SAMPLING PROGRAM, JULY 1985
# NIACHLOR PLANT SITE
# NIAGARA FALLS, NEW YORK

## Metals

| | | |
|---|---|---|
| Barium | Lead | Copper |
| Arsenic | Mercury | Zinc |
| Cadmium | Selenium | |
| Chromium | Silver | |

## Other Organics

Tetrahydrothiopene
1,4-Dichlorobutane
2-Methylfuran
Aniline
O-Chloroaniline
M-,P-Chloroaniline
1,2,4-Trichlorobenzene
Hexachlorobenzene

## Total Chlorinated Hydrocarbons (TCH) Scan

## Polychlorinated Biphenyl (PCB)

PCB-1242
PCB-1248
PCB-1254
PCB-1221

## Total Recoverable Phenols

## Total Cyanide

## Cyanide and Sulfide Reactivity

## Volatile Organics

Chloromethane
Vinyl Chloride
Chloroethane
Bromomethane
2-Chloroethyl Vinyl Ether
Ethyl Benzene
Methylene Chloride
Chlorobenzene
1,1-Dichloroethylene
1,1-Dichloroethane
trans-1,2-Dichloroethylene
Chloroform
1,2-Dichloroethane
1,1,1-Trichloroethane
Carbon Tetrachloride
Bromodichloromethane
1,2-Dichloropropane
trans-1,3,-Dichloropropene
Trichloroethylene
Benzene
cis-1,3-Dichloropropene
1,1,2-Trichloroethane
Dibromochloromethane
Bromoform
Tetrachloroethylene
1,1,2,2-Tetrachloroethane
Toluene
1,4-Dichlorobenzene
1,2-Dichlorobenzene

# TABLE 3
## CHEMICAL PARAMETER TESTING FOR EACH TEST PIT SOIL SAMPLING PROGRAM, JULY 1985 NIACHLOR PLANT SITE NIAGARA FALLS, NEW YORK

| Test Pit No. | Chemical Indicator Parameters(1) |
|---|---|
| 128 | Barium, Copper, PCB 1221,PCB 1242 PCB 1248, PCB 1254 |
| 129, 130 | Copper |
| 111, 134S, 134D | Total Cyanide, PCB 1248, Other Organics(2), Cyanide and Sulfide Reactivity |
| 113 | Total Cyanide, Other Organics(2), Cyanide and Sulfide Reactivity |
| 106 | Zinc, Other Organics, PCB 1248 |
| 107 | Other Organics(2), PCB 1242, PCB 1248, PCB 1254 |
| 108 | PCB 1248 |
| 114, 115, 116, 117 | All metals except copper, Other Organics, PCB 1242, PCB 1248, PCB 1254 |
| 118, 119, 120 | Other Organics(2) |

(1) All test pit samples listed on Table 3 were tested for the Volatile Organics listed in Table 2, Total Recoverable Phenols and Total Chlorinated Hydrocarbons, in addition to the parameters listed above. Test Pits 131, 132, 133 were tested for Volatile Organics, Total Recoverable Phenols and TCH. Test Pits 201-205 were tested for PCBs only.

(2) Only tetrahydrothiopene, 1,4-dichlorobutane, and 2-methlyfuran of the Other Organics listed on Table 2 were tested for.

TABLE 4
VOLATILE ORGANIC ANALYTICAL RESULTS
SOIL SAMPLING PROGRAM, JULY 1985
NIACHLOR PLANT SITE
NIAGARA FALLS, NEW YORK

All Values in PPM

| TEST PIT NUMBER | AES LAB NUMBER | Chloroform | Carbon Tetrachloride | Trichloro-ethylene | 1,1,2 Trichloro ethylene | Tetrachloro-ethylene | 1,1,2,2 Tetrachloro ethane | Dichloro-benzenes (All Isomers) | Bromoform | Benzene | Toluene | 1,2-trans-Dichloro-ethylene | 1,1,1-Trichloro-ethane |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 106 | 1994 | - | - | - | | - | | - | - | - | - | - | - |
| 107 | 1969 | - | - | - | | - | | NA | - | - | - | - | 0.09 |
| 108 | 1960 | - | - | - | | - | | NA | - | - | - | - | - |
| 111 | 1995 | - | - | - | | - | - | NA | - | - | - | - | - |
| 113 | 1996 | - | - | - | - | - | | NA | - | - | - | - | 0.11 |
| 114 | 1970 | - | - | - | - | - | - | - | - | - | - | - | 0.06 |
| 115 | 1971 | - | - | - | - | - | | - | - | - | - | - | 0.07 |
| 116 | 1972 | - | - | - | - | - | | 10.24 | - | - | - | - | 0.08 |
| 117 | 1997 | - | | - | | - | | | - | - | - | - | 0.14 |
| 118 | 1961 | - | - | - | - | - | - | NA | - | - | - | - | - |
| 119 | 1962 | - | - | - | - | - | | NA | - | - | - | - | - |
| 120 | 1963 | - | - | - | - | - | | NA | - | - | - | - | - |
| 128 | 1886 | - | - | - | - | - | | NA | - | - | - | - | - |
| 129 | 1887 | - | - | - | - | - | | NA | - | - | - | - | - |
| 130 | 1902 | - | - | - | - | - | | NA | - | - | - | - | - |
| 131 | 1903 | - | - | - | - | - | | NA | - | - | - | - | - |
| 132 | 1904 | - | - | - | - | - | | NA | - | - | - | - | - |
| 133 | 1905 | - | - | - | - | - | | NA | - | - | - | - | - |
| 134s | 1964 | - | - | - | - | - | - | NA | - | - | - | - | - |
| 134d | 1965 | - | - | - | - | - | | NA | - | - | - | 0.09 | - |

(-) Below The Detection Limit NA-Not Analyzed

TABLE 5
METALS ANALYTICAL RESULTS
SOIL SAMPLING PROGRAM, JULY 1985
NIACHLOR PLANT SITE
NIAGARA FALLS, NEW YORK

All Values in PPM

| TEST PIT NUMBER | AES LAB NUMBER | Arsenic | Barium | Cadmium | Chromium | Lead | Mercury | Selenium | Silver | Copper | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 106 | 1994 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 0.27 |
| 107 | 1969 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 108 | 1960 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 111 | 1995 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 113 | 1996 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 114 | 1970 | 0.006 | - | | - | | 0.013 | - | - | NA | 0.06 |
| 115 | 1971 | - | - | | 0.06 | 1.14 | 0.007 | | - | NA | 0.10 |
| 116 | 1972 | - | - | | 0.79 | | 0.006 | - | - | NA | 1.34 |
| 117 | 1997 | - | 3.82 | | - | | 0.010 | - | - | NA | 3.85 |
| 118 | 1961 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 119 | 1962 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 120 | 1963 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 128 | 1886 | NA | 4.14 | NA | NA | NA | NA | NA | NA | 11.73 | NA |
| 129 | 1887 | NA | NA | NA | NA | NA | NA | NA | NA | - | NA |
| 130 | 1902 | NA | NA | NA | NA | NA | NA | NA | NA | - | NA |
| 131 | 1903 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 132 | 1904 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 133 | 1905 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 134s | 1964 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 134d | 1965 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

NA Not Analyzed
(-) Below The Detection Limit

TABLE 6
SELECTED ANALYTICAL RESULTS
SOIL SAMPLING PROGRAM, JULY 1985
NIACHLOR PLANT SITE
NIAGARA FALLS, NEW YORK

All Values in PPM

| TEST PIT NUMBER | AES LAB NUMBER | TCH | PCB 1221 | PCB 1242 | PCB 1248 | PCB 1254 | Total Recoverable Phenols | Total Cyanide | Hexa-chloro-benzene* | Cyanide and Sulfide Reactivity |
|---|---|---|---|---|---|---|---|---|---|---|
| 106 | 1994 | - | NA | NA | - | NA | - | NA | 0.031 | NA |
| 107 | 1969 | - | NA | - | 35.0 | 10.2 | - | NA | NA | NA |
| 108 | 1960 | 2.38 | NA | NA | - | NA | - | NA | NA | NA |
| 111 | 1995 | - | NA | NA | - | NA | - | - | NA | NEGATIVE |
| 113 | 1996 | 368.42 | NA | NA | NA | NA | - | - | NA | NEGATIVE |
| 114 | 1970 | - | NA | - | - | - | - | NA | 0.003 | NA |
| 115 | 1971 | - | NA | | - | | - | NA | 0.014 | NA |
| 116 | 1972 | 4.90 | NA | - | - | - | - | NA | 0.484 | NA |
| 117 | 1997 | - | NA | | - | - | - | NA | 0.010 | NA |
| 118 | 1961 | 5.89 | NA | NA | NA | NA | - | NA | NA | NA |
| 119 | 1962 | 7.47 | NA | NA | NA | NA | - | NA | NA | NA |
| 120 | 1963 | 8.73 | NA | NA | NA | NA | - | NA | NA | NA |
| 128 | 1886 | - | - | NA | NA | NA | - | NA | NA | NA |
| 129 | 1887 | - | NA | NA | NA | NA | - | NA | NA | NA |
| 130 | 1902 | - | NA | NA | NA | NA | - | NA | NA | NA |
| 131 | 1903 | - | NA | NA | NA | NA | - | NA | NA | NA |
| 132 | 1904 | - | NA | NA | NA | NA | - | NA | NA | NA |
| 133 | 1905 | 43.90 | NA | NA | NA | NA | - | NA | NA | NA |
| 134s | 1964 | - | NA | NA | NA | NA | - | - | NA | NEGATIVE |
| 134d | 1965 | - | NA | NA | NA | NA | - | - | NA | NEGATIVE |
| 201 | 1999 | NA | NA | | 18.4 | 7.48 | NA | NA | NA | NA |
| 202 | 2000 | NA | NA | - | 23.3 | 9.34 | NA | NA | NA | NA |
| 203 | 2001 | NA | NA | | 28.9 | 12.0 | NA | NA | NA | NA |
| 204 | 2002 | NA | NA | - | 41.2 | 16.0 | NA | NA | NA | NA |
| 205 | 2003 | NA | NA | - | 59.0 | 12.3 | NA | NA | NA | NA |

NA-Not Analyzed
(-) Below The Detection Limit

*Hexachlorobenzene was the only parameter detected in any one sample in the chemicals listed under Other Organics in Table 2.

TABLE 7
COMPARISON OF ORGANIC ANALYSIS TECHNIQUES
SOIL SAMPLING PROGRAM, JULY 1985
NIACHLOR PLANT SITE
NIAGARA FALLS, NEW YORK

All Values in PPM

| TEST PIT NO. | VOLATILE ORGANIC TOTAL | TCH ANALYSIS | JAR HEAD SPACE ANALYSIS* |
|---|---|---|---|
| 106 | - | - | 1.2 |
| 107 | 0.09 | - | ND |
| 108 | - | 2.38 | ND |
| 111 | - | - | .38 |
| 113 | 0.11 | 368.42 | 13.6 |
| 114 | 0.06 | - | ND |
| 115 | 0.07 | - | ND |
| 116 | 0.08 | 2.38 | ND |
| 117 | 0.14 | - | 1.1 |
| 118 | - | 5.89 | ND |
| 119 | - | 7.47 | 1.8 |
| 120 | - | 8.73 | ND |
| 128 | - | - | ND |
| 129 | 0.07 | - | 2.7 |
| 130 | - | - | ND |
| 131 | - | - | ND |
| 132 | - | - | ND |
| 133 | - | 43.90 | 1.3 |
| 134S | - | - | ND |
| 134D | 0.09 | - | ND |

(-) Below Detection Limit ND-None Detected

* The Jar Head Space analysis values shown are an average of the jar head space analyses that correspond to the sample range for chemical analyses, as shown on the test pit logs in Appendix B.

TABLE 8
COMPARISON OF ORGANIC ANALYSIS RESULTS
FOR TEST PITS 3, 4, 111, AND 113(1)
SOIL SAMPLING PROGRAM, JULY 1985
NIACHLOR PLANT SITE
NIAGARA FALLS, NEW YORK

All Values in PPM

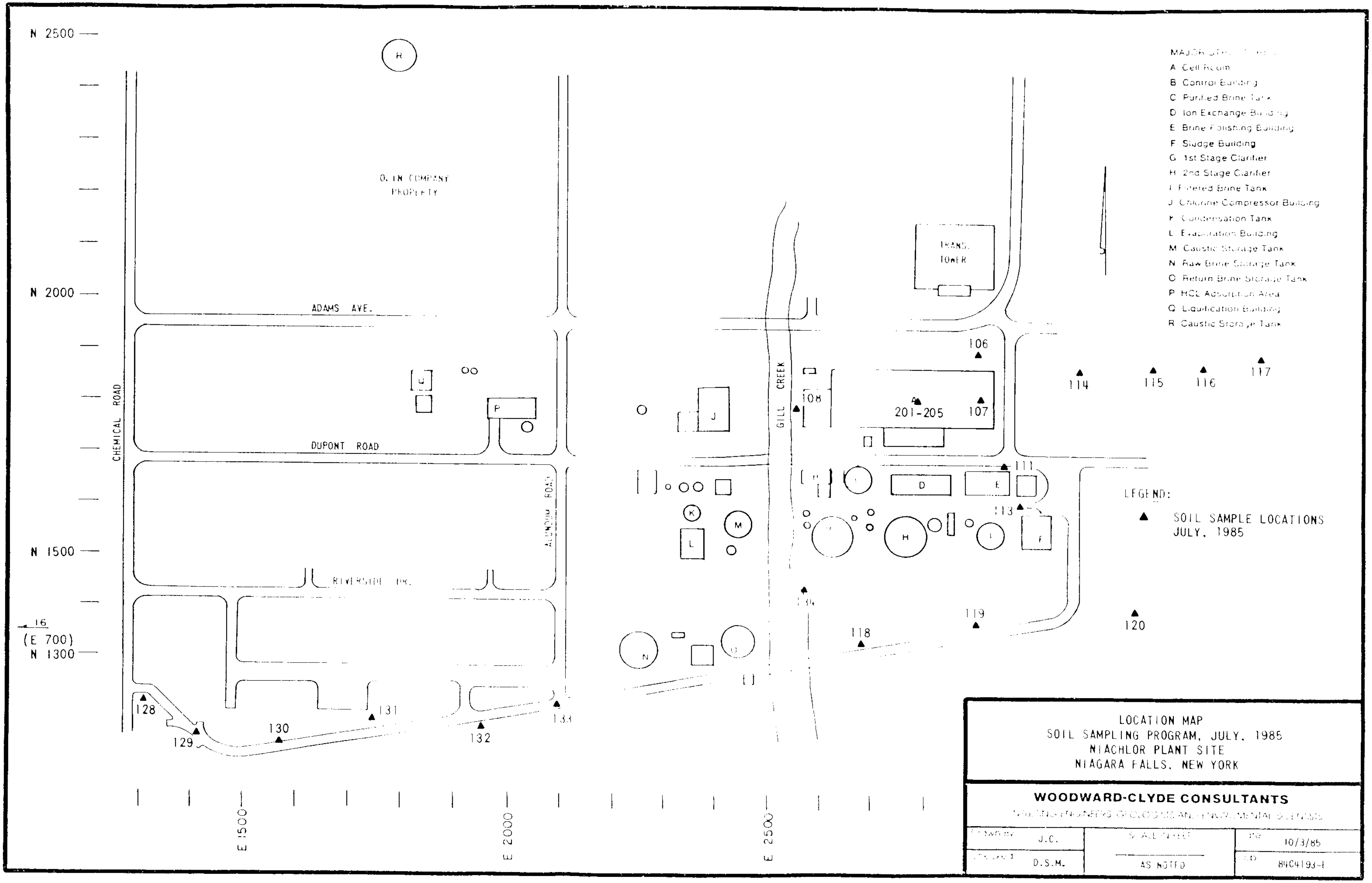
| TEST PIT NO. | VOLATILE ORGANIC TOTAL | TCH ANALYSIS | JAR HEAD SPACE ANALYSIS(2) |
|---|---|---|---|
| 3 | 11.71 | - | 50.0 |
| 111 | - | - | 0.4 |
| 4 | 0.68 | - | 35.0 |
| 113 | 0.11 | 368.42 | 13.6 |

(-) Below Detection Limit    ND-None Detected

(1) Test Pits 3 and 4 were excavated in November 1984 and the results were included in the WCC report, "Niachlor Soil Sampling, Niagara Plant, Niagara Falls, New York," dated May 3, 1985.

(2) The Jar Head Space analysis values shown are an average of the jar head space analyses that correspond to the sample range for chemical analyses, as shown on the test pit logs in Appendix B.

# Plates

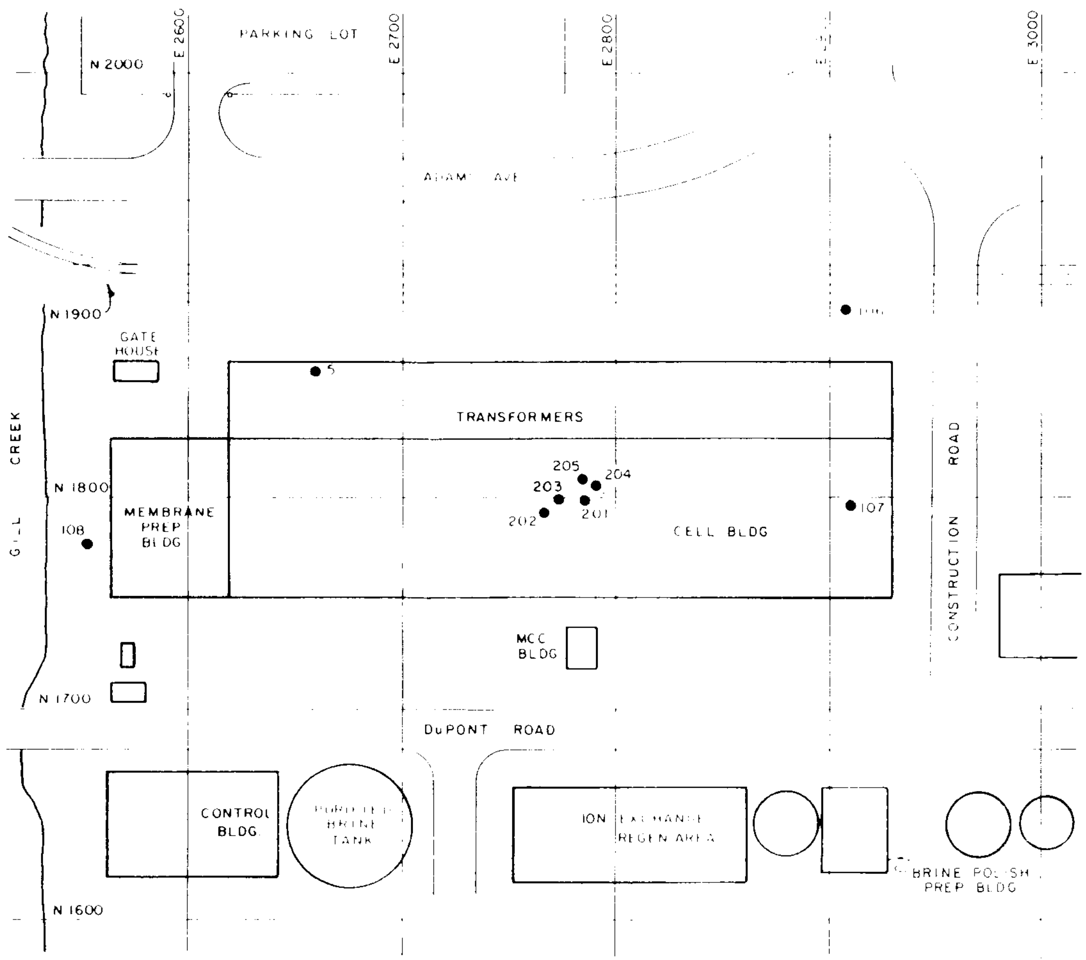



LOCATION MAP
SOIL SAMPLING PROGRAM, JULY, 1985
NIACHLOR PLANT SITE
NIAGARA FALLS, NEW YORK

**WOODWARD-CLYDE CONSULTANTS**

| | | | |
|---|---|---|---|
| | J.C. | | 10/3/85 |
| | D.S.M. | AS NOTED | 8404193-F |

PLATE I




| TEST PIT | GRID LOCATION | TOTAL PCB CONCENTRATION(PPM) |
|---|---|---|
| 2 | E2785xN1799 | 83.4 |
| 5 | E2660xN1861 | 0.4 |
| 106 | E2906xN1889 | 0 |
| 107 | E2910xN1796 | 45.2 |
| 108 | E2553xN1778 | 0 |
| 201 | E2785xN1799 | 25.9 |
| 202 | E2767xN1792 | 32.6 |
| 203 | E2773xN1799 | 40.9 |
| 204 | E2790xN1805 | 57.2 |
| 205 | E2785xN1807 | 61.3 |

NOTE: TEST PIT 201 IS THE SAME LOCATION AS TEST PIT 2. EXCAVATED 11/28/84.

TEST PIT 5 WAS EXCAVATED 11/28/84 AND THE RESULTS FOR TEST PITS 2 AND 5 ARE INCLUDED IN THE W.C.C. NIACHLOR SOIL SAMPLING REPORT DATED MAY 3, 1985.

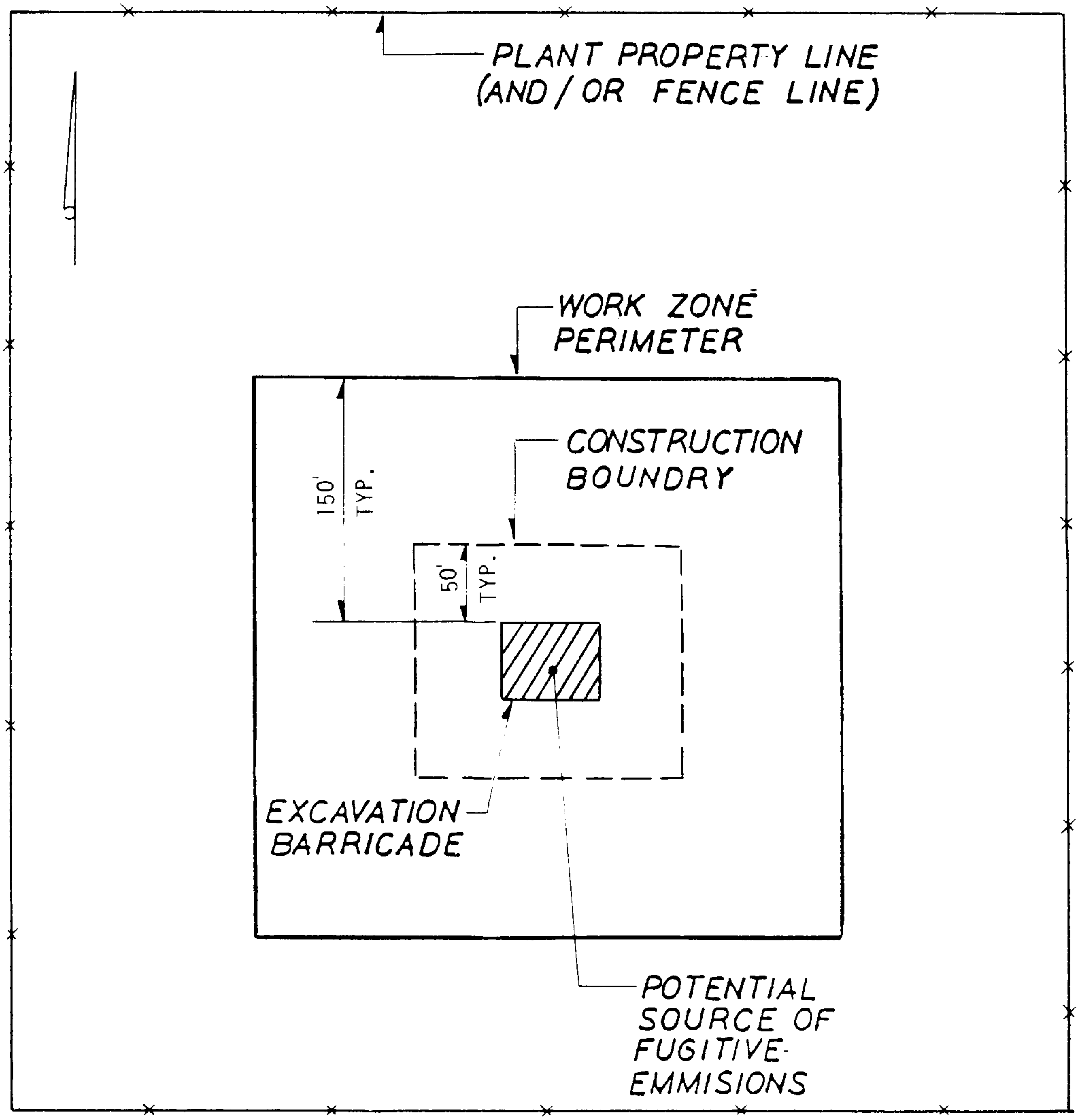
LEGEND:
- ——— PROPOSED NIACHLOR FACILITY
- ● TEST PIT LOCATION

LOCATION OF TEST PITS IN THE AREA OF KNOWN PCB CONTAMINATION
SOIL SAMPLING PROGRAM, JULY, 1985
NIACHLOR PLANT SITE
NIAGARA FALLS, NEW YORK

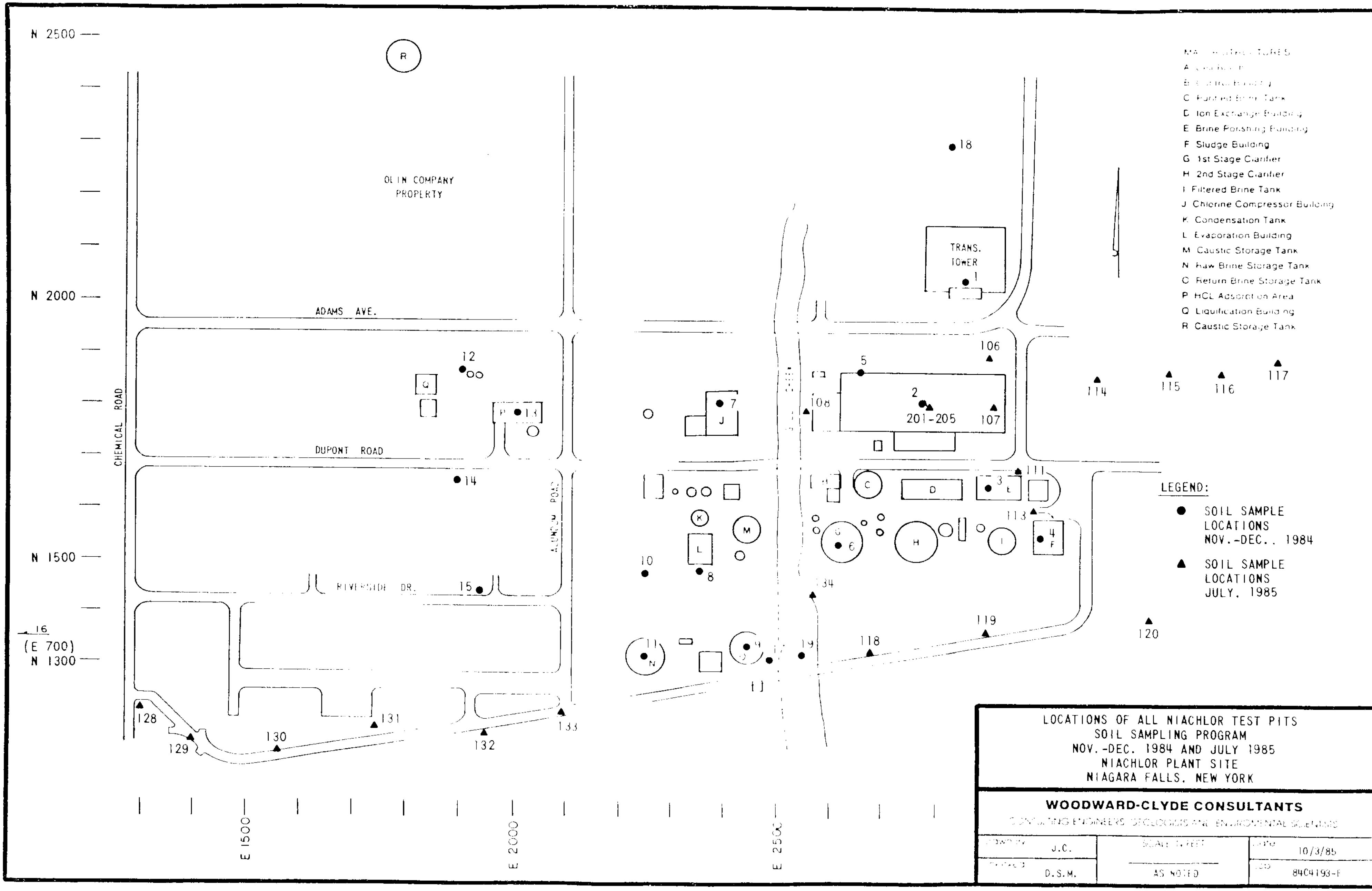
**WOODWARD-CLYDE CONSULTANTS**

| | | | |
|---|---|---|---|
| J.C. | 0 — 60 | 10/2/85 | |
| D.S.M. | | 84C4193-F | |

PLATE 2




REGIONS FOR PLANT EXCAVATION WORK
SOIL SAMPLING PROGRAM, JULY, 1985
NIACHLOR PLANT SITE
NIAGARA FALLS, NEW YORK



N 2500
N 2000
N 1500
N 1300
(E 700)
16
E 1500
E 2000
E 2500
OLIN COMPANY PROPERTY
ADAMS AVE.
DUPONT ROAD
CHEMICAL ROAD
RIVERSIDE DR.
TRANS. TOWER
C Purified Brine Tank
D Ion Exchange Building
E Brine Polishing Building
F Sludge Building
G 1st Stage Clarifier
H 2nd Stage Clarifier
I Filtered Brine Tank
J Chlorine Compressor Building
K Condensation Tank
L Evaporation Building
M Caustic Storage Tank
N Raw Brine Storage Tank
O Return Brine Storage Tank
P HCL Adsorption Area
Q Liquification Building
R Caustic Storage Tank
LEGEND:
SOIL SAMPLE LOCATIONS NOV.-DEC., 1984
SOIL SAMPLE LOCATIONS JULY, 1985
201-205
LOCATIONS OF ALL NIACHLOR TEST PITS
SOIL SAMPLING PROGRAM
NOV.-DEC. 1984 AND JULY 1985
NIACHLOR PLANT SITE
NIAGARA FALLS, NEW YORK
WOODWARD-CLYDE CONSULTANTS
J.C.
D.S.M.
AS NOTED
10/3/85
84C4193-F


PLATE 4

# Appendix A

# HEALTH AND SAFETY PLAN

| | |
|---|---|
| PROJECT NUMBER: | 84C4193-E |
| PROJECT NAME: | Niachlor Plant Site<br>Niagara Falls, NY<br>Soil Sampling |
| PROJECT MANAGER: | Jeffrey C. Evans, Ph.D., P.E. |

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## INTRODUCTION

This safety plan establishes guidelines and requirements for worker safety during conduct of field and laboratory (geotechnical) work associated with the referenced project. Employees of Woodward-Clyde Consultants (WCC) and DuPont's subcontractors are required to read the plan and sign the compliance agreement attached to the plan.

## SITE DESCRIPTION

The proposed Niachlor plant site is located at the DuPont Niagara Plant in Niagara Falls, New York. A variety of compounds have been handled at the project site. All soil sampling in this phase of the investigation will be performed on DuPont Property within the boundaries of the Niagara Plant.

## WORK DESCRIPTION

Work to be performed by WCC and DuPont's subcontractors includes excavation of shallow test pits (3-4 feet) and soil sampling. Soil samples will be collected and analyzed for indicator parameters.

## HAZARD ASSESSMENT

The primary hazard associated with scheduled field and laboratory work is exposure to volatile compounds. The known organic compounds present at the site, based on November 27 through December 5, 1984, soil samplings are listed in Table 1.

The primary routes of exposure for PCBs are skin contact and inhalation. Therefore, good personal hygiene, skin protection (Tyvek, boots, gloves) and strict adherence to decontamination procedures are most important. Respirators will also be required for these test pits as an added precaution against dust inhalation.

## GENERAL HEALTH AND SAFETY REQUIREMENTS

1. Before commencing field or laboratory work, all WCC personnel must take a WCC-approved medical examination. This requirement is waived for individuals who have taken the examination during the past 12 months. Subcontractors performing work at the project site are urged to provide a similar examination for their employees.

2. The Site Safety Officer shall hold a meeting of all field personnel (including subcontractor personnel assigned to field work) before work commences. During the meeting, all personnel shall be provided with a copy of this safety plan; the plan shall be reviewed and discussed and questions answered; and the use, fit testing, and care of respirators demonstrated. Signed compliance Agreement forms shall be collected by the Project Manager and filed. Individuals refusing to sign the form should not be allowed to work on the project.

3. The personal protective equipment specified in this plan must be provided to all field personnel. Because respirators are specified, personnel shall be informed that facial hair that interferes with proper fit of respirators must be removed.

4. All field personnel must inform the Site Safety Officer before entering the work site. At least two members of the field crew must be on site whenever work is to be performed.

5. A project safety log should be used to record entry and exit dates and times of all WCC and subcontractor personnel and of project site visitors; accidents, injuries, and illnesses, incidences of safety infractions by field personnel; air quality and personal exposure monitoring data; and other safety related matters.

6. Smoking, eating, and drinking shall not be permitted on the site.

7. Whenever possible, field personnel should work from a position upwind of test pit excavations.

8. Because the work will be performed in month of July, heat stress will be an important factor in safety. Heat stress symptoms may occur at any level of protection; and depending on temperature and humidity of the air there could be work shut down and resting periods at specific time intervals.

MAXIMUM WEAR/WORK TIME IN FULLY ENCAPSULATING OR SEALED BARRIER PROTECTIVE GARMENT

| Ambient Temperature | Maximum Wearing Time (hr) |
|---|---|
| Above 90°F | 0.25 |
| 85° - 90°F | 0.50* |
| 80° - 85°F | 1.00* |
| 70° - 80°F | 1.50 |
| 60° - 70°F | 2.00 |
| 50° - 60°F | 3.00 |
| 30° - 50°F | 5.00 |
| Below 30°F | 8.00 |

* Anticipated temperatures during field investigations

WCC will developed a work/set schedule for Level C using this information for guidance, as heat stress may be encountered due to expected climatic conditions. In order to reduce the chances for heat stress when field conditions require Level C protection, a rest period of 15 minutes outside the construction boundary will be required when the maximum wearing time has been reached.

## DECONTAMINATION PROCEDURES

There will be a Personnel Decontamination Station provided and controlled by DuPont-Olin at the site. Eyewash stations must be provided by the excavation contractor at each site where such operations are underway. It is important to remove immediately any toxic, caustic, or corrosive materials that may contact the body during the field investigation. Disposable garments provide cleanliness but are easily damaged and should be examined frequently for tears. Contaminated garments should be disposed in accordance with DuPont-Olin procedures. In the decontamination station there will be separate buckets of detergent solutions for cleaning of boots and gloves. Also other buckets should be available for rinsing chemicals off the skin.

## PROTECTIVE EQUIPMENT

Protective equipment for field personnel is listed below.

1. Hardhat (must be worn by all personnel working with heavy equipment or as required by the site operator).

2. Safety goggles or glasses (must be worn by all personnel working with heavy equipment or as required by the site operator).

3. Neoprene or viton waterproof gloves will be worn by all project personnel engaged in excavating or sampling at the site.

4. Boots, steel-toed and waterproof (must be worn by all project personnel while on the site).

5. Polycoated Tyvek (i.e. Syran Tyvek) and if conditions are wet, waterproof pants (must be worn by all personnel engaged in excavating and sampling).

6. Scott Respirators, half-mask, with Scott organic vapor cartridges No. 642-OA, or equivalent.

## RESPIRATOR PROGRAM

### DESCRIPTION

The Scott Twin Cartridge Respirator or equivalent, (hereafter called Respirator), consists of a facepiece with a pair of chemical cartridges, filters or cartridges/filter combinations as required by the specific protection needed.

The facepiece may be either a full facepiece (Model 65), providing eye protection in addition to respiratory protection, or a half facepiece (Model 64).

### LIMITATIONS AND WARNINGS

All personnel will read and understand respirator instructions, the complete respirator label and the IMPORTANT WARNINGS packaged with each type of cartridge. Twin Cartridge Respirators SHALL NOT be used for fire fighting.

Cartridges or filters DO NOT SUPPLY OXYGEN. Do not use in atmospheres containing less than 19.5 percent oxygen by volume.

DO NOT use where the contamination level is immediately dangerous to life or health.

Respirators labeled for protection against airborne particles only will not be used for gases/vapors. Respirators labeled for protection against gases/vapors only should not be used for airborne particles.

A respirator must be properly fitted to the individual to ensure proper protection. Fit testing will be performed by WCC's Health & Safety Officer.

Respirators will not be worn when conditions such as a growth of beard, sideburns, a skull cap or temple pieces on corrective glasses prevent a good face seal with either the full or half facepiece.

Contact lenses will not be worn while wearing a respirator.

If you sense any of the following danger signals, IMMEDIATELY GET INTO FRESH AIR. (Your cartridge or filter may be used up, or abnormal conditions may be creating vapor concentrations which are beyond the limit of your respirator):

- o you smell or taste chemicals, or if your eyes, nose, or throat become irritated;
- o it becomes difficult to breathe;
- o the air you are breathing becomes uncomfortably warm;
- o you fell like vomiting or become dizzy.

**FACEPIECE FITTING**

A. Qualitative Leak Check:

1. Attach organic vapor cartridges.
2. Use Scott Fit-Chek ampoules, or equal, and follow instructions on ampoule carton.
3. Should any leakage be noted:
   a. Retighten headstraps.
   b. Check condition of exhalation valve and seat. Repair if required.

In the event the facepiece CANNOT be adjusted so there is no leakage, DO NOT ENTER THE AREA REQUIRING PROTECTION. Due to particular facial features, a different style or size Scott face piece may be required to obtain a proper fit.

B. Negative Leak Check:

1. Adjust the facepiece without cartridges or filters attached, by pulling or extending the upper and lower headstraps.

2. After facepiece has been adjusted, close off both inlet connections using palms of hands. Do not apply too much pressure; otherwise the facepiece might become distorted and cause leakage.

3. Inhale slowly and hold breath momentarily. No leakage should be detected and the facepiece should be drawn slightly onto the face.

4. Should any leakage be noted:

   a. Retighten headstraps.

   b. Check conditions of exhalation valve and seat.

In the event the facepiece CANNOT be adjusted so there is no leakage, DO NOT ENTER THE AREA REQUIRING PROTECTION. Due to your particular facial features, a different style respirator may be required to obtain a proper fit.

EMERGENCIES

In the event of a major accident or life-threatening situation, the WCC Site Safety Officer shall contact DuPont, who will contact appropriate local emergency response crews. Personnel not required to assist must move to a safe area. The Site Safety Officer must notify the Health and Safety Officer (Robert Ehlenberger) and EOG Health and Safety Officer (Michael Barboza).

Illnesses and minor injuries occurring on-site or in the laboratory must be reported to the Project Manager and attended to immediately. On-site personnel will be briefed by DuPont concerning emergency procedures.

The telephone numbers and locations of local emergency services are given below.

| Emergency Service | Location | Number |
|---|---|---|
| **Police Department** | 520 Hyde Park Blvd.<br>Niagara Falls, New York | **278-8111** |
| **Fire Department** | 520 Hyde Park Blvd.<br>Niagara Falls, New York | **285-1233** |
| **Ambulance Service** | 452 19th<br>Niagara Falls, New York | **284-4228** |
| **Hospital** | Niagara Falls Memorial Medical Center<br>621 10th<br>Niagara Falls, New York | **278-4000** |

## PROJECT PERSONNEL

Personnel authorized to work on this site are:

Jeffrey C. Evans, Project Manager, WCC Site Safety Officer, WCC Field Geologist
Michael Barboza, Eastern Operating Group Health and Safety Officer
Robert Ehlenberger, Plymouth Meeting Health and Safety Officer

Also authorized to enter and work on the site are specified employees of DuPont - Olin and authorized subcontractors.

## PROJECT SAFETY PERSONNEL

Personnel responsible for implementing this safety plan are the Project Manager and Site Safety Officer. Their specific responsibilities and authority are described in the WCC Hazardous Waste Health and Safety Manual.

## SAFETY PLAN APPROVALS

---

Michael Barboza, Eastern Operating Group Health and Safety Officer — Date

---

Robert C. Ehlenberger, Plymouth Meeting Office Health and Safety Officer — Date

---

Jeffrey C. Evans, Project Manager — Date

TABLE 1
TLV DATA OF CONTAMINANTS
FROM PREVIOUS SOIL SAMPLING, WHERE AVAILABLE

| Chemical Name | TLV-Time Weighted Average | TLV-Short Term Exposure Limit |
|---|---|---|
| Benzene | 10 ppm | 25 ppm |
| Gamma-Benzene Hexachloride | 0.5 $mg/m^3$ | - |
| Bromoform | 0.5 ppm | - |
| Carbon Tetrachloride | 5 ppm | 20 ppm |
| Chloroform | 10 ppm | 50 ppm |
| Cyanide | 5 $mg/m^3$ | - |
| Dichlorobenzene | 50 ppm | - |
| Dioxin | 10 $mg/m^3$ | - |
| Mercury | 0.05 $mg/m^3$ | - |
| Methylene Chloride | 100 ppm | - |
| Tetrachloroethylene | 50 ppm | 200 ppm |
| Toluene | 100 ppm | 150 ppm |
| Trichloroethylene | 50 ppm | 200 ppm |
| 1,1,2,2-Tetrachloroethane | 1 ppm | 5 ppm |
| PCB* | 1 $mg/m^3$ | 2 $mg/m^3$ |

* Threshold Limit Values are established for Arachlor 1242. There is not an established TLV for Arachlor 1248.

# Appendix B

# LOG of TEST PIT No. 106

DATE 7/25/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0–1.5 | | | Fill: Dark grey coarse to fine sandy silty GRAVEL with cinders, cobbles, brick and concrete fragments, broken glass | 0.75 | |
| 1.5–2 | | | Fill: Brown coarse to fine gravelly coarse to fine SAND and SILT with cinders, cobbles, brick fragments | 4 | |
| 2–4 | | | Fill: Dark grey coarse to fine sandy silty GRAVEL with cinders, cobbles, brick and concrete fragments, broken glass | 0 | |
| 4 | | | | 0.25 | |

Completion Depth 4 Feet Water Depth - Feet Date 7/25/85

Project Name NIACHLOR Project Number 84C4193-E

Woodward-Clyde Consultants

# LOG of TEST PIT No. 107

DATE 7/24/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| | | | Fill: Gray silty GRAVEL | | |
| 1 | | | Fill: Gray SAND and SILT | 0 | |
| | | | Fill: Brown coarse to fine sandy coarse to fine GRAVEL with cinders, broken glass, broken metal pipe. | | |
| 2 | | | | 0 | |
| 3 | | | | 0 | |
| 4 | | | | 0 | |

Completion Depth 4 Feet Water Depth - Feet Date 7/24/85

Project Name NIACHLOR Project Number 84C4193-E

Woodward-Clyde Consultants

WCC 2

# LOG of TEST PIT No. 108

DATE 7/23/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | Gray silty GRAVEL | | |
| 1 | | | Black SAND and SILT | 0 | |
| | | | Fill: Brown silty CLAY with a trace of sand | | |
| 2 | | | | 0 | |
| 3 | | | | 0 | |
| 4 | | | | 0 | |

Completion Depth 4 Feet Water Depth - Feet Date 7/23/85

Project Name NIACHLOR Project Number 84C4193-E

Woodward-Clyde Consultants

WC( 2

# LOG of TEST PIT No. 111

DATE 7/25/85 SURFACE ELEVATION ____ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | 3" Asphalt | | |
| | | | Black silty GRAVEL (asphalt base) | | |
| 1 | | | Fill: Brown grey silty coarse to fine gravelly coarse to fine SAND with Boulders, Cinders, Brick fragments | 0.80 | |
| 2 | | | | 0 | |
| 3 | | | | 0.30 | |
| 4 | | | | 0.40 | |

Completion Depth 4 Feet Water Depth - Feet Date 7/25/85

Project Name NIACHLOR Project Number 84C4193-E

Woodward-Clyde Consultants

WCC-HF 2

# LOG of TEST PIT No. 113

DATE 7/25/85 SURFACE ELEVATION ______ LOCATION See Plate

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | 2" Asphalt | | |
| | | | Concrete | | |
| 1 | | | Fill: Black silty, coarse to fine SAND and GRAVEL with Cinders, Concrete Fragments | 9 | |
| 2 | | | | 7.5 | |
| | | | Fill: Brown coarse to fine gravelly, coarse to fine sandy, clayey SILT with brick and concrete fragments | | |
| 3 | | | | 20 | |
| 4 | | | | 18 | |

Completion Depth 4 Feet Water Depth - Feet Date 7/25/85

Project Name NIACHLOR Project Number 84C4193-E

Woodward-Clyde Consultants

WCC

# LOG of TEST PIT No. 114

DATE 7/24/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | Fill: Grey-Black coarse to fine sandy coarse to fine GRAVEL with cinders, cobbles, boulders, broken glass, brick fragments | | |
| 1 | | | | 0 | |
| 2 | | | | 0 | |
| 3 | | | | 0 | |

Completion Depth 3.5 Feet Water Depth 3.5 Feet Date 7/24/85

Project Name NIACHLOR Project Number 83C4193-E

Woodward-Clyde Consultants

WCC

# LOG of TEST PIT No. 115

DATE 7/24/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | Fill: Dark gray-brown coarse to fine sandy, coarse to fine GRAVEL with cinders, cobbles, boulders, broken glass, broken pipe, brick fragments | | |
| 1 | | | | 0 | |
| 2 | | | | 0 | |
| 3 | | | | 0 | |
| | | | | 0 | |
| 4 | | | | | |

Completion Depth 3.83 Feet Water Depth 3.83 Feet Date 7/24/85

Project Name NIACHLOR Project Number 84C4193-E



WCC

# LOG of TEST PIT No. 116

DATE 7/24/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | Fill: Dark gray coarse to fine sandy, silty, coarse to fine GRAVEL with cinders, broken glass, brick and concrete fragments | | |
| 1 | | | | 0 | |
| 2 | | | | 0 | |
| 3 | | | | 0 | |

Completion Depth 3.25 Feet Water Depth 3.25 Feet Date 7/24/85

Project Name NIACHLOR Project Number 83C4193-E

Woodward-Clyde Consultants

WCC-HP 2

# LOG of TEST PIT No. 117

DATE 7/25/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | POCKET PENETROM. READING (tsf) | DESCRIPTION | ELEVATION | |
|---|---|---|---|---|---|
| 0 | | | Fill: Dark gray coarse to fine SAND and GRAVEL with cinders, brick fragments | | |
| 1 | | | Fill: Brown-red coarse to fine sandy, gravelly, clayey silt with brick fragments | 0 | |
| 2 | | | | 0.2 | |
| | | | | 4.2 | |
| 4 | | | | 0 | |
| | | | (Note: Northside of test pit from 1-4 feet contained dark gray coarse to fine SAND and GRAVEL with cinders, brick fragments, and large concrete fragments) | | |

Completion Depth 4 Feet Water Depth 4 Feet Date 7/25/85

Project Name NIACHLOR Project Number 84C4193-E

Woodward-Clyde Consultants

WCC

# LOG of TEST PIT No. 120

DATE 7/23/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | Topsoil | | |
| 1 | | | Fill: Dark gray coarse to fine sandy, silty coarse to fine GRAVEL | 0 | |
| 2 | | | Fill: Brown coarse to fine sandy SILT and CLAY | 0 | |
| 3 | | | | 0 | |
| 4 | | | | 0 | |

Completion Depth 4 Feet Water Depth - Feet Date 7/23/85

Project Name NIACHLOR Project Number 84C4193-E

Woodward-Clyde Consultants

WCC-HP 2

# LOG of TEST PIT No. 118

DATE 7/23/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | Topsoil | | |
| 1 | ■ | | Fill: Gray coarse to fine sandy, silty, coarse to fine GRAVEL | 0<br>0 | |
| 2–4 | ■ | | Fill: Brown coarse to fine gravelly, coarse to fine sandy, clayey SILT | 0<br>0 | |

Completion Depth 4 Feet Water Depth - Feet Date 7/23/85

Project Name NIACHLOR Project Number 83C4193-E

Woodward-Clyde Consultants

# LOG of TEST PIT No. 119

DATE 7/23/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | Topsoil | | |
| 1 | | | Fill: Dark gray coarse to fine gravelly, sandy, clayey SILT | 0 | |
| 2 | | | Fill: Gray coarse to fine sandy, silty, coarse to fine GRAVEL | 0 | |
| 3 | | | Fill: Brown coarse to fine sandy SILT and CLAY | 2 | |
| 4 | | | | 5 | |

Completion Depth 4 Feet Water Depth 4 Feet Date 7/23/85

Project Name NIACHLOR Project Number 84C4193-E

Woodward-Clyde Consultants

WC( 2

# LOG of TEST PIT No. 128

DATE 7/19/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0–1 | | | Fill: Gray-black silty, sandy GRAVEL with wood, concrete, and brick fragments, broken pipe | 0 | |
| 1–2 | | | Fill: Brown gravelly, sandy SILT with wood, concrete, and brick fragments | 0 | |
| 2–3 | | | Fill: Black sandy SILT with cinders, brick fragments | 0 | |
| 3–4 | | | Fill: Red-brown sandy SILT with brick fragments | 0 | |

Completion Depth 4 Feet Water Depth - Feet Date 7/19/85

Project Name NIACHLOR Project Number 84C4193-E

Woodward-Clyde Consultants

WCC

# LOG of TEST PIT No. 129

DATE 7/19/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) |
|---|---|---|---|
| 0 | | 10" Asphalt | |
| 1 | | Fill: Dark gray silty, sandy GRAVEL (asphalt base) | 40 |
| 2 | | Tan-dark gray mottled coarse to fine gravelly, sandy SILTY CLAY | 4 |
| 3 | | | 3 |
| 4 | | | 1 |

Completion Depth 4 Feet Water Depth - Feet Date 7/19/85

Project Name NIACHLOR Project Number 84C4193-E

Woodward-Clyde Consultants

WC 2

# LOG of TEST PIT No. 130

DATE 7/22/85 SURFACE ELEVATION ____ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | 4" Asphalt | | |
| | | | Fill: Dark gray silty, sandy GRAVEL (asphalt base) | | |
| 1 | | | Beige-brown coarse to fine gravelly, sandy SILTY CLAY | 0 | |
| 2 | | | | 0 | |
| 3 | | | | 0 | |
| 4 | | | | 0 | |

Completion Depth 4 Feet Water Depth - Feet Date 7/19/85

Project Name NIACHLOR Project Number 84C4193-E

Woodward-Clyde Consultants

NCC

# LOG of TEST PIT No. 131

DATE 7/22/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) |
|---|---|---|---|---|
| 0 | | | 4" Asphalt | |
| | | | Dark gray silty, sandy GRAVEL (Asphalt Base) | 0 |
| 1 | | | Fill: Dark gray gravelly, sandy SILT with cinders, glass, brick fragments | 0 |
| 2 | | | Beige-brown coarse to fine gravelly, sandy SILTY CLAY | 0 |
| 3 | | | | |
| 4 | | | | 0 |

Completion Depth 4 Feet Water Depth - Feet Date 7/22/85

Project Name NIACHLOR Project Number 84C4193-E

Woodward-Clyde Consultants

VCC-

# LOG of TEST PIT No. 132

DATE 7/22/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | 4" Asphalt | | |
| | | | Fill: Dark gray silty, sandy GRAVEL (asphalt base) | | |
| 1 | | | | 0 | |
| | | | Beige-brown coarse to fine gravelly, sandy SILTY CLAY | | |
| 2 | | | | 0 | |
| 3 | | | | 0 | |
| 4 | | | | 0 | |

Completion Depth 4 Feet Water Depth - Feet Date 7/22/85

Project Name NIACHLOR Project Number 84C4193-E

**Woodward-Clyde Consultants**

WCC

# LOG of TEST PIT No. 133

DATE 7/22/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | 4" Asphalt | | |
| | | | Fill: Dark gray silty sandy GRAVEL | | |
| 1 | | | | 0 | |
| | ■ | | Beige-brown coarse to fine gravelly, sandy SILTY CLAY | | |
| 2 | ■ | | | 0 | |
| 3 | ■ | | | 0 | |
| 4 | ■ | | | 4 | |

Completion Depth 4 Feet Water Depth - Feet Date ______

Project Name NIACHLOR Project Number 84C4193-E

Woodward·Clyde Consultants

NCC...

# LOG of TEST PIT No. 134

DATE 7/23/85 SURFACE ELEVATION ______ LOCATION See Plate 1

| DEPTH, ft. | SAMPLES | | DESCRIPTION | HEAD SPACE ANALYSIS (ppm) | |
|---|---|---|---|---|---|
| 0 | | | Fill: Gray sandy, silty GRAVEL | | |
| 1 | | | | 0 | |
| 2 | | | | 0 | |
| 3 | ■ | | | 0 | |
| 3 | ■ | | Fill: Gray-brown coarse to fine sandy, silty, coarse to fine GRAVEL | | |
| 4 | | | | 0 | |
| 5 | | | | 0 | |
| 6 | | | | 0 | |
| 6 | | | Fill: Gray-brown coarse to fine sandy, silty, coarse to fine GRAVEL | | |
| 7 | ■ | | | 0 | |
| 8 | | | | | |

Completion Depth 8 Feet Water Depth 8 Feet Date 7/23/85

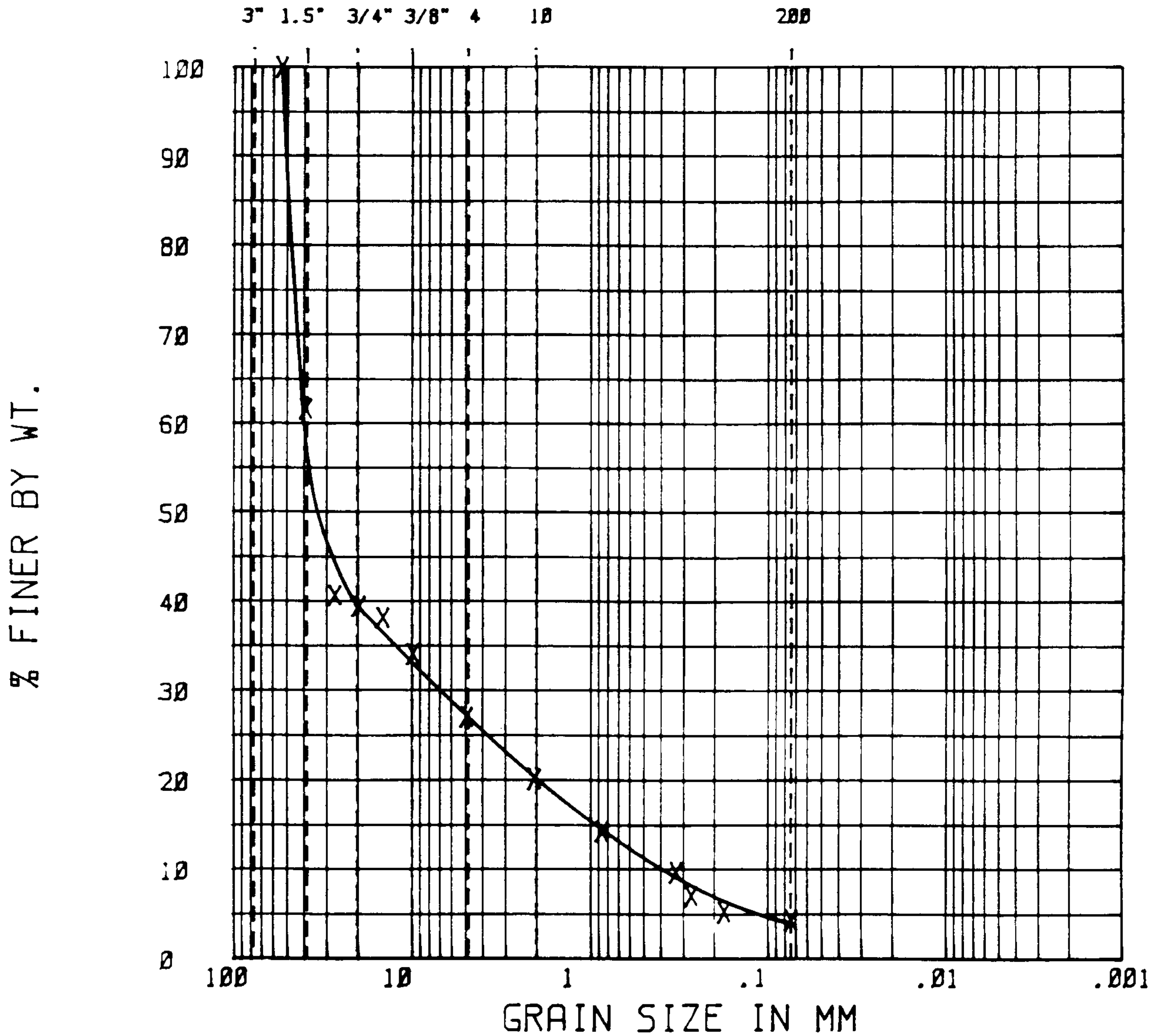
Project Name NIACHLOR Project Number 84C4193-E

**Woodward-Clyde Consultants**

WCC

# Appendix C

# WOODWARD-CLYDE CONSULTANTS
## PLYMOUTH MEETING LAB

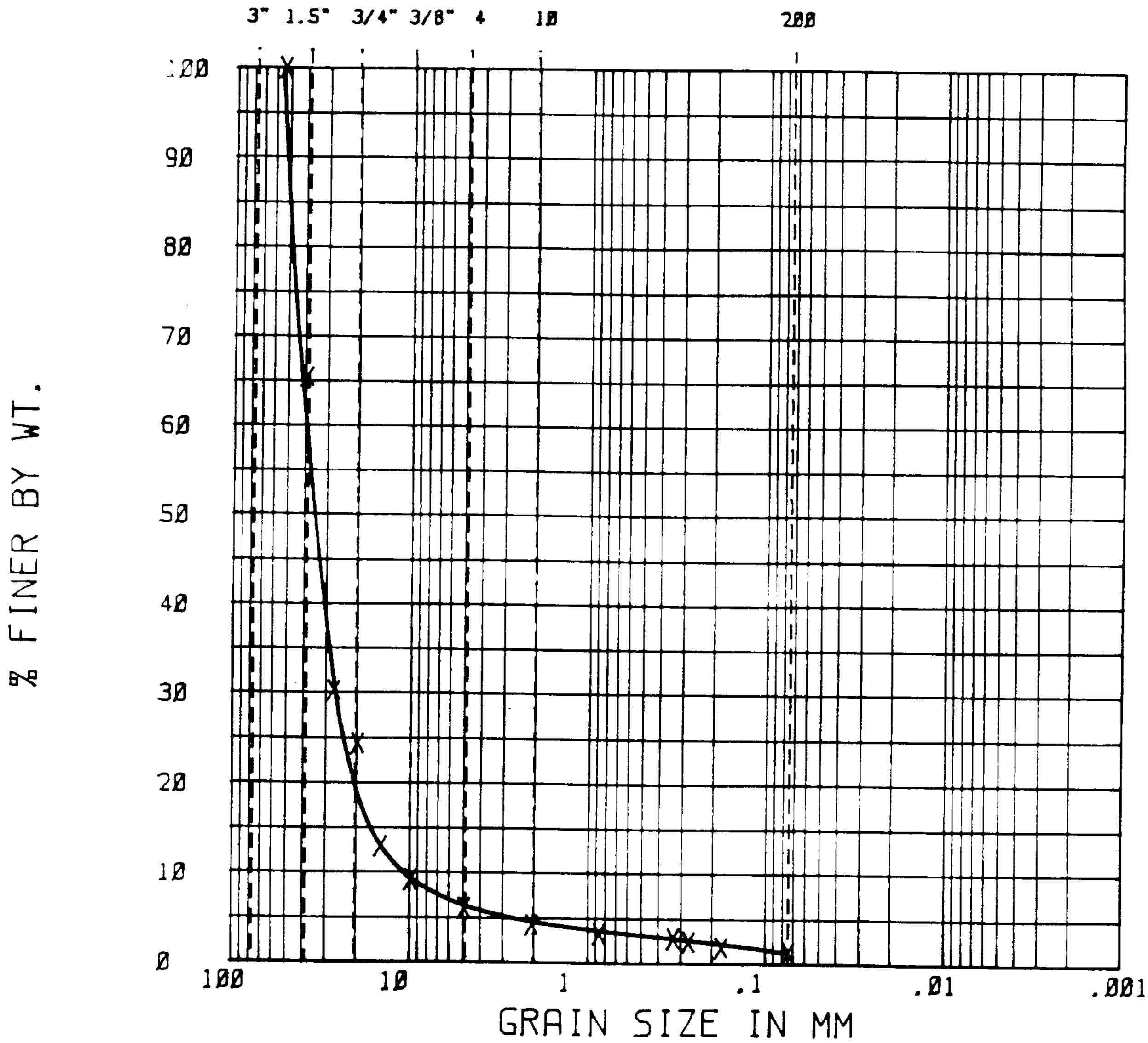



JOB NUMBER :84C4193E

---

BORING NO. : TP-106 SAMPLE NO. : S-1
DEPTH : SYMBOL : X
MC : 8.59 LL : PL :
CLASS :Dark grey cse-fine sandy cse-fine gravel trace of silt

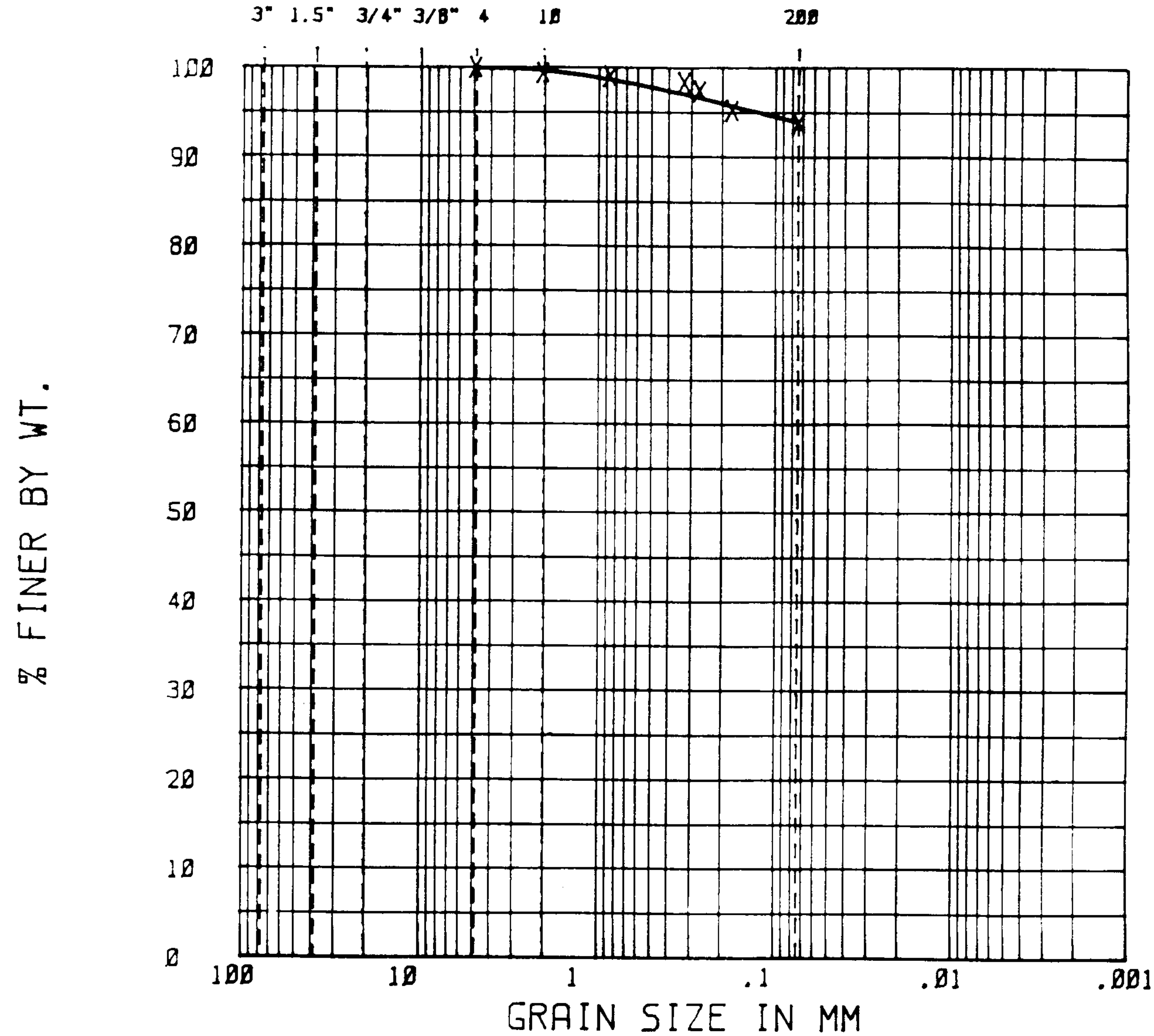
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-107
SAMPLE NO. : S-1
DEPTH :
SYMBOL : X
MC : 2.04
LL :
PL :
CLASS :Light brown cse-fine gravel trace of sand

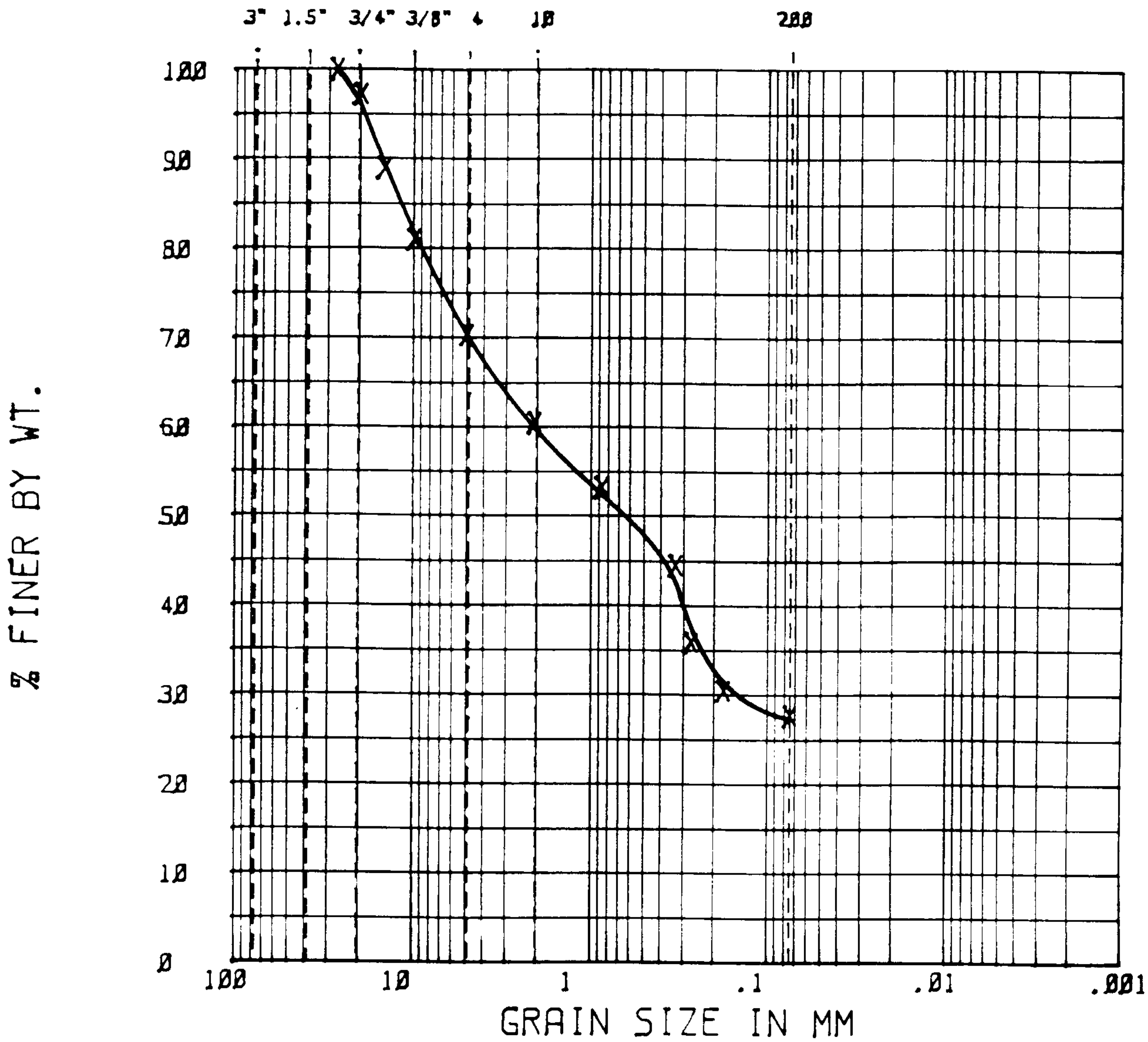
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-108
SAMPLE NO. : S-1
DEPTH :
SYMBOL : X
MC : 19.36
LL :
PL :
CLASS :Light brown clayey silt trace of fine sand

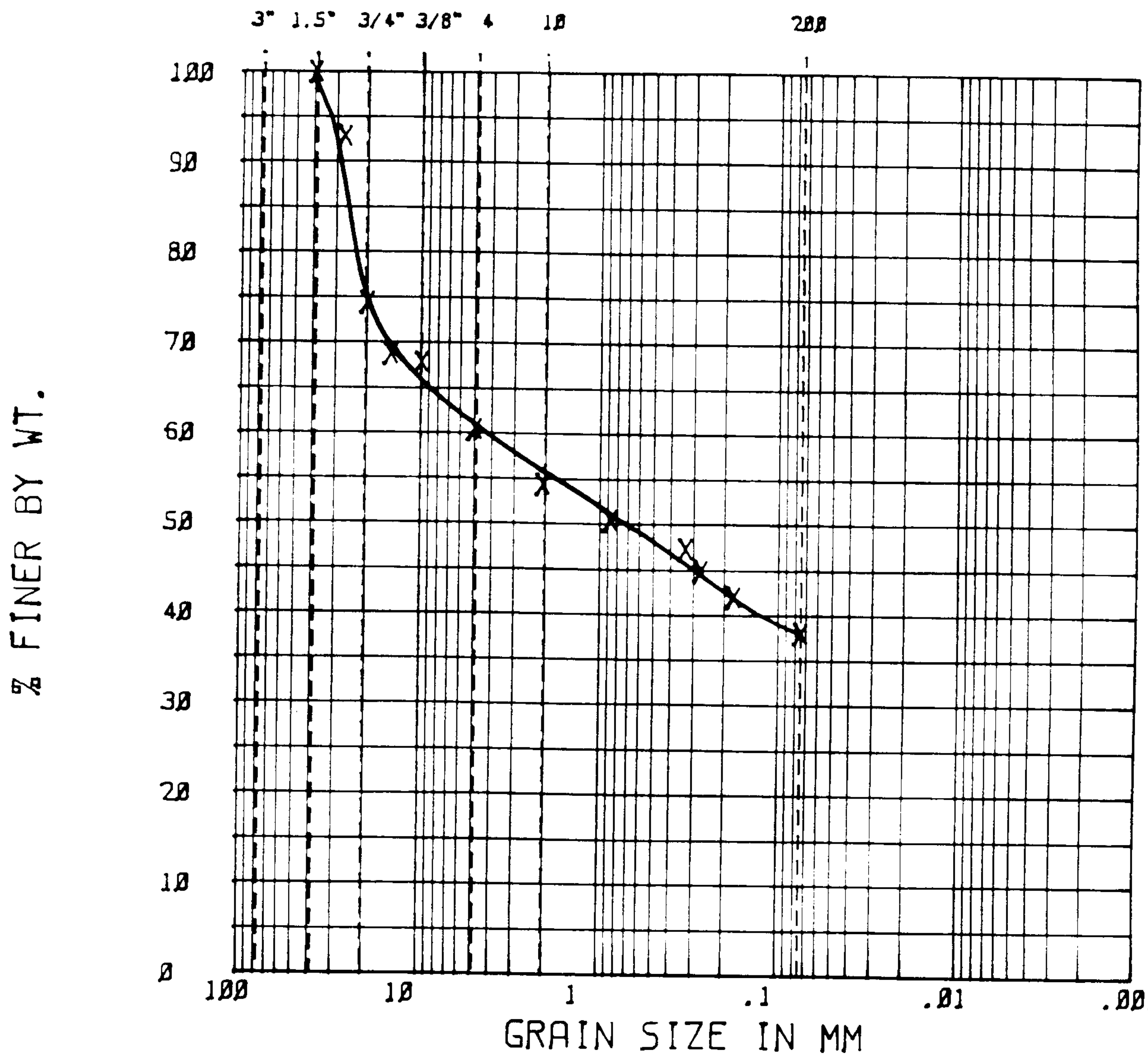
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER : 84C4193E

BORING NO. : TP-111
SAMPLE NO. : S-1
DEPTH :
SYMBOL : X
MC : 10.35
LL :
PL :
CLASS : Brown grey silty fine gravelly coarse to fine sand

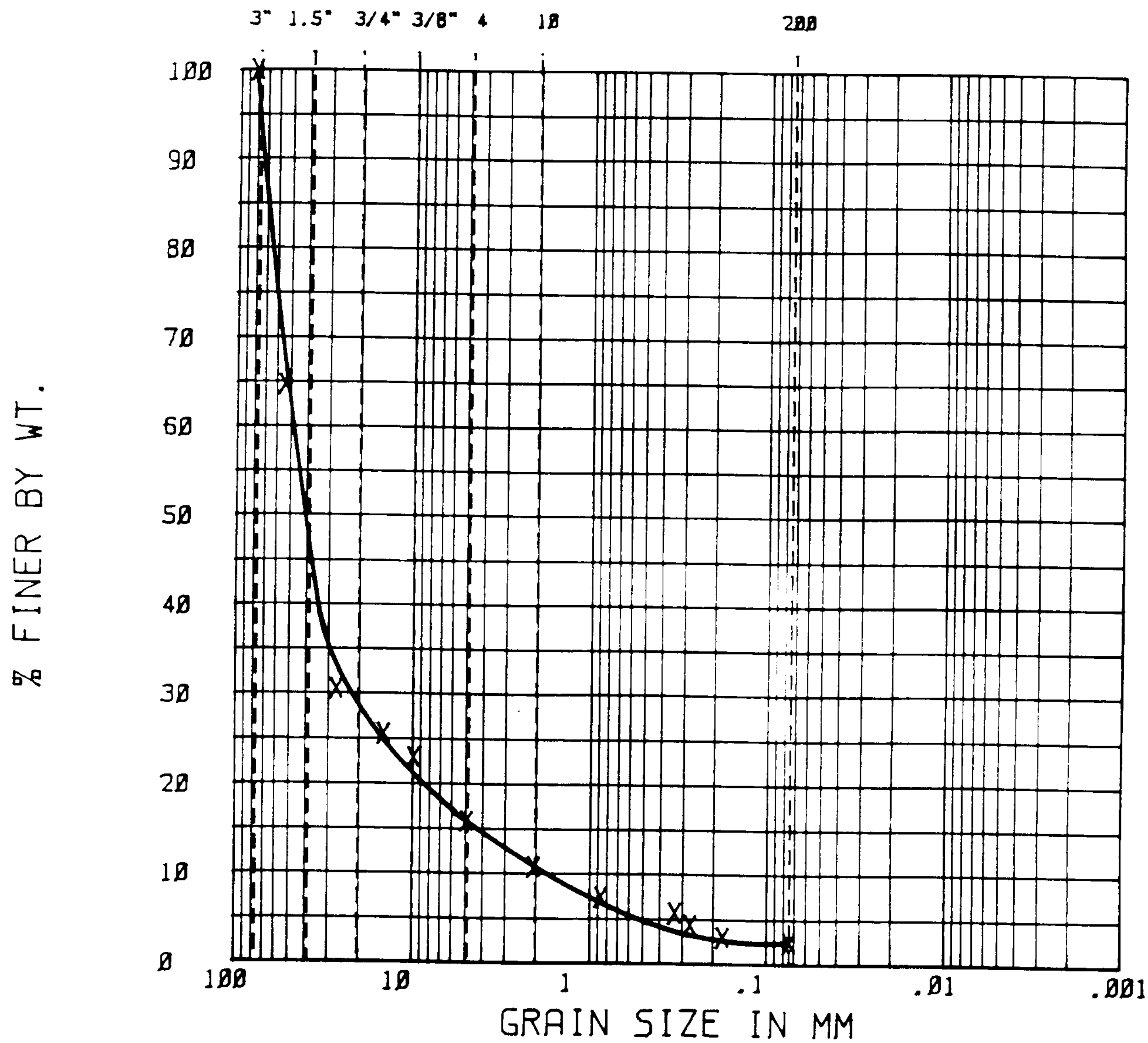
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER : 84C4193E

BORING NO. : TP-113
SAMPLE NO. : S-1
DEPTH :
SYMBOL : X
MC : 8.83
LL :
PL :
CLASS : Brown w/ black mottled cse-fine sandy silty cse-fine gravel

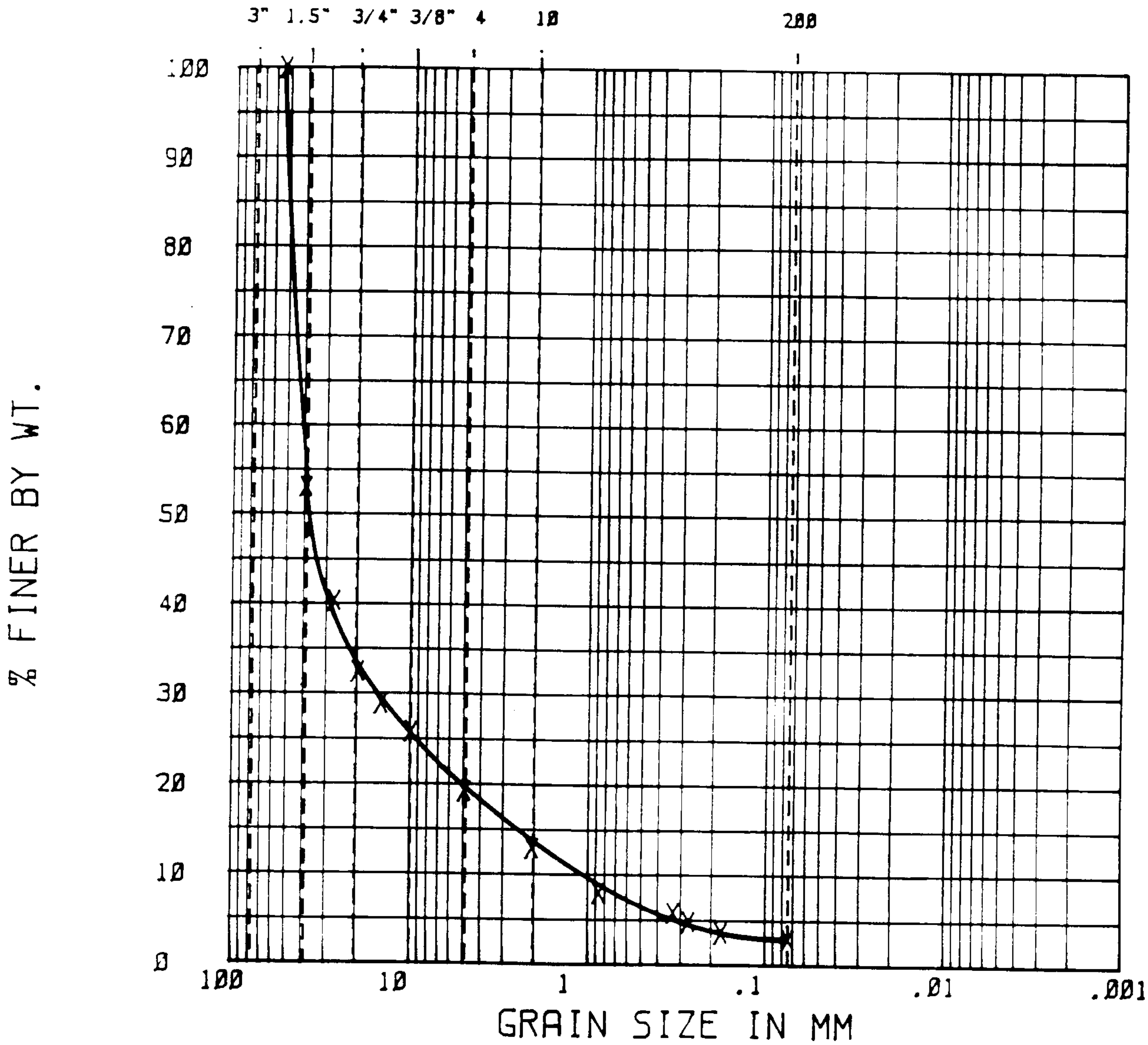
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-114
SAMPLE NO. : S-1
DEPTH :
SYMBOL : X
MC : 5.7
LL :
PL :
CLASS :Medium grey cse-fine sandy cse-fine gravel

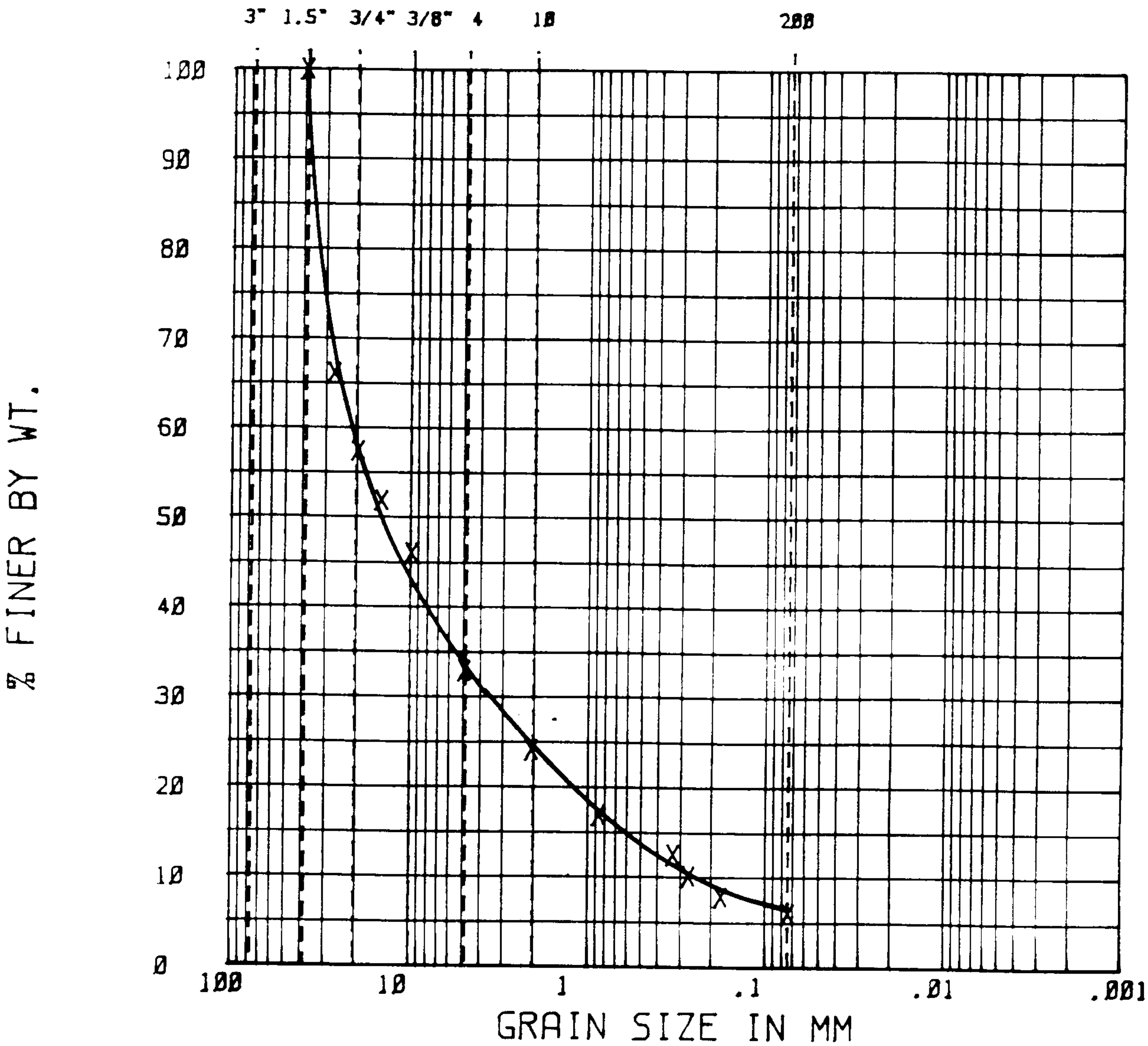
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-115 SAMPLE NO. : S-1
DEPTH : SYMBOL : X
MC : 5.92 LL : PL :
CLASS :Dark grey brown cse-fine sandy cse-fine gravel

# WOODWARD-CLYDE CONSULTANTS
## PLYMOUTH MEETING LAB

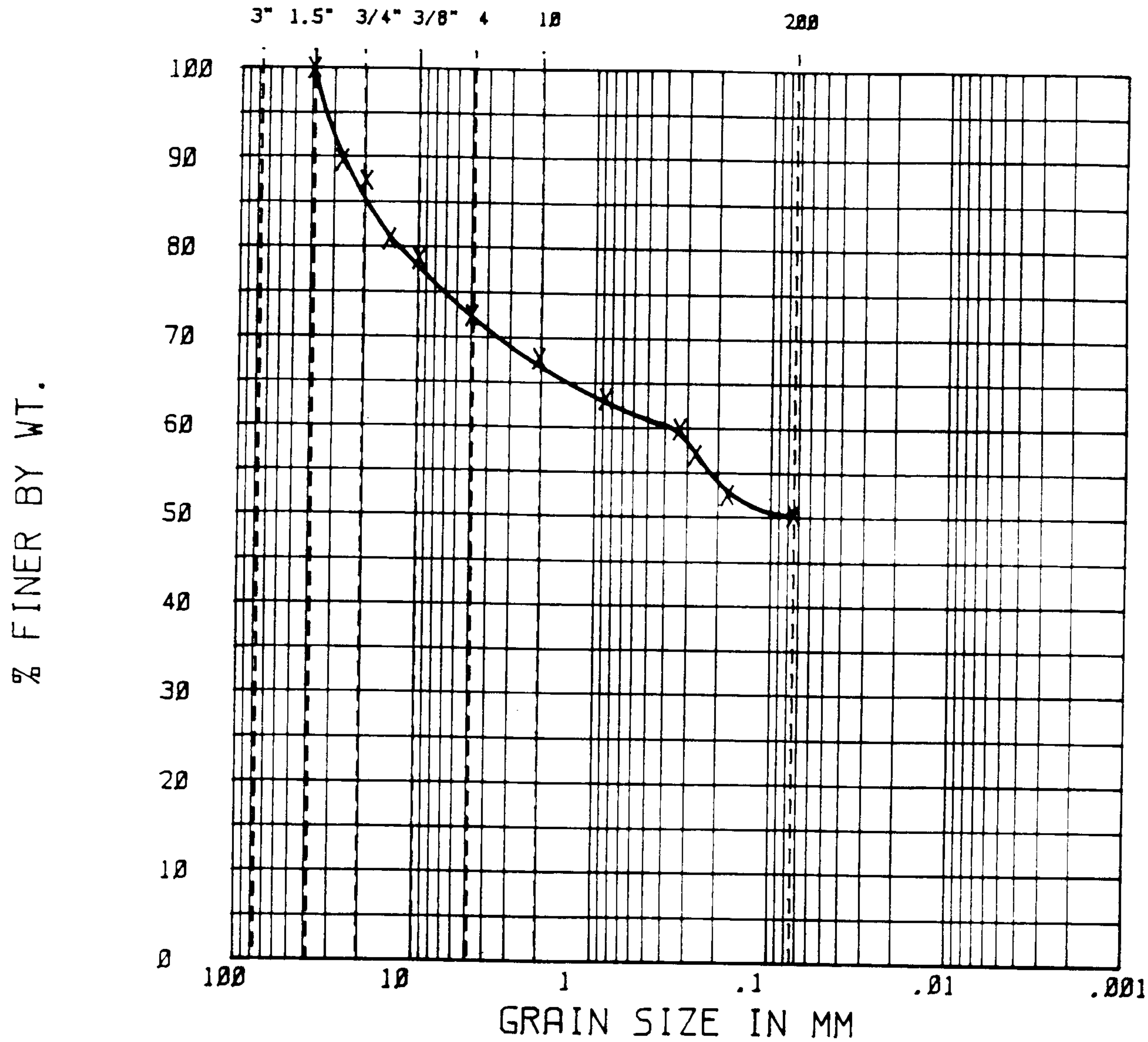



JOB NUMBER :84C4193E

---

BORING NO. : TP-116 SAMPLE NO. : S-1
DEPTH : SYMBOL : X
MC : 19.34 LL : PL :
CLASS :Dark grey cse-fine sandy cse-fine gravel trace of silt

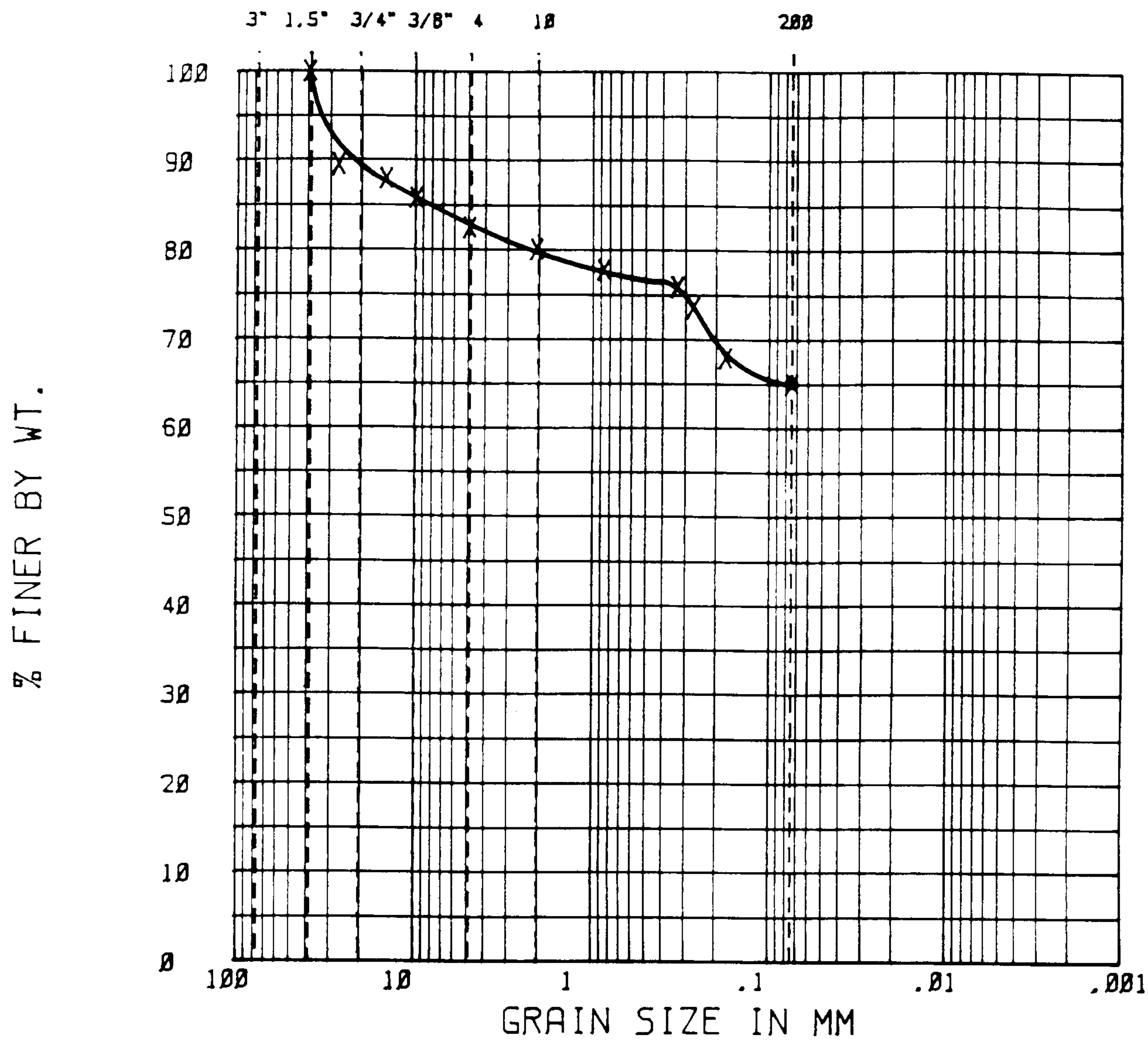
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-117
SAMPLE NO. : S-1
DEPTH :
SYMBOL : X
MC : 15.51
LL :
PL :
CLASS :Brown red cse-fine sandy cse-fine gravelly clayey silt

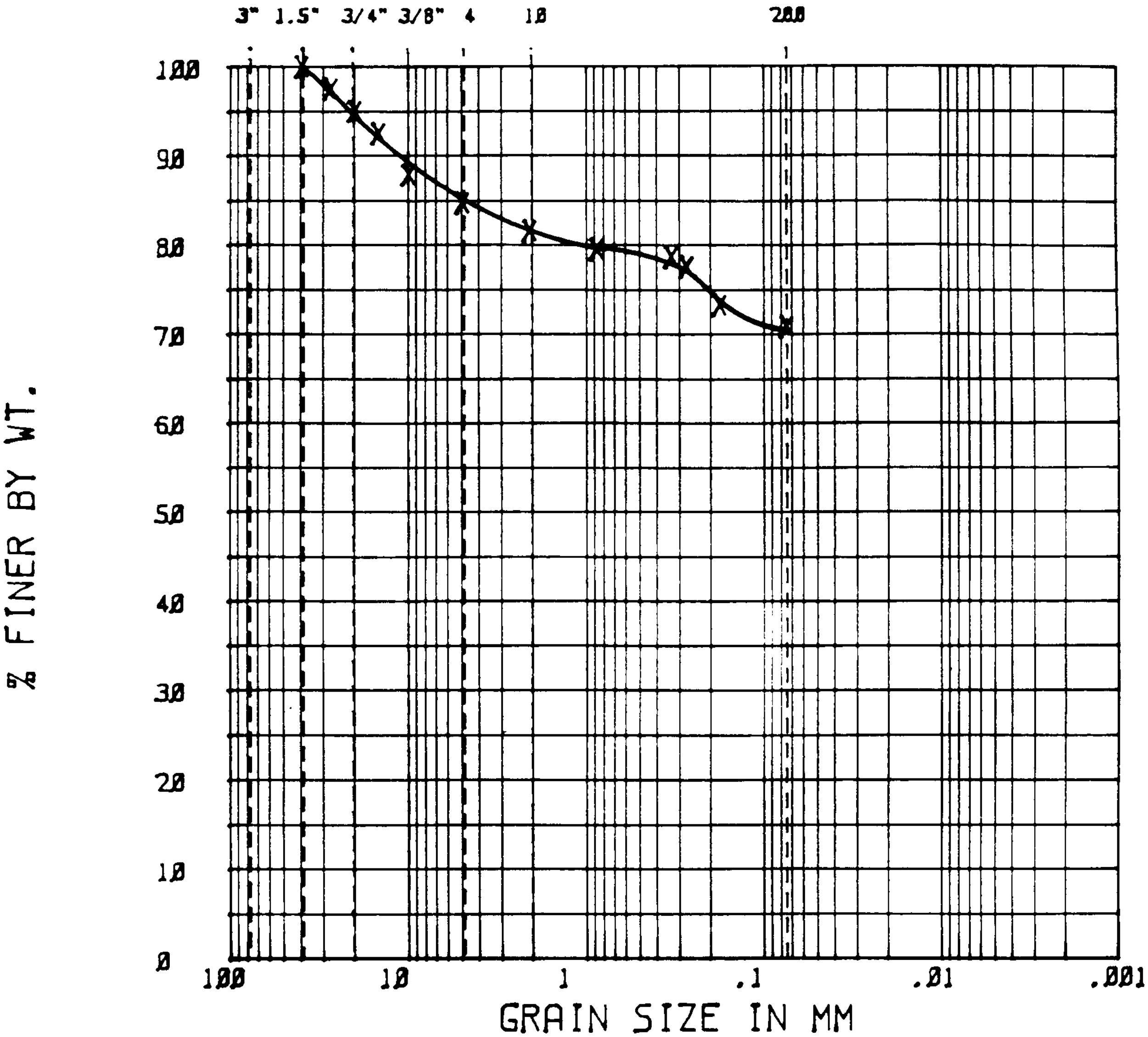
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-118 SAMPLE NO. : S-1
DEPTH : SYMBOL : X
MC : 13.98 LL : PL :
CLASS :Brown cse-fine gravelly cse-fine sandy clayey silt

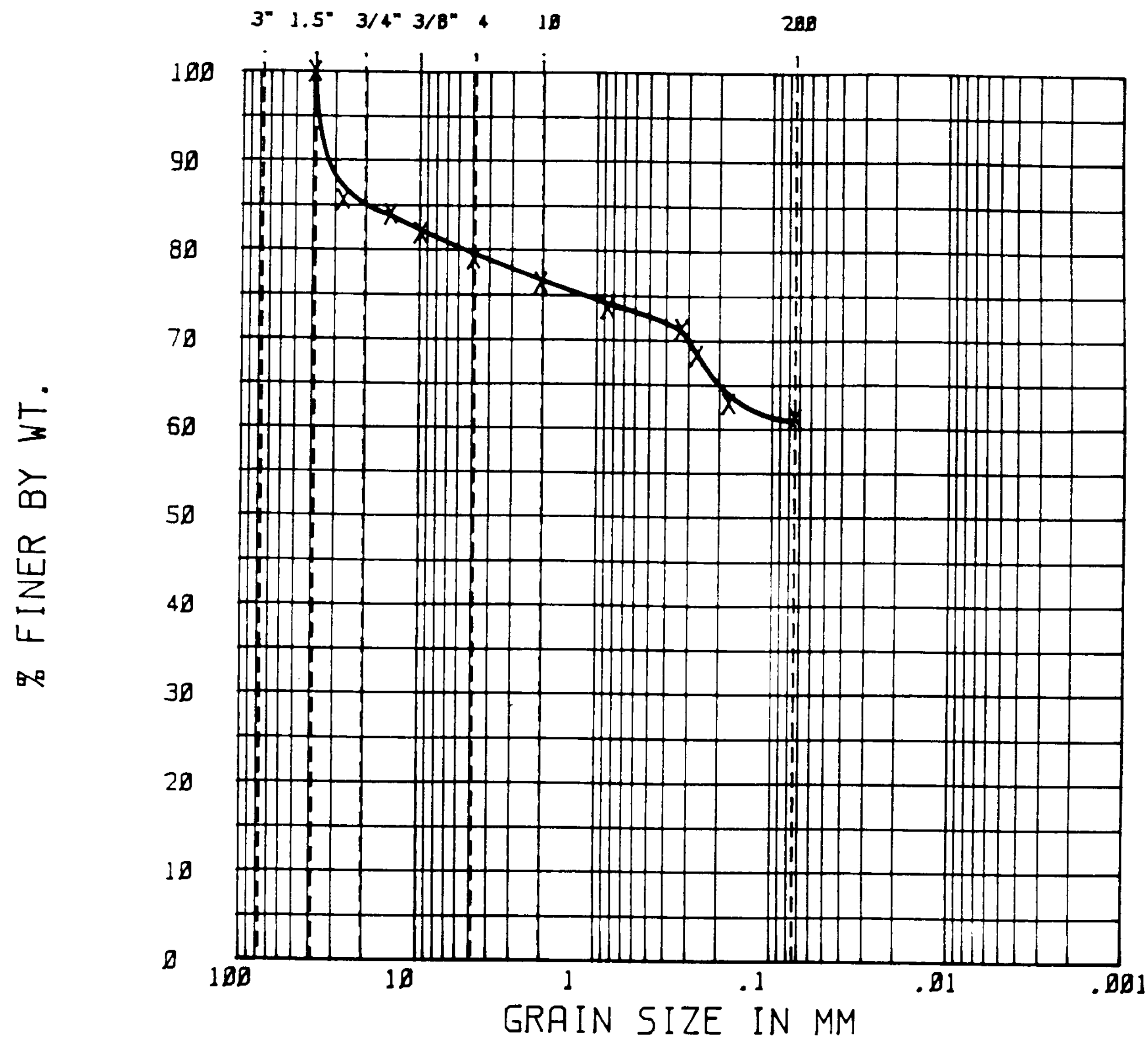
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-119
SAMPLE NO. : S-1
DEPTH :
SYMBOL : X
MC : 13.47
LL :
PL :
CLASS :Brown cse to fine sandy cse to fine gravelly clayey silt

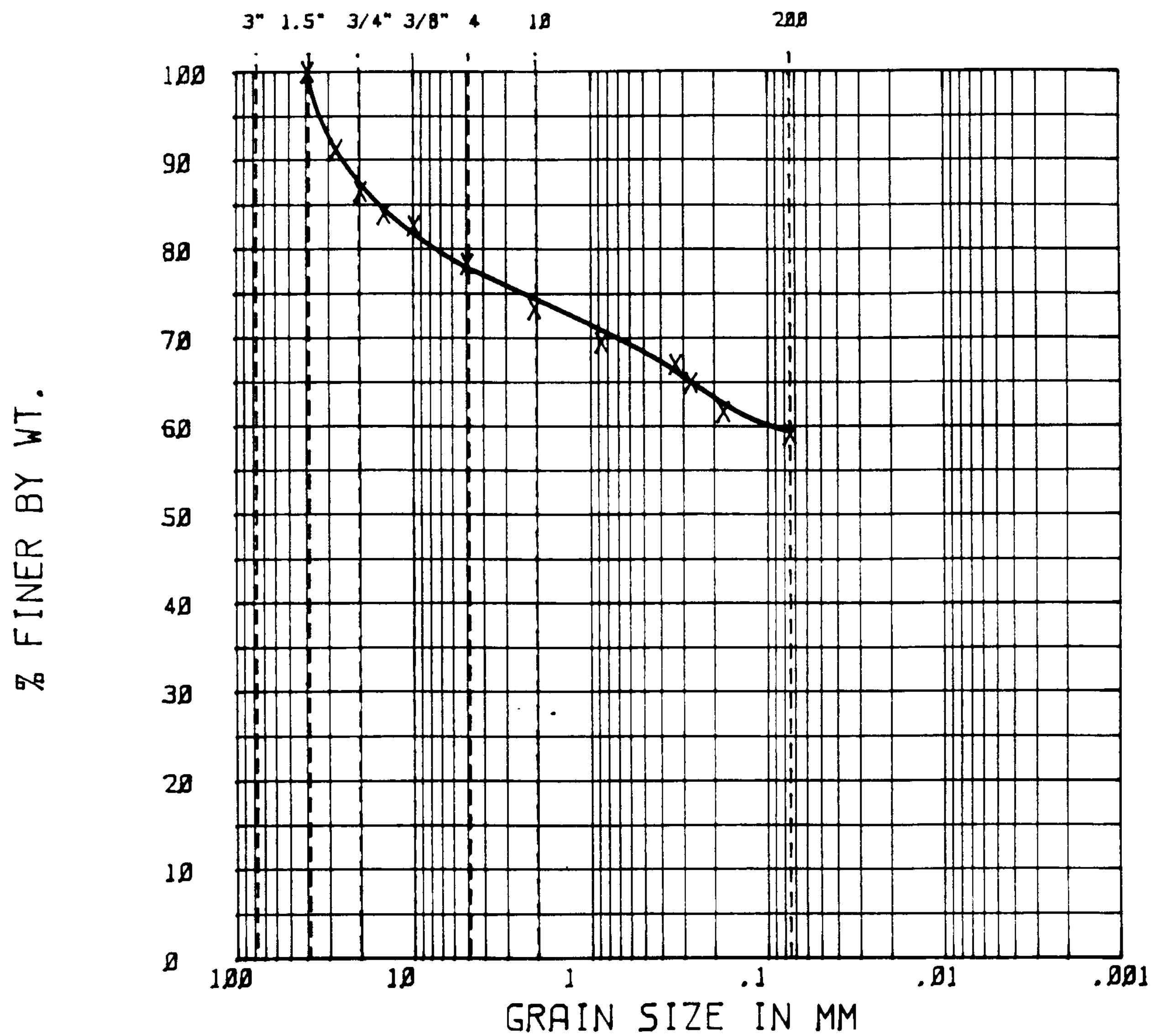
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-120
SAMPLE NO. : S-1
DEPTH :
SYMBOL : X
MC : 11.73
LL :
PL :
CLASS :Brown cse-fine sandy cse-fine gravelly clayey silt

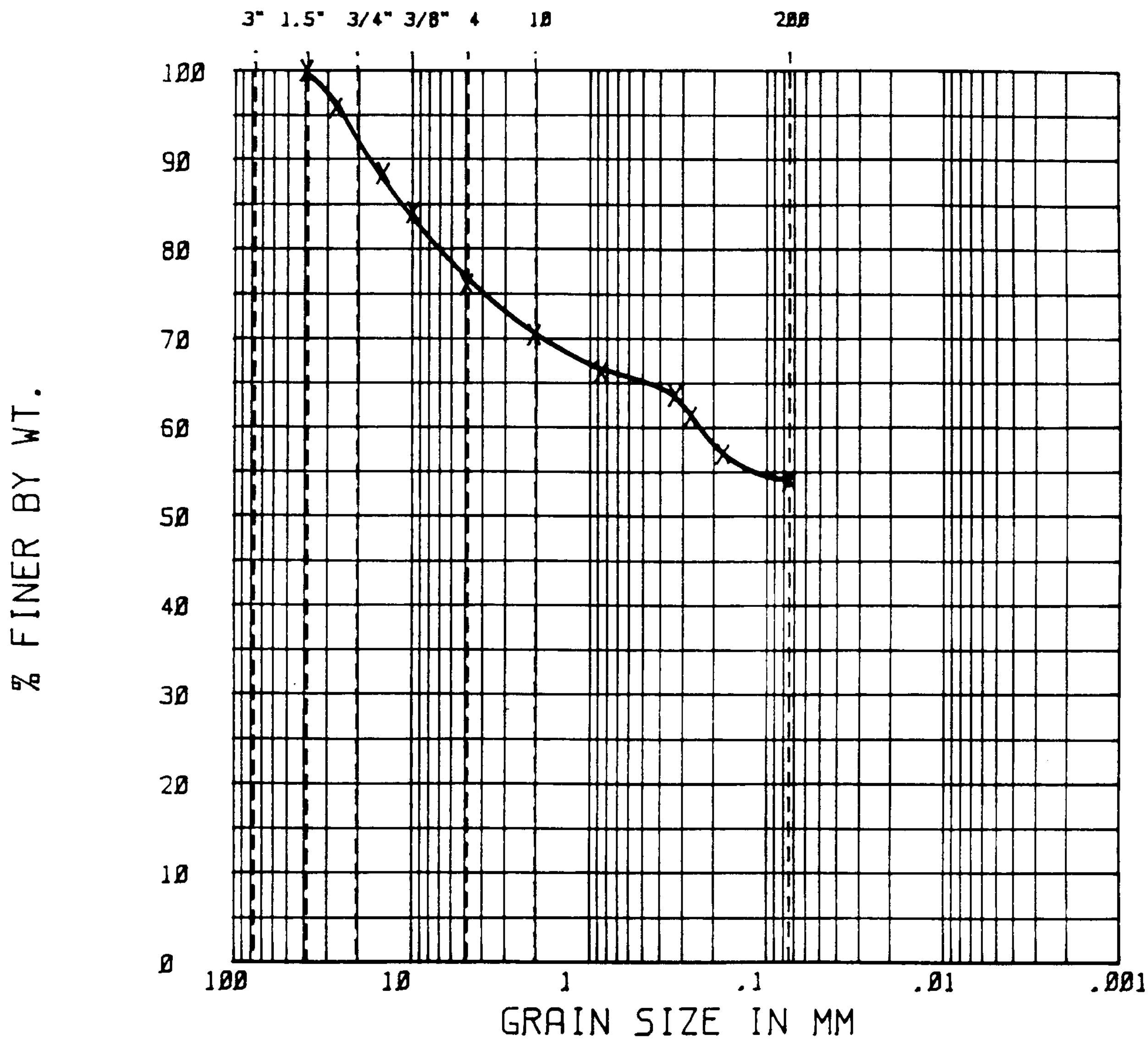
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-129 SAMPLE NO. : S-1
DEPTH : SYMBOL : X
MC : 13.37 LL : PL :
CLASS :Tan-dark grey mottled sandy gravelly clayey silt

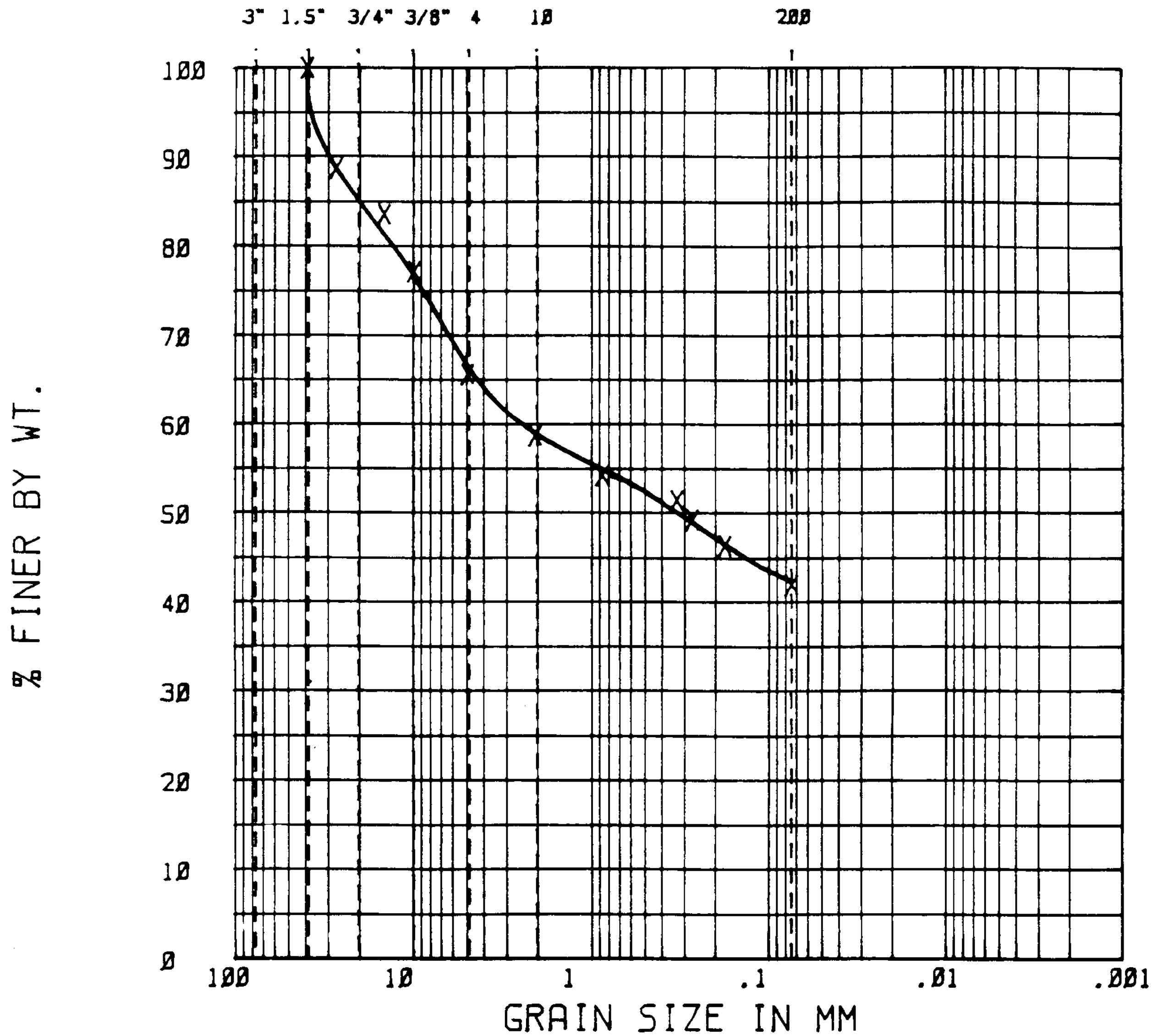
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-130 SAMPLE NO. : S-1
DEPTH : SYMBOL : X
MC : 9.88 LL : PL :
CLASS :Red brown cse-fine sandy cse-fine gravelly clayey silt

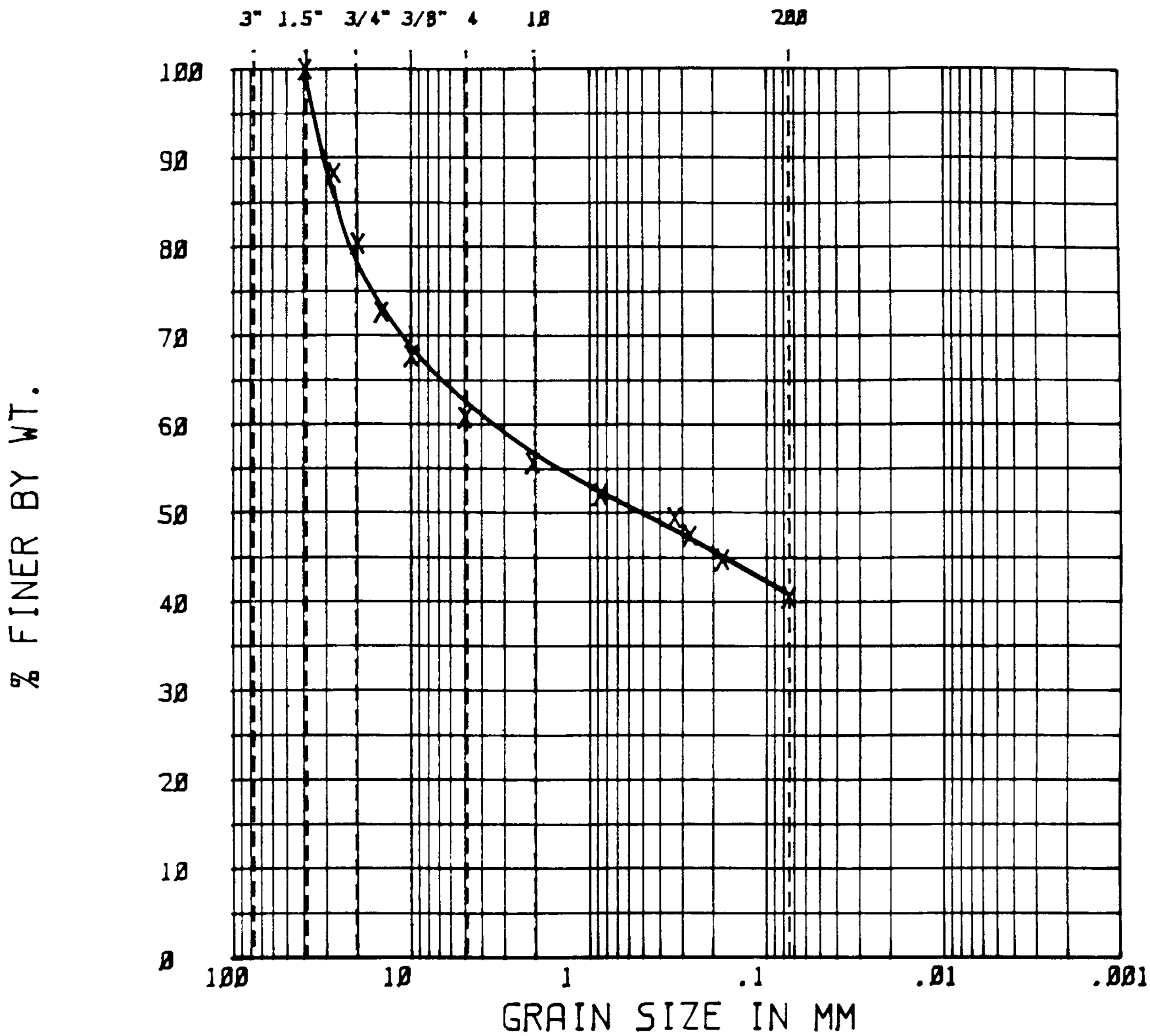
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-131 SAMPLE NO. : S-1
DEPTH : SYMBOL : X
MC : 7.55 LL : PL :
CLASS :Brown grey cse-fine sandy cse-fine gravelly clayey silt

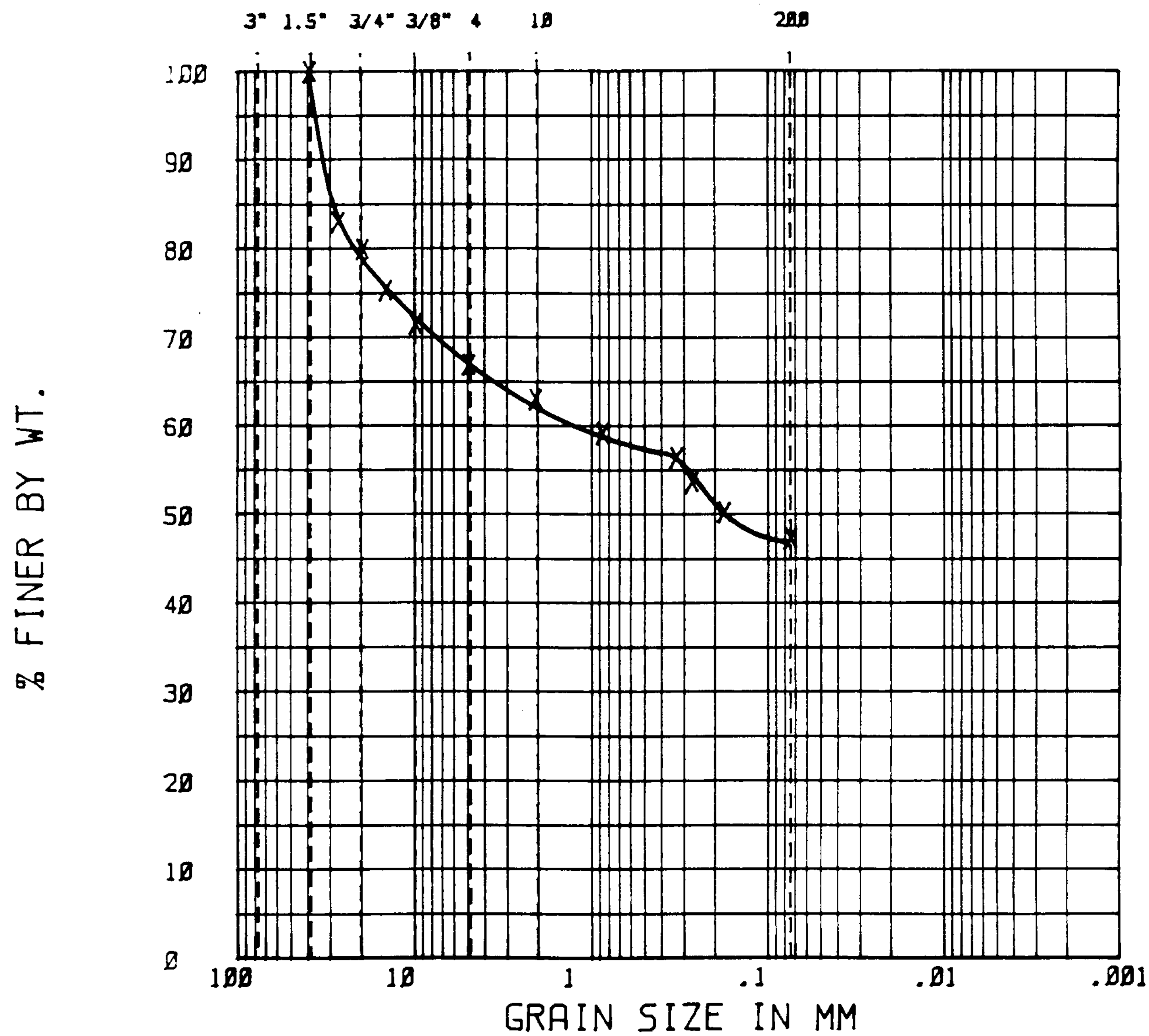
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-132 SAMPLE NO. : S-1
DEPTH : SYMBOL : X
MC : 9.2 LL : PL :
CLASS :Brown red cse-fine sandy cse-fine gravelly clayey silt

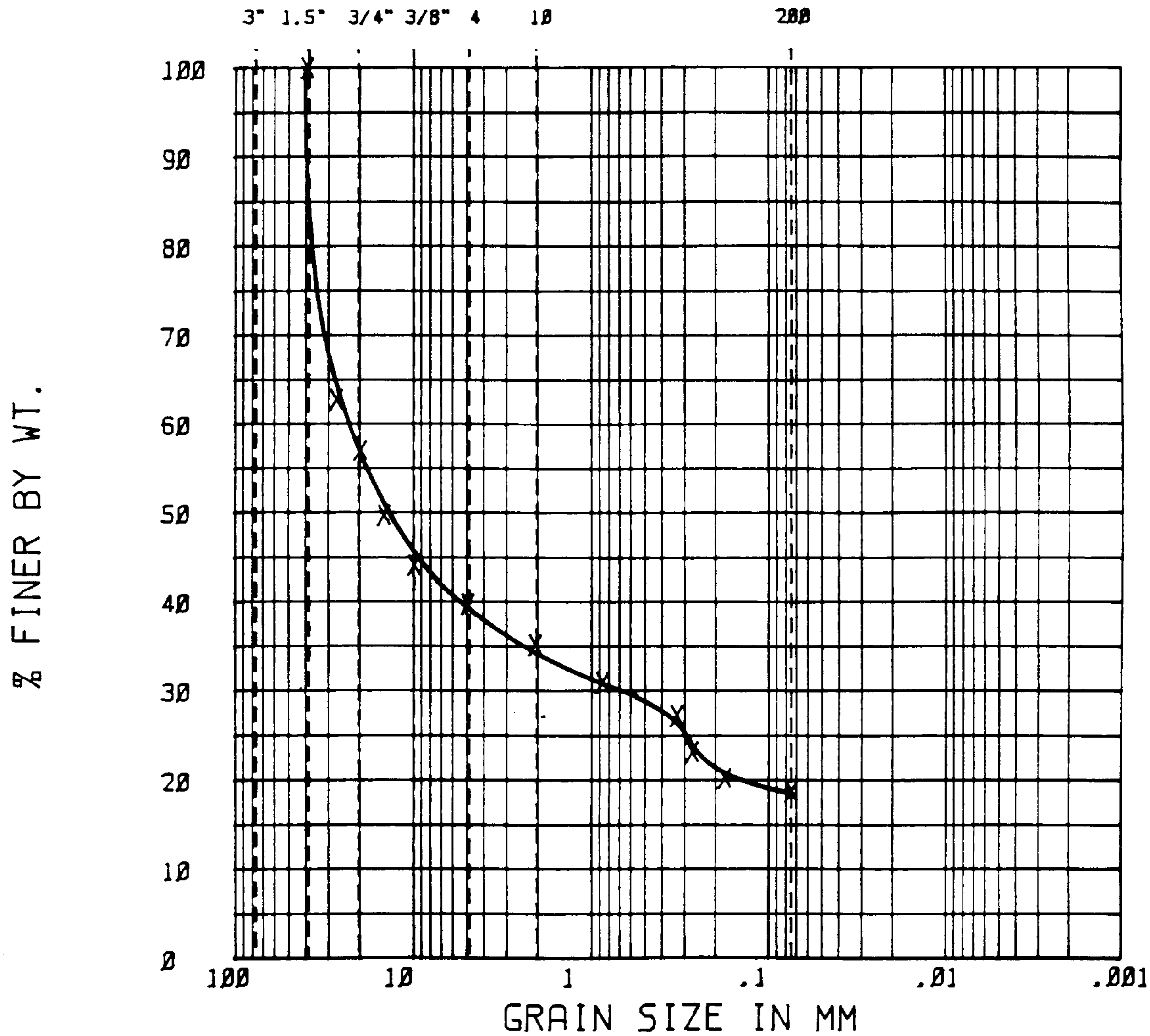
WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-133 SAMPLE NO. : S-1
DEPTH : SYMBOL : X
MC : 8.54 LL : PL :
CLASS :Brown cse-fine gravelly cse-fine sandy clayey silt

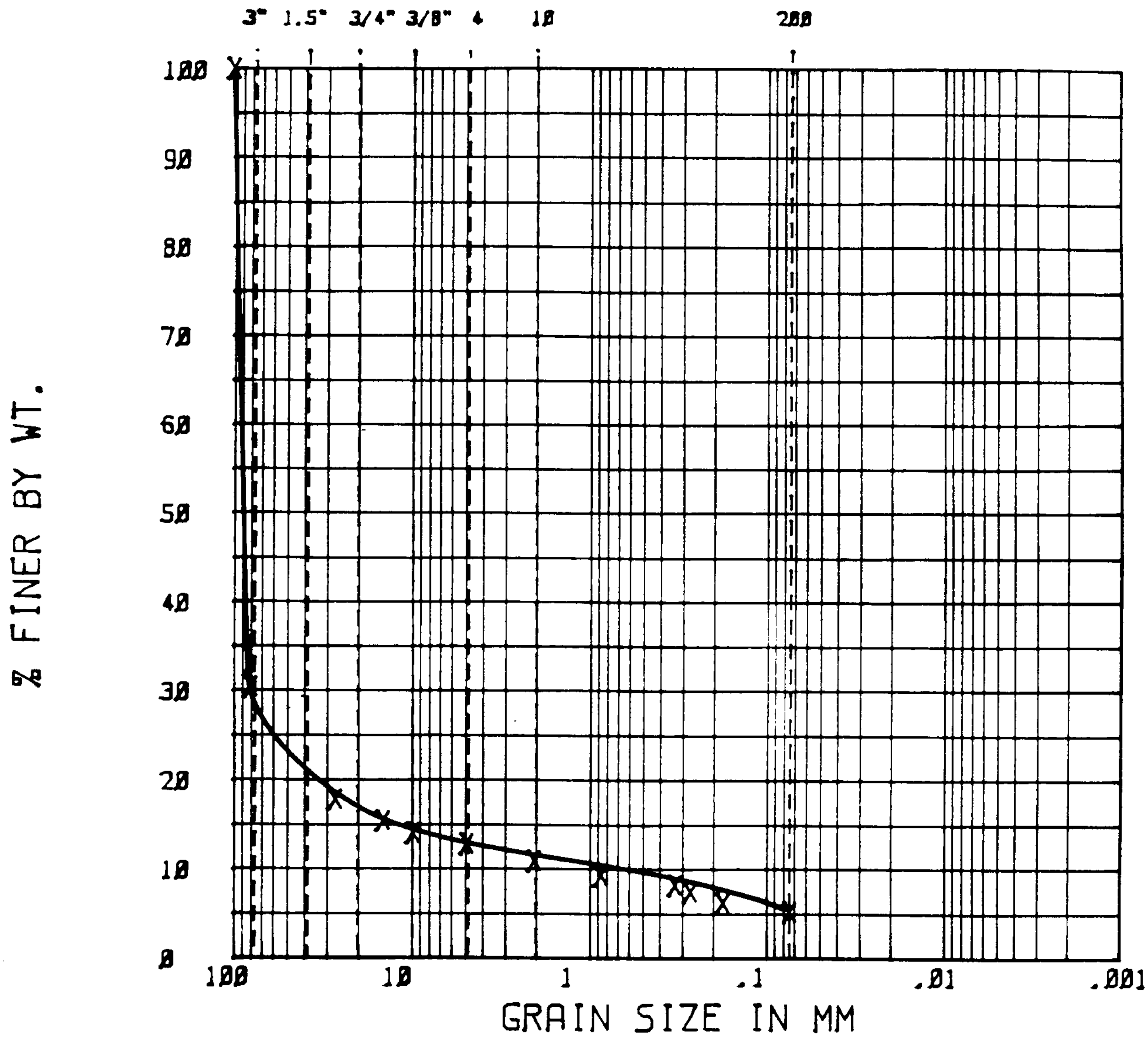
# WOODWARD-CLYDE CONSULTANTS
## PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-134 SAMPLE NO. : S-1
DEPTH : SYMBOL : X
MC : 3.36 LL : PL :
CLASS :Grey brown silty cse-fine sandy cse-fine gravel

WOODWARD-CLYDE CONSULTANTS
PLYMOUTH MEETING LAB




JOB NUMBER :84C4193E

BORING NO. : TP-134 SAMPLE NO. : S-2
DEPTH : SYMBOL : X
MC : 3.73 LL : PL :
CLASS :Brown grey cse to fine gravel w/ traces of cse to fine sandy silt

# APPENDIX D

Soil sampling for the NIACHLOR Project was conducted between July 19, 1985 and July 25, 1985. This appendix contains a summary of results for each test pit.

Test Pit 106 - Test Pit 106 is located on the Conrail right-of-way, just north of the new cell building. A sample was taken from 0 to 4 feet and grain-size analysis classified the sample as dark gray coarse to fine sandy silty gravel with cinders, cobbles, concrete and brick fragments, and broken glass. OVA head space analysis detected volatile organics at the 1-,2-,and 4-foot intervals, with values ranging from 0.25 to 4 ppm. Chemical analysis detected the presence of zinc (0.27 ppm) and hexachlorobenzene (0.031 ppm).

Test Pit 107 - Test Pit 107 is located in the proposed new cell building. The original test pit location was located at E2910-N1776. A large slab of concrete was encountered at a 1-foot depth so the test pit was moved 5 feet west to E2905-N1776. This location also encountered a concrete slab at a 1-foot depth, so the test pit was moved to the actual location, E2910-N1796, where there was a gap between two large pieces of concrete. A sample was taken from 0 to 4 feet and grain-size analysis classified the sample as brown coarse to fine sandy coarse to fine gravel with cinders, broken glass, and broken metal pipe. OVA head space analysis did not detect any volatile organics. Chemical analysis detected the presence of 1,1,1-trichloroethane (0.09 ppm), PCB 1242 (35 ppm), and PCB 1248 (10.2 ppm).

Test Pit 108 - Test Pit 108 is located on the east bank of Gill Creek in the old Building 310 Excavation Project. The original location of E2548-N1786 was obstructed at a 1-foot depth by a large piece of concrete. The test pit was moved to E2553-N1796, where no concrete was encountered. A sample was taken from 1 to 4 feet and grain-size analysis classified the sample as brown silty clay with a trace of sand. OVA head space analysis did not detect any volatile organics, and chemical analysis showed a TCH value of 2.38 ppm.

Test Pit 111 - Test Pit 111 is located at the new brine polishing building. A sample was taken from 0.5 to 4 feet, and grain-size analysis classified the sample as brown gray silty coarse to fine gravelly coarse to fine sand with boulders, cinders, and brick fragments. OVA head space analysis detected volatile organics at 1-,2-,and 4 foot depths, ranging from 0.30 to 0.80 ppm. Chemical analysis did not detect the presence of any contaminants.

Test Pit 113 - Test Pit 113 is located in the new sludge building. A sample was taken from 0.5 to 4 feet, and grain-size analysis classified the sample as brown-black coarse to fine gravelly sandy clayey silt with brick and concrete fragments. OVA head space analysis detected volatile organics at all depths, ranging from 7.5 to 20 ppm. Chemical analysis found 1,1,1-trichloroethylene (0.11 ppm) and TCH had a value of 368.42 ppm.

Test Pit 114 - Test Pit 114 is located along the new railroad siding. A sample was taken from 0 to 3.5 feet, and grain-size analysis classified the sample as gray-coarse to fine sandy coarse to fine gravel with cinders, cobbles, boulders, broken glass, and brick fragments. OVA analysis did not detect any volatile organics. Groundwater was encountered at 3.5 feet. Chemical analysis detected the presence of 1,1,1-trichloroethylene (0.06 ppm), mercury (0.013 ppm), zinc (3.85 ppm), and hexachlorobenzene (0.003 ppm).

Test Pit 115 - Test Pit 115 is located along the new railroad siding. A sample was taken from 0 to 3.83 feet, and grain-size analysis classified the sample as dark gray-brown coarse to fine sandy coarse to fine gravel with cinders, cobbles, boulders, broken glass and pipe, and brick fragments. OVA head space analysis did not detect any volatile organics. Groundwater was encountered at 3.83 feet. Chemical analysis detected the presence of 1,1,1-trichloroethane (0.07 ppm), chromium (0.06 ppm), lead (1.14 ppm), mercury (0.007 ppm), zinc (1.34 ppm), and hexachlorobenzene (0.014 ppm).

Test Pit 116 - Test Pit 116 is located along the new railroad siding. A sample was taken from 0 to 3.25 feet, and grain size analysis classified the sample as dark gray coarse to fine sandy silty coarse to fine gravel with cinders, broken glass, and brick and concrete fragments. OVA head space analysis did not detect any volatile organics. Groundwater was encountered at a depth of 3.25 feet. Chemical analysis detected the presence of 1,1,1-trichloroethane (0.08 ppm), chromium (0.79 ppm), mercury (0.006), zinc (0.10 ppm), hexachlorobenzene (0.484 ppm), and a TCH value of 4.90 ppm.

Test Pit 117 - Test Pit 117 is located along the new railroad siding. A sample was taken from 1 to 4 feet, and grain-size analysis classified the sample as brown-red coarse to fine sandy gravelly clayey silt with brick fragments. OVA head space analysis detected volatile organics at 2- and 3- foot depths of 0.2 and 4.2 ppm. Groundwater was encountered at a depth of 4 feet. Chemical analysis detected the presence of 1,1,1-trichloroethane (0.14 ppm), barium (3.82 ppm), mercury (0.01 ppm), zinc (0.06 ppm), and hexachlorobenzene (0.01 ppm).

Test Pit 118 - Test Pit 118 is located along the new entrance road. A sample was taken from 0.5 to 4 feet and grain-size analysis classified the soil as brown coarse to fine gravelly coarse to fine sandy clayey silt. OVA head space analysis did not detect any volatile organics. Chemical analysis showed a TCH value of 5.89 ppm.

Test Pit 119 - Test Pit 119 is located along the new entrance road. A sample was taken from 0.5 to 4 feet, and grain-size analysis classified the sample as brown coarse to fine sandy coarse to fine gravelly clayey silt. OVA head space analysis detected the presence of organics at 3 and 4 feet, with value of 2 ppm and 5 ppm, respectively. Chemical analysis showed a TCH value of 7.47 ppm.

Test Pit 120 - Test Pit 120 is located along the new entrance road. A sample was taken between 0.5 and 4 feet, and grain-size analysis classified the sample as brown coarse to fine sandy coarse to fine gravelly clayey silt. OVA head space analysis did not detect any volatile organics. Chemical analysis showed a TCH value of 8.73 ppm.

Test Pit 128 - Test Pit 128 is located on the proposed new entrance road. A sample was taken from 0 to 4 feet and the test pit log indicated fill ranging from gray-black silty sandy gravel to red-brown sandy silt and contained wood, brick and concrete fragments, and cinders. OVA head space analysis did not detect any volatile organics. Chemical analysis detected the presence of barium (4.14 ppm) and copper (11.73 ppm).

Test Pit 129 - Test Pit 129 is located on the proposed new entrance road. A sample was taken from 1.5 to 4 feet, and grain-size analysis classified the sample as tan-dark gray mottled coarse to fine gravelly sandy silty clay. OVA head space analysis detected the presence of volatile organics at all depths, ranging from 40 ppm to 1 ppm. Chemical analysis indicated the presence of 1,1,1,-trichloroethane (0.07 ppm).

Test Pit 130 - Test Pit 130 is located on the proposed new entrance road. A sample was taken from 1 to 4 feet, and grain-size analysis classified the sample as beige-brown coarse to fine gravelly sandy silty clay. OVA head space analysis did not detect any volatile organics. Chemical analysis did not detect the presence of any contaminants.

Test Pit 131 - Test Pit 131 is located on the proposed new entrance road. A sample was taken from 1 to 4 feet, and grain-size analysis classified the sample as beige-brown coarse to fine gravelly sandy silty clay. OVA head space analysis did not detect volatile organics. Chemical analysis did not detect any volatile organics.

Test Pit 132 - Test Pit 132 is located on the proposed new entrance road. A sample was taken from 1.5 to 4 feet, and grain-size analysis classified the sample as beige-brown coarse to fine gravelly sandy silty clay. OVA head space analysis did not detect any volatile organics. Chemical analysis did not detect any volatile organics.

Test Pit 133 - Test Pit 133 is located on the proposed new entrance road. A sample was taken from 1.5 to 4 feet, and grain-size analysis classified the sample as a beige-brown coarse to fine gravelly sandy silty clay. OVA head space analysis detected the presence of volatile organics at the 4-foot level of 4 ppm. Chemical analysis showed a TCH value of 43.9 ppm.

Test Pit 134 - Test Pit 134 is located on the east back of Gill Creek south of the new stage clarifier. A shallow (3 to 4 foot) and deep (7 to 8 foot) samples were taken and both were classified as gray-brown coarse to fine sandy silty coarse to fine gravel fill. OVA head space analysis did not detect any volatile organics. Groundwater was encountered at a depth of 8 feet. Chemical analysis detected the presence of trans-1,2-dichloroethylene (0.09 ppm).

Test Pits 201-205 - Test Pits 201 through 205 are located in the proposed cell building. The purpose of these test pits was to retest for PCB contamination discovered in Test Pit 2 (excavated 11/28/84). Test Pit 201 was placed on the original location of Test Pit2, which was located in the field. The original location of Test Pits 202 through 205 was to be a 10 foot x 10 foot square, with a test pit in each corner and Test Pit 201 in the middle. During excavation, however, a continuous concrete structure was found at a 1-foot depth, running southwest to northeast through this square area. Therefore, Test Pits 202 through 205 were placed as shown on Plate 2, enabling the design depth of 3.5 feet to be reached. Chemical analysis of the samples for PCBs detected PCB 1242 and 1248 in all five samples. Total PCB concentrations for each test pit were as follows: Test Pit 201-25.9 ppm, Test Pit 202-32.6 ppm, Test Pit 203-30.9 ppm, Test Pit 204-57.2 ppm, and Test Pit 205-61.3 ppm.

# Appendix E

1. B. Continued

ADVANCED ENVIRONMENTAL SYSTEMS
===============================
STANDARD ADDITIONS DATA SHEET

CUSTOMER: DUPONT
JOB CODE: AZB

UNITS: MILLIGRAMS/LITER, OR PPM

| S.# | ELEMENT | 0/ABS. | 1 SPK/1 ABS | 2 SPK/2 ABS | 3 SPK/3 ABS | FIN CONC | r* |
|---|---|---|---|---|---|---|---|
| 188 | COPPER | 0.183 | 0.625/0.205 | 1.25/0.227 | 2.5/0.262 | 11.73 | .998 |
| 188 | COPPER | 0.001 | 0.625/0.021 | 1.25/0.039 | 2.5/0.078 | BDL | .9999 |
| 190 | COPPER | 0.001 | 0.625/0.020 | 1.25/0.037 | 2.5/0.077 | BDL | .999 |
| | | | | | | | |
| 188 | BARIUM | -0.003 | 5.0/0.004 | 7.5/0.008 | 10.0/0.010 | 4.15 | .995 |
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*"r" is the correlation coefficient.

+/- correlation coefficient is outside of control window of 0.995

| TEST PIT NO. | AES SAMPLE NO. |
|---|---|
| 128 | 1886 (First Sample Listed Above) |
| 129 | 1887 (Second Sample Listed Above) |
| 130 | 1902 (Third Sample Listed Above) |

TABLE 4 AREA B

C. METALS CONT'D.

ADVANCED ENVIRONMENTAL SYSTEMS

STANDARD ADDITIONS DATA SHEET

CUSTOMER: DUPONT
JOB CODE: AZB

UNITS: MILLIGRAMS/LITER, OR PPM

| S.# | ELEMENT | 0/ABS. | 1 SPK/1 ABS | 2 SPK/2 ABS | 3 SPK/3 ABS | FIN CONC | r* |
|---|---|---|---|---|---|---|---|
| 970 | LEAD | -0.001 | 2.5/0.005 | 5.0/0.014 | 10.0/0.030 | 1.14 | .998 |
| 971 | LEAD | -0.001 | 2.5/0.006 | 5.0/0.015 | 10.0/0.029 | BDL [1] | .999 |
| 972 | LEAD | 0.000 | 2.5/0.014 | 5.0/0.027 | 10.0/0.027 | BDL | .998 |
| 970 | MERCURY | * 23 | .002/29 | .004/36 | .005/40 | 0.013 | .999 |
| 971 | MERCURY | * 15 | .002/22 | .004/31 | .005/34 | 0.007 | .998 |
| 972 | MERCURY | * 13 | .001/20 | .002/24 | .005/37 | 0.006 | .995 |
| 997 | MERCURY | * 16 | .0025/22 | .004/28 | .005/31 | 0.010 | .994 |
| 970 | SILVER | 000 | 0.5/0.024 | 1.0/0.043 | 2.0/0.86 | BDL | .999 |
| 971 | SILVER | 0.00 | 0.5/0.024 | 1.0/0.049 | 2.0/0.089 | BDL | .998 |
| 972 | SILVER | 0.00 | 0.5/0.024 | 1.0/0.045 | 2.0/0.093 | BDL | .999 |
| 997 | SILVER | 0.00 | 0.5/0.024 | 1.0/0.044 | 2.0/0.088 | BDL | .999 |
| 971 | CHROMIUM | 0.001 | 1.25/0.009 | 2.5/0.015 | 5.0/0.028 | 0.6 | .999 |
| 972 | CHROMIUM | 0.002 | 1.25/0.008 | 2.5/0.014 | 5.0/0.028 | 0.79 | .998 |
| 997 | CHROMIUM | 0.001 | 1.25/0.007 | 2.5/0.014 | 5.0/0.30 | BDL | .999 |
| 997 | LEAD | 0.00 | 2.5/0.014 | 5.0/0.027 | 10.0/0.060 | BDL | .998 |
| | | | | | | | |
| | | | | | | | |

"r" is the correlation coefficient.

/- correlation coefficient is outside of control window of 0.995

-Below determinable limits.

| TEST PIT NO. | AES SAMPLE NO. |
|---|---|
| 114 | 970 |
| 115 | 971 |
| 116 | 972 |
| 117 | 997 |

TABLE 4 AREA B

C. METALS CONT'D.

ADVANCED ENVIRONMENTAL SYSTEMS

STANDARD ADDITIONS DATA SHEET

CUSTOMER: DUPONT
JOB CODE: AZB

UNITS: MILLIGRAMS/LITER, OR PPM

| S.# | ELEMENT | 0/ABS. | 1 SPK/1 ABS | 2 SPK/2 ABS | 3 SPK/3 ABS | FIN CONC | r* |
|---|---|---|---|---|---|---|---|
| 970 | SELENIUM | 0.001 | 0.0125/0.011 | 0.025/0.026 | 0.050/0.052 | BDL [1] | .998 |
| 971 | SELENIUM | 0.000 | 0.0125/0.011 | 0.025/0.026 | 0.050/0.058 | BDL | .997 |
| 972 | SELENIUM | 0.001 | 0.0125/0.015 | 0.025/0.034 | 0.050/0.069 | BDL | .999 |
| 977 | SELENIUM | 0.002 | 0.0125/0.007 | 0.025/0.016 | 0.050/0.032 | BDL | .996 |
| 970 | ARSENIC | -0.005 | 0.0125/0.016 | 0.025/0.054 | 0.050/0.105 | 0.006 | .996 |
| 971 | ARSENIC | 0.002 | 0.0125/0.020 | 0.025/0.036 | 0.050/0.086 | BDL | .995 |
| 972 | ARSENIC | 0.002 | 0.0125/0.035 | 0.025/0.059 | 0.050/0.114 | 0.004 | .999 |
| 997 | ARSENIC | 0.020 | 0.0125/0.046 | 0.025/0.065 | 0.050/0.117 | 0.021 | .999 |
| 970 | ZINC | 0.168 | 0.125/0.177 | 0.25/0.188 | 0.5/0.211 | 3.85 | .999 |
| 971 | ZINC | 0.077 | 0.125/0.090 | 0.25/0.110 | 0.5/0.134 | 1.34 | .995 |
| 972 | ZINC | 0.006 | 0.125/0.25 | 0.25/0.41 | 0.5/0.075 | 0.10 | .999 |
| 977 | ZINC | 0.006 | 0.125/0.029 | 0.25/0.51 | 0.5/0.099 | 0.06 | .999 |
| 970 | BARIUM | -0.001 | 5.0/0.007 | 7.5/0.010 | 10.0/0.013 | BDL | .997 |
| 971 | BARIUM | 0.000 | 5.0/0.007 | 7.5/0.007 | 10.0/0.012 | BDL | .995 |
| 972 | BARIUM | 0.000 | 5.0/0.007 | 7.5/0.009 | 10.0/0.012 | BDL | .995 |
| 997 | BARIUM | -0.002 | 5.0/0.003 | 7.5/0.007 | 10.0/0.010 | 3.82 | .995 |
| 970 | CHROMIUM | 0.001 | 1.25/0.007 | 2.50/0.015 | 5.0/0.030 | BDL | .999 |

*"r" is the correlation coefficient.

+/- correlation coefficient is outside of control window of 0.995

[1]-Below determinable limits.

| TEST PIT NO. | AES SAMPLE NO. |
|---|---|
| 114 | 970 |
| 115 | 971 |
| 116 | 972 |
| 117 | 977 |

TABLE 4 AREA B

C. METALS CONT'D.

ADVANCED ENVIRONMENTAL SYSTEMS

STANDARD ADDITIONS DATA SHEET

CUSTOMER: DUPONT
JOB CODE: AZB

UNITS: MILLIGRAMS/LITER, OR PPM

| S.# | ELEMENT | 0/ABS. | 1 SPK/1 ABS | 2 SPK/2 ABS | 3 SPK/3 ABS | FIN CONC | r* |
|---|---|---|---|---|---|---|---|
| 970 | CADMIUM | 0.001 | 0.10/0.015 | 0.25/0.030 | 0.50/0.063 | BDL | .998 |
| 971 | CADMIUM | 0.003 | 0.10/0.017 | 0.25/0.039 | 0.50/0.069 | BDL | .999 |
| 972 | CADMIUM | 0.000 | 0.10/0.015 | 0.25/0.030 | 0.50/0.061 | BDL | .998 |
| 997 | CADMIUM | -0.001 | 0.10/0.017 | 0.25/0.030 | 0.50/0.063 | BDL | .995 |

*"r" is the correlation coefficient.

+/- correlation coefficient is outside of control window of 0.995

| TEST PIT NO. | AES SAMPLE NO. |
|---|---|
| 114 | 970 |
| 115 | 971 |
| 116 | 972 |
| 117 | 977 |

# ADVANCED ENVIRONMENTAL SYSTEMS

## STANDARD ADDITIONS DATA SHEET

CUSTOMER: DUPONT
JOB CODE: AZB

UNITS: MILLIGRAMS/LITER, OR PPM

| S.# | ELEMENT | 0/ABS. | 1 SPK/1 ABS | 2 SPK/2 ABS | 3 SPK/3 ABS | FIN CONC | r* |
|---|---|---|---|---|---|---|---|
| 994 | ZINC | 0.00 | 0.5/0.044 | 2.5/0.197 | 5.0/0.341 | 0.27 | .997 |

*"r" is the correlation coefficient.

+/- correlation coefficient is outside of control window of 0.995

TEST PIT NO.
106

AES SAMPLE NO.
994

TABLE 2 AREA 5

g. TCH Scan Duplicate

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - QUALITY CONTROL DUPLICATE
UNITS OF MEASURE: MILLIGRAMS/ KILOGRAM, OR PPM
CLIENT: DUPONT A.E.S. JOB CODE AZB

| ANALYSIS | SAMPLE | ORIGINAL CONC. | DUPL. CONC. | AVERAGE CONC. | RANGE | REL. % DIFF. |
|---|---|---|---|---|---|---|
| TCH SCAN | 1969 | BDL* | BDL | NA** | NA | NA |

Relative Percent Difference =
Range/Average X 100

*Below determinable limits.
**Not applicable.

| TEST PIT NO. | AES SAMPLE NO. |
|---|---|
| 107 | 1969 |

TABLE 3 e AREA 6

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - QUALITY CONTROL DUPLICATE
UNITS OF MEASURE: MILLIGRAMS/ KILOGRAM, OR PPM
CLIENT: DUPONT A.E.S. JOB CODE AZB

| ANALYSIS | SAMPLE | ORIGINAL CONC. | DUPL. CONC. | AVERAGE CONC. | RANGE | REL. % DIFF. |
|---|---|---|---|---|---|---|
| TCH SCAN | 1964 | BDL* | BDL | NA** | NA | NA |

Relative Percent Difference =
Range/Average X 100
*Below determinable limits.
**Not applicable.

| TEST PIT NO. | AES SAMPLE NO. |
|---|---|
| 134s | 1964 |

TABLE 3 TOTAL CYANIDE

C. Cont'd.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: WET CHEMISTRY DUPLICATE
UNITS OF MEASURE: MILLIGRAMS/LITER, OR PPM
CLIENT: DUPONT A.E.S. JOB CODE AZB

| ANALYSIS | SAMPLE | ORIGINAL CONC. | DUPL. CONC. | AVERAGE CONC. | RANGE | REL. % DIFF. |
|---|---|---|---|---|---|---|
| PHENOLS | 1886 | BDL [1] | BDL | BDL | NA [2] | NA |
| PHENOLS | 1905 | BDL | BDL | BDL | NA | NA |
| CYANIDES | 1964 | BDL | BDL | BDL | NA | NA |

Relative Percent Difference =
Range/Average X 100

[1]-Below determinable limits.
[2]-Not applicable.

| TEST PIT NO. | AES SAMPLE NO. |
|---|---|
| 128 | 1886 |
| 133 | 1905 |
| 134s | 1964 |

TABLE 4 AREA B

B. CONT'D.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - TEST CONTROLS
UNITS OF MEASURE: MILLIGRAMS/KILOGRAM, OR PPM
CLIENT: DUPONT A.E.S. JOB CODE 01AZB

| ANALYSIS | TYPE | ORIGINAL CONC. | ADDED CONC. | EXPECTED CONC. | REPORTED CONC. | PERCENT RECOVERY | 95% CONFIDENCE INTERVAL |
|---|---|---|---|---|---|---|---|
| PCB 1242 | 1997 | <5.0 | 7.35 | 7.35 | 7.50 | 102 | NA* |
| PCB 1242 | 1886 | <5.0 | 7.38 | 7.38 | 12.2 | 165 | NA |
| **2-METHYLFURAN | 1971 | <1.5 | 9.68 | 9.68 | 11.62 | 120.0 | NA |
| TETRAHYDROTHIOPHENE | 1969 | <1.5 | 11.3 | 11.3 | 8.3 | 73.4 | NA |
| 1,4-DICHLOROBUTANE | 1969 | <1.5 | 11.9 | 11.9 | 10.6 | 89.1 | NA |

| TEST PIT NO. | AES SAMPLE NO. |
|---|---|
| 117 | 1997 |
| 128 | 1886 |
| 115 | 1971 |
| 107 | 1969 |

*Not applicable.
**Samples were extracted in Methanol and the extract was then spiked, therefore, the difference in determinable limits.

TABLE 4 AREA B

B. CONT'D.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - QUALITY CONTROL DUPLICATE
UNITS OF MEASURE: MILLIGRAMS/KILOGRAM, OR PPM
CLIENT: DUPONT A.E.S. JOB CODE 01AZB

| ANALYSIS | SAMPLE | ORIGINAL CONC. | DUPL. CONC. | AVERAGE CONC. | RANGE | REL. % DIFF. |
|---|---|---|---|---|---|---|
| PCB 1248 | 1969 | 46.7 | 23.3 | 35.0 | 23.4 | 66.8 |
| PCB 1248 | 1964 | <5.0 | <5.0 | NA * | NA | NA |
| 2-METHYLFURAN | 1971 | <10.0 | <10.0 | NA | NA | NA |
| 2-METHYLFURAN | 1969 | <10.0 | <10.0 | NA | NA | NA |
| TETRAHYDOTHIOPHENE | 1971 | <10.0 | <10.0 | NA | NA | NA |
| TETRAHYDOTHIOPHENE | 1969 | <10.0 | <10.0 | NA | NA | NA |
| 1,4-DICHLOROBUTANE | 1971 | <10.0 | <10.0 | NA | NA | NA |
| 1,4-DICHLOROBUTANE | 1969 | <10.0 | <10.0 | NA | NA | NA |

Relative Percent Difference =
Range/Average X 100

Not applicable.

| TEST PIT NO. | AES SAMPLE NO. |
|---|---|
| 107 | 1969 |
| 134s | 1964 |
| 115 | 1971 |

TABLE 4 AREA 8

b. RCRA Chemicals Con'd.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - TEST CONTROLS
UNITS OF MEASURE: MILLIGRAMS/KILOGRAM, OR PPM
CLIENT:DUPONT A.E.S. JOB CODE AZB

| ANALYSIS | SAMPLE | TYPE | ORIGINAL CONC. | ADDED CONC. | EXPECTED CONC. | REPORTED CONC. | PERCENT RECOVERY | 95% CONFIDENC INTERVAL |
|---|---|---|---|---|---|---|---|---|
| ANILINE | 1997 | SPIKE | BDL* | 10.80 | 10.80 | 8.25 | 76.41 | ** N |

| TEST PIT NO. | AES SAMPLE NO. |
|---|---|
| 117 | 1997 |

*Below determinable limits.
**Not available.

TABLE 4 AREA 8

c. RCRA Chemicals Cont'd.

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - TEST CONTROLS
UNITS OF MEASURE: MICROGRAMS/KILOGRAM, OR PPB
CLIENT:DUPONT A.E.S. JOB CODE AZB

| ANALYSIS | SAMPLE | TYPE | ORIGINAL CONC. | ADDED CONC. | EXPECTED CONC. | REPORTED CONC. | PERCENT RECOVERY | 95% CONFIDENC[E] INTERVAL |
|---|---|---|---|---|---|---|---|---|
| 1,4-DICHLOROBENZENE | 1972 | SPIKE | 10.40 | 133.5 | 143.9 | 232.0 | 161.7 | * N |
| 1,2-DICHLOROBENZENE | 1972 | SPIKE | <12 | 161.4 | 161.4 | 241.0 | 149.4 | N |

| TEST PIT NO. | AES SAMPLE NO. |
|---|---|
| 116 | 1972 |

*Not available.

TABLE 5 AREA 9

## A. VOLATILES

ADVANCED ENVIRONMENTAL SYSTEMS, INC.
LABORATORY REPORT

TYPE OF ANALYSIS: GC - TEST CONTROLS
UNITS OF MEASURE: MILLIGRAMS/KILOGRAM, OR PPM
CLIENT:DUPONT A.E.S. JOB CODE AZB

| ANALYSIS | TYPE | ORIGINAL CONC. | ADDED CONC. | EXPECTED CONC. | REPORTED CONC. | PERCENT RECOVERY | 95% CONFIDENC[E] INTERVAL |
|---|---|---|---|---|---|---|---|
| TRANS-1,2-DICHLOROETHYLENE | SPIKE | <0.05 | 0.41 | 0.41 | 0.33 | 81 | |
| 1,1,1-TRICHLOROETHANE | #1962 | <0.05 | 0.41 | 0.41 | 0.25 | 61 | |
| TRICHLOROETHYLENE | | <0.05 | 0.41 | 0.41 | 0.29 | 71 | |
| TETRACHLOROETHYLENE | | <0.05 | 0.41 | 0.41 | 0.36 | 88 | |
| BENZENE | | <0.05 | 0.41 | 0.41 | 0.30 | 73 | |
| TOLUENE | | <0.05 | 0.41 | 0.41 | 0.26 | 63 | |

| TEST PIT NO. | AES SAMPLE NO. |
|---|---|
| 119 | 1962 |

# APPENDIX A

# CHAIN OF CUSTODY RECORD

# CHAIN OF CUSTODY RECORD

| PROJECT NO. | PROJECT NAME | ADVANCED ENVIRONMENTAL SYSTEMS INC. |
|---|---|---|
| | [illegible] | |

SAMPLER'S SIGNATURE [illegible]

| SAMPLE NO. | SEQ. NO. | DATE | TIME | SAMPLE LOCATION | SAMPLE TYPE | NUMBER OF CONTAINERS | REMARKS |
|---|---|---|---|---|---|---|---|
| [illegible] | | [illegible] | 515 | | [illegible] | 2 | |
| [illegible] | | [illegible] | [illegible] | | [illegible] | 2 | |
| | | | | | | | |
| [illegible] | | [illegible] | [illegible] | | [illegible] | 1 | |
| [illegible] | | [illegible] | [illegible] | | [illegible] | 1 | |
| | | | | | | | |
| | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | | | [illegible] | [illegible] | | | |
| | | | | | | | |
| | | | | | | | |
| | | [illegible] | | [illegible] | [illegible] | [illegible] | |
| | | | | | | | |
| | | | | | TOTAL NO. OF CONTAINERS | 6 | |

| RELINQUISHED BY (Sign) | DATE/TIME | RECEIVED BY (Sign) | RELINQUISHED BY (Sign) | DATE/TIME | RECEIVED BY (Sign) |
|---|---|---|---|---|---|
| 1 [illegible] | [illegible] | 2 [illegible] | 2 | | 3 |
| RELINQUISHED BY (Sign) | DATE/TIME | REC'D BY MOBILE LAB (Sign) | REL'D BY MOBILE LAB (Sign) | DATE/TIME | RECEIVED BY (Sign) |
| 3 | | 4 | 4 | | 5 |
| METHOD OF SHIPMENT | | SHIPPED BY (Sign) | RECEIVED FOR LABORATORY (Sign) | | DATE/TIME |

# CHAIN OF CUSTODY RECORD

| PROJECT NO. | PROJECT NAME |
|---|---|
| | [illegible] |

**ADVANCED ENVIRONMENTAL SYSTEMS INC.**

SAMPLER'S SIGNATURE: [illegible signature]

| SAMPLE NO. | SEQ. NO. | DATE | TIME | SAMPLE LOCATION | SAMPLE TYPE | NUMBER OF CONTAINERS | REMARKS |
|---|---|---|---|---|---|---|---|
| TP 130 | | 1/22 | | NIACHEM JR | VOA Vials (soil) | 3 | |
| TP131 | | 1/22 | | NIACHEM JR | VOA Vials (soil) | 3 | |
| TP132 | | 1/22 | | NIACHEM JR | VOA Vials (soil) | 3 | |
| TP133 | | 1/22 | | NIACHEM JR | VOA Vials (soil) | 3 | |
| | | | | | TOTAL NO. OF CONTAINERS | 12 | |

| RELINQUISHED BY (Sign) | DATE/TIME | RECEIVED BY (Sign) | RELINQUISHED BY (Sign) | DATE/TIME | RECEIVED BY (Sign) |
|---|---|---|---|---|---|
| 1 [signature] | [illegible] | 2 [signature] | 2 | | 3 |
| RELINQUISHED BY (Sign) 3 | DATE/TIME | REC'D BY MOBILE LAB (Sign) 4 | REL'D BY MOBILE LAB (Sign) 4 | DATE/TIME | RECEIVED BY (Sign) 5 |
| METHOD OF SHIPMENT | | SHIPPED BY (Sign) | RECEIVED FOR LABORATORY (Sign) | | DATE/TIME |

# CHAIN OF CUSTODY RECORD

| PROJECT NO. | PROJECT NAME | |
|---|---|---|
| AEI[illegible] | [illegible] | ADVANCED ENVIRONMENTAL SYSTEMS INC. |

SAMPLER'S SIGNATURE: [illegible signature]

| SAMPLE NO. | SEQ. NO. | DATE | TIME | SAMPLE LOCATION | SAMPLE TYPE | NUMBER OF CONTAINERS | REMARKS |
|---|---|---|---|---|---|---|---|
| TP-114 | S-1 | 7/23/85 | | NIACHLOR | 1 Liter 2 VOAs | 3 | |
| TP-13[illegible] | S-2 | 7/23/85 | | NIACHLOR | 1 Liter 2 VOAs | 3 | [illegible] |
| TP-115 | S-1 | 7/23/85 | | NIACHLOR | 1 Liter 2 VOAs | 3 | [illegible] |
| TP-114 | S-1 | 7/23/85 | | NIACHLOR | 1 Liter 2 VOAs | 3 | [illegible] |
| TP-120 | S-1 | 7/23/85 | | NIACHLOR | 1 Liter 2 VOAs | 3 | [illegible] |
| TP-12[illegible] | S-1 | 7/23/85 | | NIACHLOR | 1 Liter 2 VOAs | 3 | [illegible] |
| | | | | | TOTAL NO. OF CONTAINERS | 18 | |

| RELINQUISHED BY (Sign) | DATE/TIME | RECEIVED BY (Sign) | RELINQUISHED BY (Sign) | DATE/TIME | RECEIVED BY (Sign) |
|---|---|---|---|---|---|
| 1 [illegible signature] | 7/23/85 [illegible]:13 | 2 [illegible signature] | 2 | | 3 |
| RELINQUISHED BY (Sign) 3 | DATE/TIME | REC'D BY MOBILE LAB (Sign) 4 | REL'D BY MOBILE LAB (Sign) 4 | DATE/TIME | RECEIVED BY (Sign) 5 |
| METHOD OF SHIPMENT | | SHIPPED BY (Sign) | RECEIVED FOR LABORATORY (Sign) | | DATE/TIME |

# CHAIN OF CUSTODY RECORD

PROJECT NO. A2B

PROJECT NAME NIIICHKOP

**ADVANCED ENVIRONMENTAL SYSTEMS INC.**

SAMPLER'S SIGNATURE [illegible signature]

| SAMPLE NO. | SEQ. NO. | DATE | TIME | SAMPLE LOCATION | SAMPLE TYPE | NUMBER OF CONTAINERS | REMARKS |
|---|---|---|---|---|---|---|---|
| [illegible] | S1 | 7/24/85 | | NIICHKOP | Liter 3 VOAs | 3 | |
| [illegible] | S1 | [illegible] | | NIICHKOP | Liter 3 VOAs | 3 | |
| [illegible] | S1 | [illegible] | | NIICHKOP | Liter 3 VOAs | 3 | |
| [illegible] | S1 | [illegible] | | NIICHKOP | Liter 3 VOAs | 3 | |
| | | | | | TOTAL NO. OF CONTAINERS | 12 | |

| RELINQUISHED BY (Sign) | DATE/TIME | RECEIVED BY (Sign) | RELINQUISHED BY (Sign) | DATE/TIME | RECEIVED BY (Sign) |
|---|---|---|---|---|---|
| 1 [illegible signature] | [illegible] | 2 [illegible signature] | 2 | | 3 |
| RELINQUISHED BY (Sign) 3 | DATE/TIME | REC'D BY MOBILE LAB (Sign) 4 | REL'D BY MOBILE LAB (Sign) 4 | DATE/TIME | RECEIVED BY (Sign) 5 |
| METHOD OF SHIPMENT | | SHIPPED BY (Sign) | RECEIVED FOR LABORATORY (Sign) | | DATE/TIME |

# CHAIN OF CUSTODY RECORD

| PROJECT NO. | PROJECT NAME | |
|---|---|---|
| 840 485 E | [illegible] Sheet #1 | **ADVANCED ENVIRONMENTAL SYSTEMS INC.** |

SAMPLER'S SIGNATURE: [signature]

| SAMPLE NO. | SEQ. NO. | DATE | TIME | SAMPLE LOCATION | SAMPLE TYPE | NUMBER OF CONTAINERS | REMARKS |
|---|---|---|---|---|---|---|---|
| TP | | | | 201 | Soil 1-l bottle | 1 | |
| TP | | | | 202 | ↓ | 1 | |
| TP | | | | 203 | ↓ | 1 | |
| TP | | | | 204 | ↓ | 1 | |
| TP | | | | 205 | ↓ | 1 | |
| TP | | | | 111 | ↓ | 1 | |
| TP | | | | 113 | ↓ | 1 | |
| TP | | | | 117 | ↓ | 1 | |
| TP | | | | 106 | ↓ | 1 | |
| TP | | | | 119 | | 9 | [illegible] |
| TP | | | | 117 | VOA [illegible] | 2 | |
| TP | | | | 111 | VOA [illegible] | 2 | |
| | | | | | TOTAL NO. OF CONTAINERS | 13 | |

| RELINQUISHED BY (Sign) | DATE/TIME | RECEIVED BY (Sign) | RELINQUISHED BY (Sign) | DATE/TIME | RECEIVED BY (Sign) |
|---|---|---|---|---|---|
| 1 [signature] | [illegible] | 2 [signature] | 2 | | 3 |
| RELINQUISHED BY (Sign) | DATE/TIME | REC'D BY MOBILE LAB (Sign) | REL'D BY MOBILE LAB (Sign) | DATE/TIME | RECEIVED BY (Sign) |
| 3 | | 4 | 4 | | 5 |
| METHOD OF SHIPMENT | | SHIPPED BY (Sign) | RECEIVED FOR LABORATORY (Sign) | | DATE/TIME |

# CHAIN OF CUSTODY RECORD

| PROJECT NO. | PROJECT NAME | |
|---|---|---|
| 846-41932 | [illegible] Sheet #2 | **ADVANCED ENVIRONMENTAL SYSTEMS INC.** |

SAMPLER'S SIGNATURE [illegible signature]

| SAMPLE NO. | SEQ. NO. | DATE | TIME | SAMPLE LOCATION | SAMPLE TYPE | NUMBER OF CONTAINERS | REMARKS |
|---|---|---|---|---|---|---|---|
| FP | | | | 103 | Soil - VOA | 2 | |
| FP | | | | 106 | Soil VOA | 2 | |
| | | | | | Field blank water in VOA | 1 | |
| | | | | 5 pack [illegible] | [illegible] | | |
| | | | | | | | [illegible] |
| | | | | | TOTAL NO. OF CONTAINERS | 4 | |

| RELINQUISHED BY (Sign) | DATE/TIME | RECEIVED BY (Sign) | RELINQUISHED BY (Sign) | DATE/TIME | RECEIVED BY (Sign) |
|---|---|---|---|---|---|
| 1 [illegible signature] | [illegible] | 2 [illegible signature] | 2 | | 3 |
| RELINQUISHED BY (Sign) 3 | DATE/TIME | REC'D BY MOBILE LAB (Sign) 4 | REL'D BY MOBILE LAB (Sign) 4 | DATE/TIME | RECEIVED BY (Sign) 5 |
| METHOD OF SHIPMENT | | SHIPPED BY (Sign) | RECEIVED FOR LABORATORY (Sign) | | DATE/TIME |

# APPENDIX B

# ANALYTICAL METHODOLOGIES RREFERENCE LIST

## ANALYTICAL METHODOLOGIES REFERENCE LIST

Routine Analyses are Performed in Accordance with Protocols Found in the Following Numbered Sources. These Numbers Correspond to those Listed in the Laboratory Report Under the Reference ("REF") Column.


1 - EPA 600/D-80-021, "Guidelines Establishing Test Procedures for the Analysis of Pollutants; Proposed Regulations", Federal Register 44(233), December 3, 1979.

2 - EPA 600/D-80-022, "Guidelines Establishing Test Procedures for the Analysis of Pollutants; Proposed Regulations, Correction", Federal Register 44(244), December 18, 1979.

3 - EPA 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", (1983)

4 - EPA 600/4-79-057, "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", (1982)

5 - EPA-SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", second edition (1982)

6 - "Standard Methods for the Examination of Water and Wastewater", 15th Edition, (1980)

7 - New York State Institute of Toxicology Analytical Handbook, October 1982

8 - NIOSH Manual of Analytical Methods, second edition 1977

9 - "The Analysis of Polychlorinated Biphenyls in Transformer Fluid and Waste Oil", EPA Environmental Monitoring and Support Laboratory, draft, June 24, 1980

10 - "Approved Analytical Procedures for Determining the Content of Constituents Banned from Landburial" (New York State D. E. C., Division of Solid and Hazardous Waste), Jan. 1985.

11 - EPA 600/4-81-055, "Interim Methods for the Sampling and Analysis of Priority Pollutants in Sediments and Fish Tissue", Revised Jan. 7, 1983