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91885

optimizing environmental resources ♦ water, air, earth **AquAeTer**

August 1, 1997

920007B/72

Terese Van Donsel
United States Environmental Protection Agency
Office of Superfund (HSRM-6J)
77 West Jackson Boulevard
Chicago, IL 60604-3590

RE: Delineation Sampling Program Results
Millennium Inorganic Chemicals Inc. Plant II $TiCl_4$ Facility

Dear Ms. Van Donsel:

Please find enclosed five copies of the Delineation Sampling Program Results for the Millennium Inorganic Chemicals Inc. Plant II $TiCl_4$ facility.

If you have any questions or comments, please feel free to contact us by telephone at (615) 373-8532, by FAX at (615) 373-8512, or by electronic mail at aquaeter.inc@nashville.com.

Sincerely,

AquAeTer, Inc.

Elizabeth A. Holliday

Elizabeth A. Holliday, P.E.
Project Manager

Michael R. Corn / cae

Michael R. Corn, P.E.
President

enclosure

cc: S. Breslow, Millennium Inorganic Chemicals Inc. (without appendices)
W. Schildt, Millennium Inorganic Chemicals Inc. (without appendices)
M. McIntyre, Millennium Inorganic Chemicals Inc. (without appendices)
L. Espel, Greene Espel (without appendices)
J. Heimbuch, *de maximis* (with appendices)
M. Schmidt, Woodward-Clyde Consultants (with appendices)

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This report provides the results of a Delineation Sampling Program (DSP) implemented at the Millennium Inorganic Chemicals Inc. (Millennium) Plant II $TiCl_4$ facility. The DSP was implemented by agreement between Millennium and U.S. Environmental Protection Agency (USEPA), Region V, Office of Superfund. The purpose of the sampling was to provide sufficient definition of polychlorinated biphenyl (PCB) contamination in site soils in order to prepare the engineering design for the site remediation.

The remedial action proposed for the facility by USEPA specifies that site materials with greater than 50 mg/kg PCBs be excavated and sent to either an on-site landfill or an off-site landfill that complies with the Toxic Substances Control Act (TSCA). Millennium has proposed that the most cost-effective and protective landfill is their Ohio Environmental Protection Agency (OEPA)-permitted industrial waste landfill, that is located along Middle Road and is being managed by Plant II. The DSP was developed in order to better define potential excavation areas in five plant areas and to estimate the volume of soils that contain greater than 50 mg/kg PCBs. The field activities for the DSP were conducted from June 2, 1997 through June 19, 1997, by Millennium and **AquAeTer, Inc.** The investigation consisted of a field study, including the placement of 62 soil borings; laboratory analyses of the 291 soil samples for PCB content; and preliminary volume calculations based on the laboratory results. Presently there are over 1,000 PCB analyses associated with this site. USEPA has determined that this level of sampling is sufficient to progress to the engineering design stage for this site.

Previously identified PCB contaminated areas were further defined by the results of the DSP. Contaminated soils were generally found in areas predicted by past sampling events except for one new area found adjacent to the northeast corner of the North Pond. Boring results indicate that the entire site is underlain by dry, stiff grey clay (glacial till) encountered at boring depths to 22 feet. The moisture content of the soils averaged 23 percent. To date, only Aroclor 1248 has been identified in the samples collected by Millennium.

DSP sampling data, as well as historical sampling data, were used to revise the estimated volumes of contaminated soil at the Plant II $TiCl_4$ facility. Revised volume estimates for each of the five plant areas are identified below.

REVISED VOLUME ESTIMATES

PLANT AREA	50 - 500 mg/kg ESTIMATED VOLUME (yd^3)	>500 mg/kg ESTIMATED VOLUME (yd^3)
Non-Traffic Area	303	181
North Traffic Area	1,461	274
Laydown Area	0	0
Plant Process Area	725	317
Mining Residuals Pile	14,595	3,021
Total Volume	**17,084**	**3,793**

Based on the preliminary volume calculations, the estimated 30-year present worth cost to implement Alternative VI from Technical Memorandum 3 (TM-3) for this site are $9,586,000. This cost is based on disposal at the Model City, New York TSCA landfill.

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SECTION 1

INTRODUCTION

This report provides the results of a Delineation Sampling Program (DSP) implemented at the Millennium Inorganic Chemicals Inc. (Millennium) Plant II $TiCl_4$ facility. The DSP was implemented by agreement between Millennium and the U.S. Environmental Protection Agency (USEPA), Region V, Office of Superfund. The purpose of the sampling was to better define polychlorinated biphenyl (PCB) contamination in site soils. The following text briefly describes the facility, historical sampling, and implementation of the DSP.

SITE DESCRIPTION

Millennium Plant II operates a titanium dioxide (TiO_2) manufacturing facility located in Ashtabula, Ohio, as shown in Figure 1-1. Plant II consists of two facilities: **1)** a titanium tetrachloride ($TiCl_4$) facility; and **2)** a titanium dioxide facility, as presented in Figure 1-2. A detailed site map of the $TiCl_4$ facility is presented in Figure 1-3.

The Plant II $TiCl_4$ facility is located in the south-central portion of the industrialized area near Fields Brook. State Road forms the western boundary, and Middle Road forms the southern boundary. Detrex Corporation is located to the north, across Fields Brook, and Vygen Corporation is located to the east. Fields Brook flows from east to west between Detrex and the Millennium Plant II $TiCl_4$ facility.

The facility consists of five primary plant areas: **1)** the Non-Traffic Area; **2)** the North Traffic Area; **3)** the Laydown Area; **4)** the Plant Process Area; and **5)** the Mining Residuals Pile.

Stormwater from the majority of the facility drains to the facility wastewater treatment system. The areas that drain to the treatment system are within the Facility Stormwater Collection Area (FSCA). Plant areas outside of the FSCA primarily drain towards Fields Brook. The FSCA and its relation to each of the five plant areas is included in Figure 1-3.

SAMPLING HISTORY

Approximately 1,000 samples, primarily soils, have been analyzed for PCBs at the Millennium Plant II $TiCl_4$ facility from December 1990 to present. These samples were collected under a Toxic Substance Control Act (TSCA) work plan; under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Source Control Operable Unit (SCOU) investigation; and as part of site operational activities.

Three different "action levels" exist for the facility under the TSCA and CERCLA programs: **1)** the Fields Brook sediment clean-up goal (CUG) of 3.1 mg/kg; **2)** the TSCA trigger level of 50 mg/kg PCBs; and **3)** the combined CERCLA and TSCA definition of principal threat, 500 mg/kg PCBs. In light of these three levels, the PCB data have been used to evaluate the lateral and vertical extent of PCBs within the facility for better definition of remedial alternatives for the site.

DELINEATION SAMPLING PROGRAM

The most recent remedial alternative proposed for the facility involves the excavation of site materials with greater than 50 mg/kg PCBs. In order to better define potential excavation areas in the five plant areas, the Delineation Sampling Program was developed. The DSP was conducted from June 2, 1997 through June 19, 1997, by Millennium and **AquAeTer.** The investigation consisted of a field study, including the placement of 62 soil borings; laboratory analyses of the 291 soil samples for PCB content; and preliminary volume calculations based on the laboratory results. This report presents a discussion of the field study, the laboratory analyses and results, and the preliminary volume estimates. In addition, the report briefly evaluates various methods to determine final excavation lines during the design phase of the project. After implementation of the DSP, over 1,000 PCB analyses have been performed at the 28-acre Millennium facility. Boring locations for all site samples are shown in Figure 1-4.

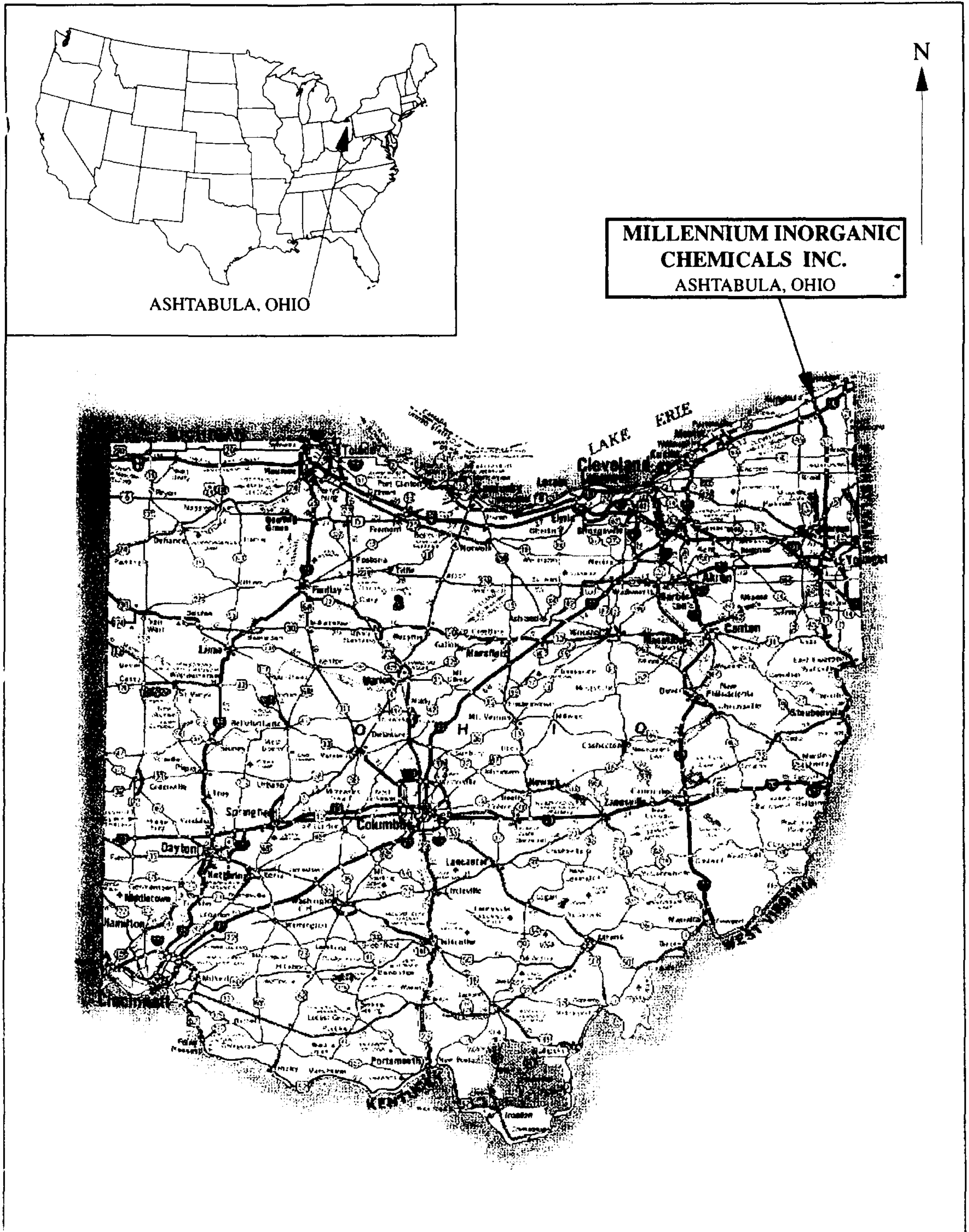
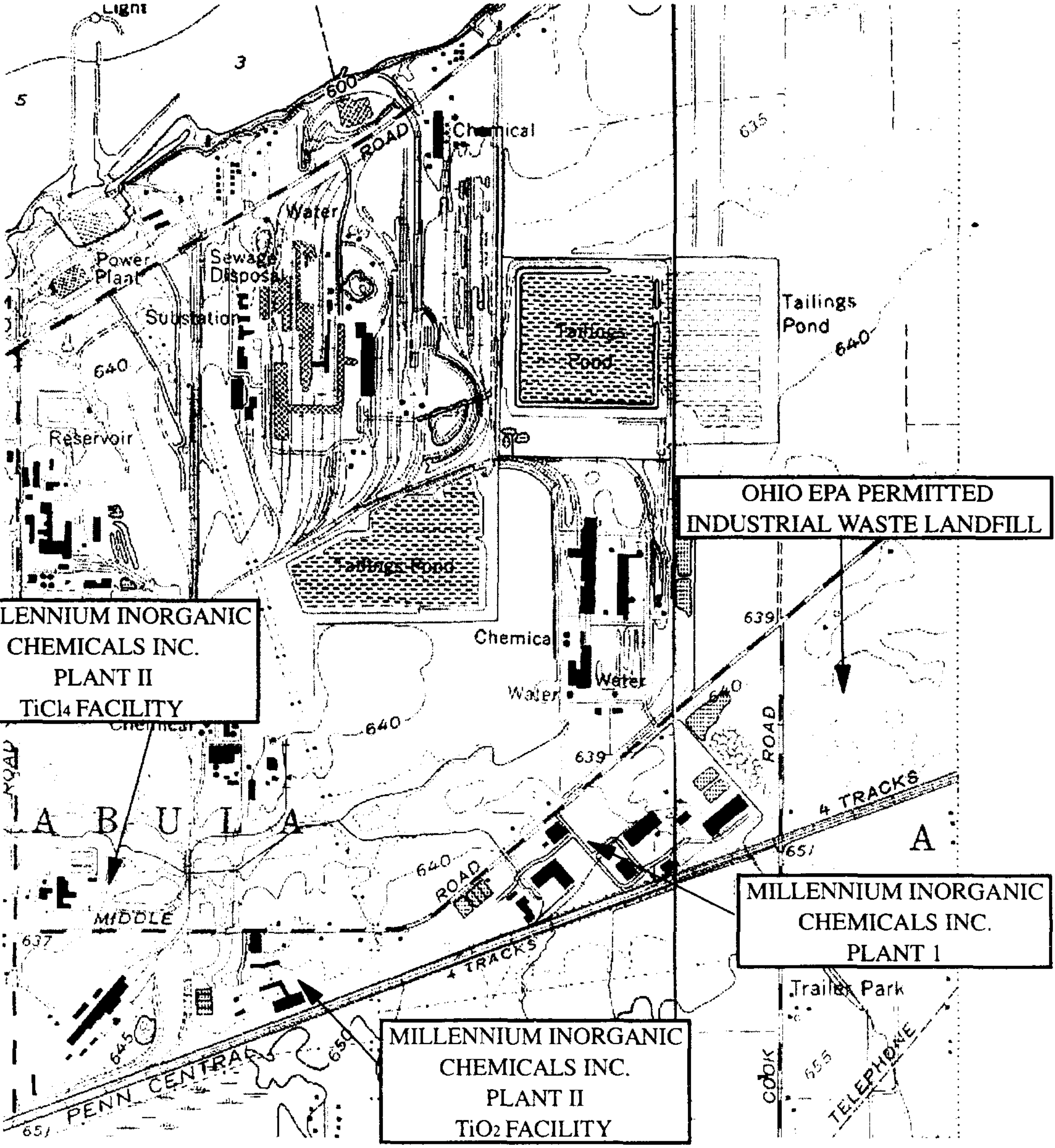


FIGURE 1-1
LOCATION MAP



SOURCE: USGS 7.5 min TOPOGRAPHIC MAP, QUADRANGLES ASHTABULA NORTH, OH, 1970; NORTH GAGEVILLE, OH 1979.

FIGURE 1-2

AREA MAP

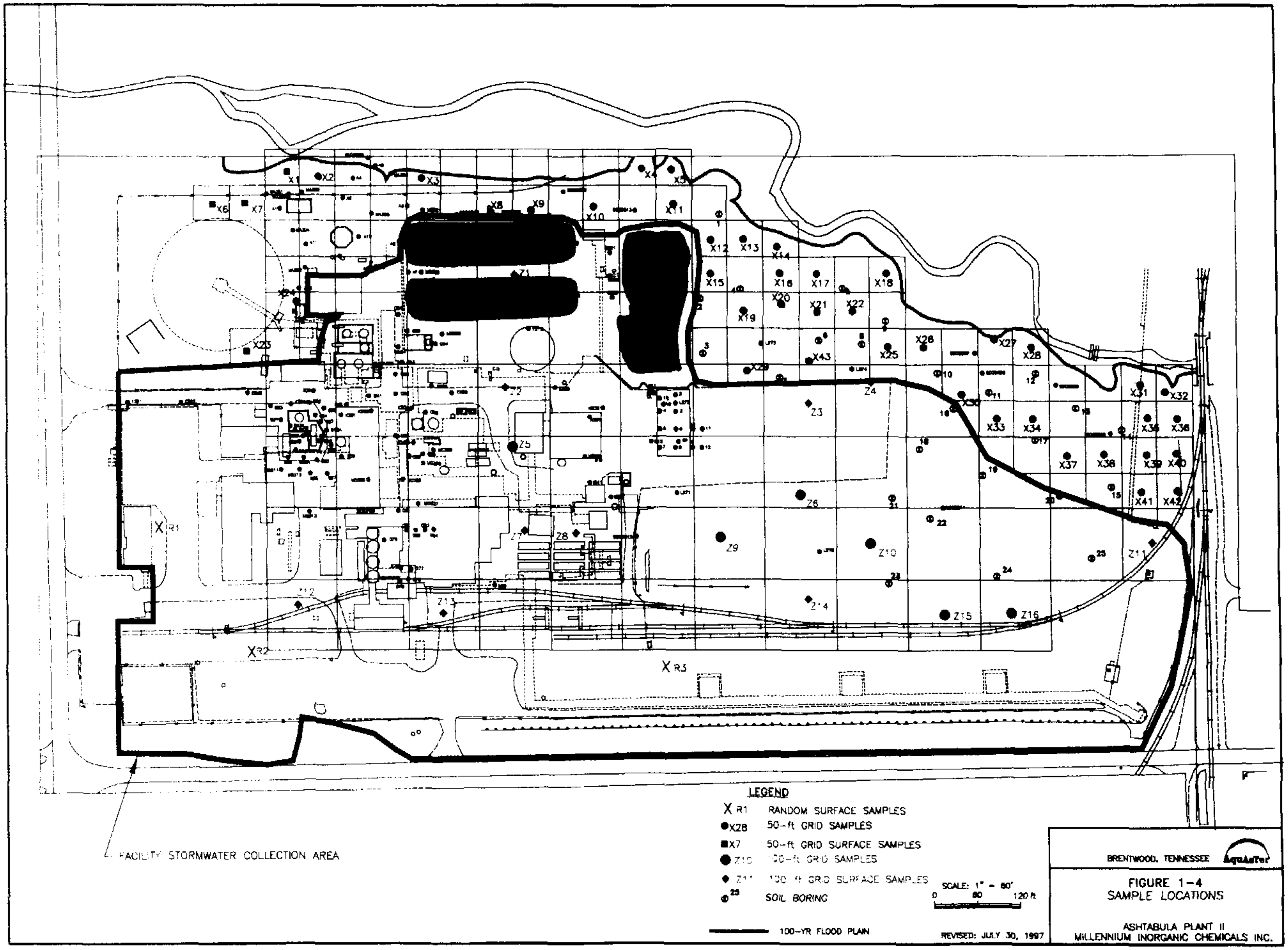


FIGURE 1-4
SAMPLE LOCATIONS

ASHTABULA PLANT II
MILLENNIUM INORGANIC CHEMICALS INC.

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SECTION 2

SCOPE OF WORK

The drilling activities were conducted in order to further define and delineate the areas of the facility which contain levels of PCBs at: 1) 50 to 500 mg/kg; and 2) greater than 500 mg/kg. The delineation sampling project included 47 locations for soil borings with a drill rig or hand auger, 15 surface sampling locations, and a total of 323 PCB analyses (including 32 quality assurance/quality control analyses).

Each sample was assigned a distinct sample identification number. Field notes and boring logs were maintained for each location. The field notes and boring logs are presented in Appendices 1 and 2, respectively.

SAMPLE LOCATIONS

USEPA and Millennium agreed upon sample locations in advance of the field activities. The sample locations were based upon a grid pattern, as shown in Figure 2-1 and as outlined below.

Outside of the FSCA

Outside the FSCA, samples were collected on a 50-foot grid, either from the surface or every 2 feet vertically to glacial till. These borings represent areas that have the potential to erode directly to the Fields Brook floodplain. The surface samples were collected in areas associated with the vehicular transport of PCBs (on tires), which generally results in only surface contamination.

Samples from the mining residuals pile area were collected using an all-terrain vehicle (ATV) drill rig. A hand auger was used for eight locations at the eastern portion of the property. These eight locations were situated above underground plant utilities which made the use of the drill rig impractical. During the field activities, USEPA verbally agreed to the placement of these eight locations to a depth of six feet each by hand auger.

Inside of the FSCA

In portions of the active plant areas and the Mining Residuals Pile which drain to the FSCA, samples were collected on a 100-foot grid, every 4 feet vertically to the soil/till interface. Inside the FSCA in the Laydown Area, three samples were collected on a 100-foot grid, to a depth of 4 feet. The depth range for soil analysis from the core samples from these three borings was randomly selected and preapproved by USEPA. Two samples were collected from inside the FSCA under the concrete pad from a depth of 0 to 2 feet. The actual borings were progressed to a depth of eight feet, and boring logs were prepared to document that mining residuals were not encountered.

Inside the FSCA in the remainder of the plant, samples were collected on a 100-foot grid. These samples consisted of primarily surface samples; however, one location (Z5) was sampled every four feet vertically to the soil/till interface.

In addition, in areas inside the FSCA with no known or potential connection to PCB use, transport, or disposal (i.e., to the south of the railroad tracks and outside the fence in the west parking/grass areas), three random surface samples were collected (R1, R2, and R3).

SAMPLING PROCEDURES

Prior to initiation of drilling activities, R.E. Warner & Associates of Westlake, Ohio was subcontracted to survey and mark the locations of boring sites. A stake, marked with the corresponding sample number, was placed at each of the proposed sampling locations. The location of each sample point was positioned on the sampling grid using a Pentax PTS-III 10 Total Station® laser system. **AquAeTer** provided oversight for the surveying activities to ensure that marked locations were within the approved grid locations and would be accessible to the drilling equipment. Several locations were moved within their respective grid squares in order to avoid obstacles such as overhead pipe racks, structures, utilities, and topographical features.

EDP Consultants, Inc. (EDP) of Kirtland, Ohio was subcontracted to drill soil borings at all locations. Each boring was placed as deep as necessary to reach glacial till. **AquAeTer** gathered some surface samples which could be obtained without use of the drill rig or other equipment provided by EDP. Surface samples were collected by **AquAeTer** with a shovel or stainless steel hand trowel. Cleanup procedures identical to those used for the split spoon samples (discussed below) were used on this equipment between the collection of each sample.

Samples were collected at the pre-determined locations, as feasible. If the sampling crew collected a sample at an alternative location, the actual sample location was recorded by measuring and recording the bearing and distance from the staked point using a compass and tape measure. The boring locations, as surveyed in the field, are shown in Figure 2-1. The boring location coordinates in the Plant II coordinate system are presented in Figure 2-2, which has been approved and stamped by a Professional Land Surveyor in the State of Ohio.

SAMPLE LABELS

Each sample collected was assigned a unique sample identification number. The identification number consisted of the components described below.

♦	Sample Matrix	X = 50-foot grid Z = 100-foot grid R = random samples
♦	Sample Number/Location	01, 02....n, n = number of samples in the Matrix
♦	Sample Type	S = Soil, D = Duplicate, M = Matrix Spike Duplicate

SAMPLE COLLECTION AND QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Surface Soil Samples

Surface soil samples were collected at the marked sampling location. Field personnel photographed the sampling location using a white board to identify the sample point. All sampling data were entered into a bound, water-resistant field log book. No variations to the approved scope of work were recorded in the field variance notebook. Because USEPA considered a boring location to be valid as long as it was within its respective grid square, it was not considered a variance when a boring location was relocated within its respective grid square. The use of the hand auger rather than the drill rig was not considered a variance from the approved work plan. Hand-augering was approved in advance by USEPA, and was necessary to avoid underground utilities in the eastern portion of the site. Valid samples were collected by hand auger from these sites. Surface samples were collected in the manner described below.

- Soil samples were collected from the upper 6 inches of soil after existing cover materials (i.e., vegetation, gravel, concrete, or asphalt) were removed from the sampling location. Areas cleaned for sampling were approximately 1 foot by 1 foot.
- At least 50 grams of soil were collected for the PCB analysis and placed in a 4-ounce, wide-mouth glass jar with a Teflon-lined lid.
- Duplicate and Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples were collected by distributing soil equally into two sets of sample containers at a frequency of 1 per 20 samples collected, as described in the Sediment Operable Unit Quality Assurance Project Plan (SOU QAPjP). MS/MSD samples were prepared by the laboratory from the environmental samples collected by the field personnel. These samples were analyzed for PCBs to evaluate whether matrix spike recoveries falling outside the acceptable windows were attributable to sample matrix interferences or to laboratory analytical errors. The sample was placed in an appropriate sample container for shipment to the analytical laboratory.
- In order to minimize cross contamination between sample locations, any equipment or personal protective equipment which potentially came into contact with contaminated material, was changed or decontaminated between sampling events.
- Surface soil samples were analyzed for PCBs (Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260). Sample containers were stored in iced, insulated coolers with appropriate chain-of-custody documentation and sent to the laboratory via overnight carrier.

Collection of field blanks and inclusion of trip blanks were not required for soil samples. Subsurface samples were collected in the manner described below.

- The drill rig auger was advanced after existing cover materials (i.e., vegetation, gravel, concrete, or asphalt) were removed from the sampling location.
- A 2-foot split spoon sampler was used and boring logs were maintained for the entire drilling depth. Samples collected at 4-foot vertical intervals were obtained from the upper two feet of each interval. For example, in a 12-foot deep boring, samples would be collected at 0 to 2 feet, 4 to 6 feet, and 8 to 10 feet.
- At least 50 grams of soil were collected for the PCB analysis and placed in a 4-ounce, wide-mouth glass jar with a Teflon-lined lid.
- Duplicate and MS/MSD samples were collected by distributing soil equally into two sets of sample containers at a frequency of 1 per 20 samples collected, as described in the SOU QAPjP. MS/MSD samples were prepared by the laboratory from the environmental samples collected by the field personnel. These samples were analyzed for PCBs to evaluate whether matrix spike recoveries falling outside the acceptable windows are attributable to sample matrix interferences or to laboratory analytical errors.
- In order to minimize cross contamination between sample locations, any equipment or personal protective equipment which had the potential to cause cross-contamination was changed or decontaminated between sampling events.
- Surface soil samples were analyzed for PCBs (Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260). Sample containers were stored in iced, insulated coolers with

appropriate chain-of-custody documentation and sent to the laboratory via overnight carrier.

Collection of field blanks and inclusion of trip blanks in sample shipments was not required for soil samples. Proper labeling and chain-of-custody procedures were followed for all samples. Samples were preserved at or below 4 °C.

DECONTAMINATION ACTIVITIES

Decontamination of personnel and equipment was performed to prevent possible cross-contamination and transport of contaminants off-site or between work areas. A mobile decontamination station was established near each sample location.

Personnel Decontamination

Sampling personnel were required to use new, clean gloves while collecting each sample. Non-disposable personal protective gear was decontaminated before personnel left the hot zone and at the end of each day. The personnel decontamination procedure is described below:

1. Place equipment and/or samples in designated area;
2. Remove outer coveralls and booties and place in plastic bags;
3. Wash boots and outer gloves using soap (Alconox or equivalent) and potable water rinse. Place gloves and disposable overboots in plastic bags;
4. Remove respirator, if used, sanitize, and store in appropriate place;

5. Wash hands and face;
6. Collect and store disposable equipment for disposal; and
7. Collect and store rinsate for disposal.

Sampling Equipment Decontamination

If possible, disposable or dedicated sampling equipment was used; and therefore, this equipment did not require decontamination. However, for non-dedicated equipment, the following decontamination procedure was followed.

Sampling equipment was decontaminated before use. Reusable, non-dedicated equipment was decontaminated between each sampling event and before removal from the exclusion zone. The procedure for sampling equipment decontamination is described below:

1. Remove loose soil by wiping with a paper towel wetted in cleaning solution;
2. Wash with Alconox or other low-phosphate detergent wash;
3. Rinse with organic-free deionized (DI) water;
4. Rinse with isopropanol;
5. Rinse with DI water;
6. Allow to air dry (when weather permitted);
7. Triple rinse with DI water; and
8. Collect and store rinsate for disposal.

Drill augers were decontaminated by steam cleaning between uses. The augers were placed into a small diked area constructed to contain the washwater from this procedure. The drill rig was decontaminated just inside a larger diked area constructed to contain the washwater from this procedure. External surfaces were cleaned with a high volume water stream while the rig was elevated. The exterior and interior of the drill rig were then steam cleaned. Wooden pallets and spare tires formed a pathway over which the rig could move from the hot zone to the decontamination zone. This pathway minimized further contact with the surface of the designated hot zone.

All cleaning solutions used in the decontamination zone, as well as those collected from decontaminating split spoons in the hot zone, were collected and filtered through an activated carbon column prior to discharge to the plant wastewater treatment facility.

Split spoons and augers were kept on-site after the final decontamination. Cleanliness of these items was determined through PCB wipe samples. Wipe samples were collected from six augers and nine split spoons, then analyzed by Lancaster Laboratories, Inc. Laboratory reports for the wipe samples are included in Appendix 3. The split spoons and augers were removed by the drilling sub-contractor once the analytical results verified that the wipe samples from the augers and split spoons contained less than 10 µg/100 cm^2 (40 CFR 761.125 (b)(1)(i)).

Decontamination results of the drill rig were determined by visual inspection after the high volume water wash and steam cleaning steps. The drill rig underwent decontamination similar to the augers, which were determined to contain less than the Toxic Substances Control Act (TSCA) limit of 10 µg/100 cm^2 by analysis of PCB wipe samples.

HEALTH AND SAFETY

A Health and Safety Plan (HASP) was developed and followed for this project. In addition to the HASP, other health and safety concerns defined the work practices employed in the field. Persons entering the hot zone had the proper personal protective equipment. Furthermore, all individuals were properly informed of all health considerations and safety procedures. A site health and safety meeting was conducted prior to initiation of field activities to discuss safety procedures. Occupational Safety and Health Act (OSHA) worker training certificates are presented in Appendix 4.

DISPOSAL OF CONTAMINATED PROJECT MATERIALS

Decontamination rinsate was collected and pumped through an activated carbon drum prior to discharge to the facility wastewater treatment system. Personal protective equipment (PPE) and plastic items which may have been contaminated during sampling activities were collected in new, clean steel drums in the decontamination zone. Four drums of PPE were generated during the Fall 1996 sampling event, and four additional drums were generated during the June 1997 Delineation Sampling Program. One drum of activated carbon was used during the Fall 1996 sampling event, and two activated carbon drums were used during the June 1997 event. At the completion of the June 1997 event, eight drums of PPE and three activated carbon drums were sent to the Chemical Waste Management (CWM) Model City, New York facility for landfill (PPE drums) or incineration (carbon drums). CWM operates a TSCA-approved facility and has received PCB-contaminated soils from past Millennium soil removal activities.

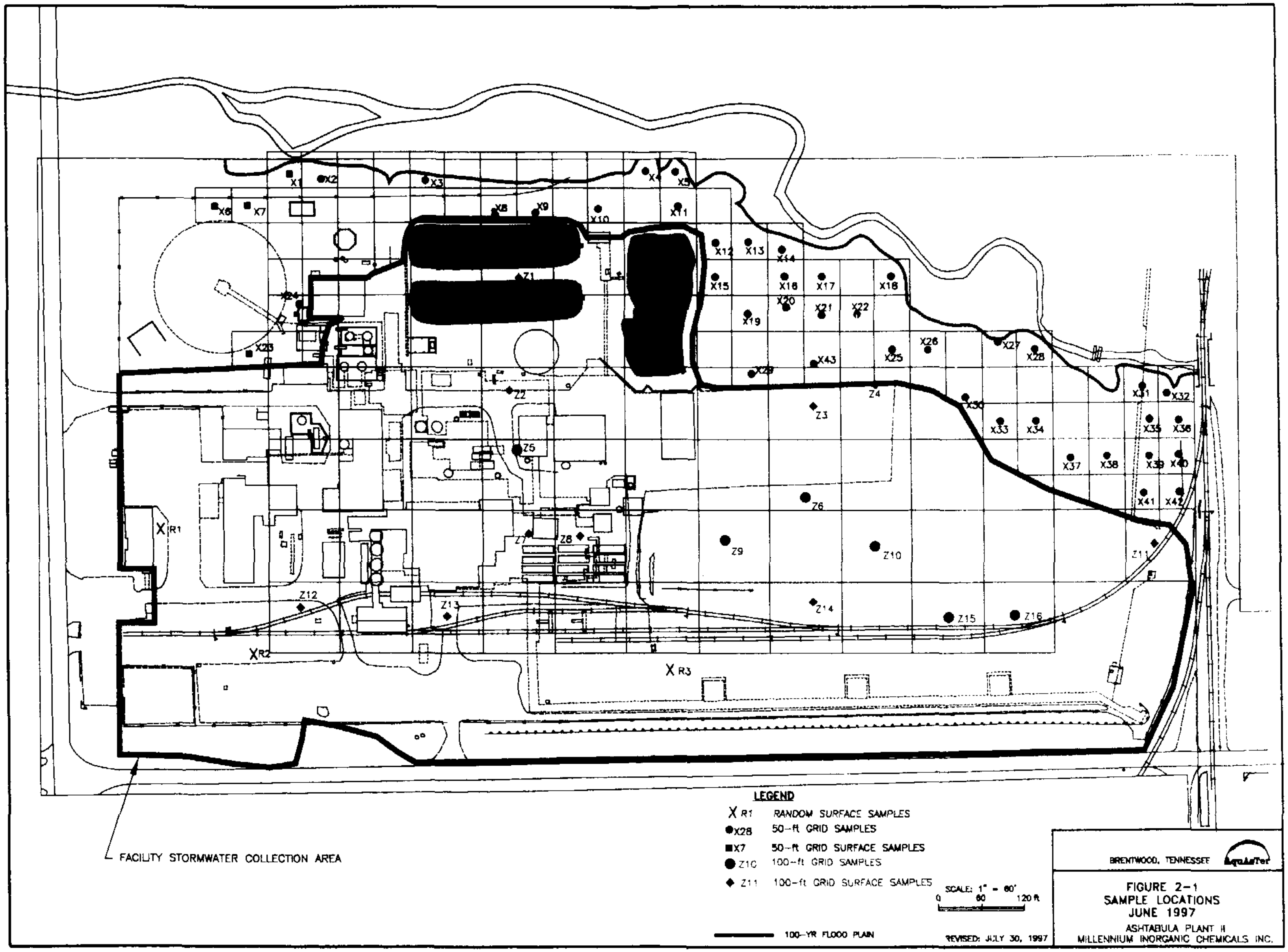
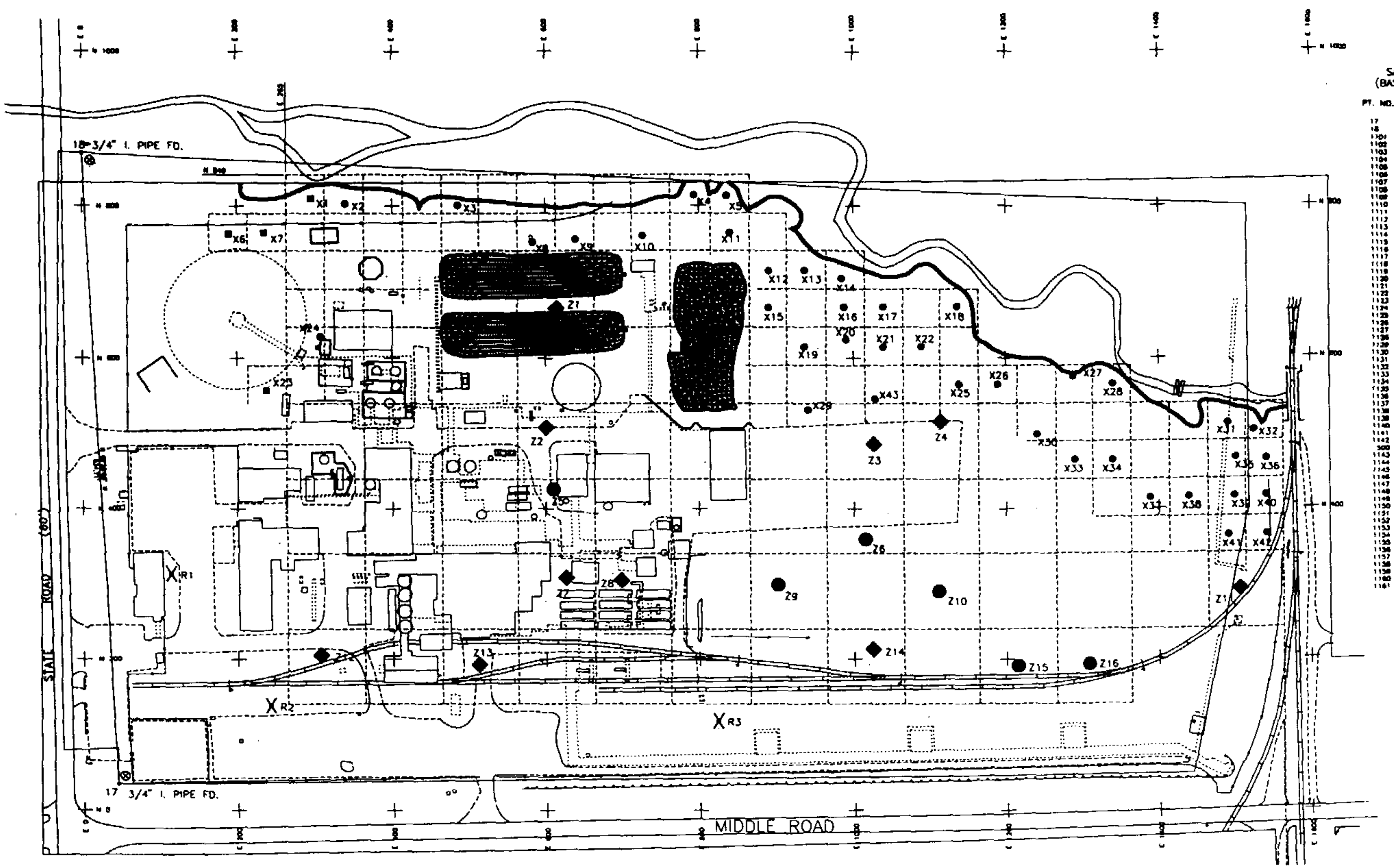


FIGURE 2-1
SAMPLE LOCATIONS
JUNE 1997
ASHTABULA PLANT II
MILLENNIUM INORGANIC CHEMICALS INC.



SAMPLING POINT LOCATIONS
(BASED ON PLANT GRID SYSTEM)

PT. NO.	NORTHING	EASTING	DESC.
17	35.0000	43.2223	3/4" I. PIPE
18	[illegible]	-0.7387	3/4" I. PIPE
1101	808.6125	298.0017	X1
1102	803.6343	330.7151	X2
1103	800.6792	485.1475	X3
1104	813.8773	794.0410	X4
1105	813.3324	836.4118	X5
1106	794.3153	190.0806	X6
1107	785.8546	236.1946	X7
1108	752.8421	583.3316	X8
1109	756.3411	630.7233	X9
1110	761.0753	726.6383	X10
1111	765.1546	830.8653	X11
1112	715.2084	891.1436	X12
1113	715.6725	837.1404	X13
1114	700.4873	984.5800	X14
1115	666.8313	880.5518	X15
1116	667.6733	987.8213	X16
1117	668.1347	1038.7517	X17
1118	487.7770	1138.7652	X18
1119	614.6140	938.4650	X19
1120	624.0000	980.0771	X20
1121	614.8434	1030.5207	X21
1122	615.0201	1080.3556	X22
1123	507.7306	238.2779	X23
1124	588.3046	307.4776	X24
1125	564.7798	1138.3431	X25
1126	564.8474	1188.0872	X26
1127	575.5133	1288.6341	X27
1128	566.4432	1338.4144	X28
1129	531.3369	840.7804	X29
1130	498.7085	1240.4503	X30
1131	512.8726	1488.7112	X31
1132	503.4231	1524.2440	X32
1133	464.6194	1288.0758	X33
1134	464.6384	1338.3026	X34
1135	466.8875	1499.9677	X35
1136	464.8384	1540.6682	X36
1137	413.9667	1388.3381	X37
1138	415.0504	1438.3784	X38
1139	415.3087	1498.3200	X39
1140	416.4847	1540.0114	X40
1141	363.3784	1490.3780	X41
1142	364.4830	1541.0519	X42
500	549.7431	1028.3387	X43
1143	313.5612	113.2061	R1
1144	138.8217	247.5846	R2
1145	118.4854	823.4312	R3
1146	666.8453	814.7357	Z1
1147	508.1918	800.9794	Z2
1148	465.7388	1026.5756	Z3
1149	515.8187	1113.8789	Z4
1150	425.8824	610.4018	Z5
1151	356.6123	1014.7056	Z6
1152	308.0048	626.3533	Z7
1153	304.6137	667.8011	Z8
1154	298.7522	901.4800	Z9
1155	288.8844	1111.0580	Z10
1156	281.4426	1505.3510	Z11
1157	204.8805	307.0725	Z12
1158	192.7178	511.8249	Z13
1159	213.0665	1024.5462	Z14
1160	180.7080	1214.4222	Z15
1161	193.0662	1307.8266	Z16

LEGEND

X R1	RANDOM SURFACE SAMPLES
● X28	50-ft GRID SAMPLES
■ X7	50-ft GRID SURFACE SAMPLES
● Z10	100-ft GRID SAMPLES
◆ Z11	100-ft GRID SURFACE SAMPLES
• 17/18	3/4" I. PIPE FD.
▬	100-YR FLOOD PLAIN
⊗	BENCH MARKS (LOCATIONS TO BE VERIFIED)

N

0' 60 120 ft

NOTE: BASE MAPPING PROVIDED BY OTHERS

R.E. WARNER & ASSOCIATES
CONSULTING ENGINEERS

JOB No. 21497

DR. BY DLS
CHK. BY MS
APR. BY WAN
DATE 8-10-97
SCALE 1" = 140'

NO.	DATE		BY	CHKD
3	7/31/97	ADDED X43, R3	MS	MS
2	7-18-97	REVISED LOCATIONS	DLS	MS
1	7/03/97	ADDED LOCATIONS	TJH	KWS
0	6/27/97	ISSUED	TJH	KWS

BRENTWOOD, TENNESSEE AquAeTer

DELINEATION SAMPLING LOCATIONS

ASHTABULA PLANT II
MILLENNIUM INORGANIC CHEMICALS INC.

Millennium Inorganic Chemicals
PLANT 2
ASHTABULA, OHIO

TiCL4 PLANT SITE
GRID AND SAMPLING
LOCATIONS

FIGURE 2-2

DRAWN BY:
CHECKED BY:
APPROVED BY:
APPROVED BY:
PROJECT:
DATE
SCALE
DRAWING NUMBER
10-0-1638

MICHAEL

Michael Straub
7/31/97

SECTION 3

LABORATORY RESULTS

PCBs are the parameter of concern for this site. All samples were analyzed for PCBs, specifically Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, and Aroclor 1260, using Method 8081 as described in Test Methods for Evaluating Solid Waste, third edition and subsequent revisions (SW846), by Lancaster Laboratories, Inc.

The quality assurance/quality control (QA/QC) procedures followed those outlined by Woodward-Clyde Consultants (WCC) in the "Source Control Operable Unit RI/FS Revised QAPjP and Field Sampling Plan, Phase I" (December 1992) and the "Phase III Floodplain Sampling Design Investigation Quality Assurance Project Plan Addendum" (November 8, 1994). While the referenced plans are specific to WCC sampling events, the premise of these reports was used for this sampling event. Sampling and oversight were performed by **AquAeTer.**

PCB ANALYSIS

Samples for PCB determination were forwarded by overnight courier to Lancaster Laboratories, Inc. in Lancaster, Pennsylvania for analysis. Laboratory results for the analyses are summarized in Table 3-1. A complete set of laboratory results is presented in Appendix 5. The laboratory results presented here, in conjunction with all previous site data, were used as the basis for preliminary volume calculations, as described in Section 4. The previous site data are summarized in Table 3-2.

Quality assurance/quality control samples were taken in order to test the validity of the analytical laboratory. QA/QC was provided by 16-blind duplicate soil samples taken in the ratio of one duplicate for each 20 regular soil samples. Duplicates were created by dividing the soil aliquot into two approximately equal masses and submitting each as a separate sample. Each duplicate sample is denoted by the suffix "D." Results from the duplicate samples are compared to the original samples in Table 3-3. Duplicate results indicate good agreement between each duplicate and the corresponding original sample. Variability between the duplicate and original sample can be attributed to stratification of soils within the split-spoon sampler.

Fifteen PCB wipe samples were taken from the interior surfaces of decontaminated split spoons and outside surfaces of augers to assess the decontamination procedure and to assure that the sampling equipment was clean before leaving the plant site. Wipe sample results are presented in Table 3-4 and show that decontamination procedures were successful and that the equipment was clean before leaving the site. The wipe sample designated as Auger 2B showed a PCB detection of 1.1 μg/100 cm^2 (at a detection limit of 1.0 μg/100 cm^2). The TSCA regulatory cleanup level for wipe samples is 10 μg/100 cm^2.

MOISTURE ANALYSIS

All samples, including QA/QC, were analyzed for moisture content by Lancaster Laboratories, Inc. The laboratory results are summarized in Table 3-1. Soil samples ranged from 10 to 63 percent moisture, with an average of 22 percent moisture. Samples taken beneath asphalt surfaces had high moisture contents. The moisture content in these samples may have been influenced by the presence of the deionized cooling and lubricating water used in the masonry core sampler.

HISTORICAL FILL AREAS

In order to better understand the historical placement of fill material at the site, PCB concentrations were evaluated with respect to present and historic site elevations. A schematic indicating the ground surface elevations and the PCB concentrations in each boring is presented in Figure 3-1.

The 1956 topographical map presents the top of the bank of Fields Brook looping in a curve farther south than its present location. The floodplain, therefore, extended farther south of Fields Brook into the present mining residuals pile. The 1994 topographic map shows the top of the present bank located much closer to, and parallel to, the current floodplain boundary. It is believed that placement of fill material during the late 1960's to early 1970's was accomplished by placing fill from the bank (1956 topography) to the existing floodplain until the elevations were brought up to the grade of the mining residuals pile at that time. The fill material appears to have been placed at approximately the same elevation as the top of the original bank. This fill area extends from a point north of the concrete pad eastward to a point north of the center of the Mining Residuals Pile.

An overlay of past and current topographic lines depicting the fill area are shown in Figure 3-2. A simplified north-south diagram of cross-section A-A' is shown in Figure 3-3. This area received six to approximately 17 feet of fill from site owners prior to Millennium in order to create its current elevation. The entire fill area along the old and new Brook banks represents a potential for the deposition of PCB-contaminated materials at depths from six to approximately 17 feet. This fill material would have been on top of the existing floodplain at that time. Based on this analysis, the soils with elevated PCB concentrations near historical boring SCCSB03 that are around 15 ft deep were placed as fill in the old floodplain in this area. The existing floodplain today is believed to be around the existing floodplain elevation in 1956. This conclusion is supported by results from the Woodward-Clyde Consultants (WCC) floodplain sampling program. These results have been compared with the Millennium sampling program, and the conclusions are discussed below.

FLOODPLAIN INVESTIGATION RESULTS

Floodplain/wetland area (FWA) delineation sampling for PCBs and hexachlorobenzene (HCB) was performed by WCC and presented in a draft report entitled "FWA Delineation Sampling Report, Fields Brook Site, Ashtabula, Ohio" issued on May 28, 1997. The Floodplain Exposure Unit (FEU) was sampled on a 50-ft grid system which placed at least one 12-inch surface sample per grid. The FWA delineation results are presented in Figure 3-4. The WCC map and the Millennium site map are based on 1987 and 1994 aerial surveys, respectively. Due to differences between the aerial surveys, the WCC floodplain information as shown on the Millennium map is presented on an approximate scale.

The majority of FWA results along the Brook on the Millennium property are lower than 50 mg/kg. Three FWA areas of PCB contamination greater than 50 mg/kg are presented in Figure 3-4. However, the only true correlation between the Millennium facility and the FWA occurs north/northwest of the old outfall. Contamination in the old outfall area most likely occurred prior to 1971, when PCBs were removed from the facility heat transfer system. Of the two other FWA areas with slightly greater than 50 mg/kg PCBs, the surface soils on the Millennium site were found to be less than 50 mg/kg at one of these locations. At the other location, Millennium will be removing soils directly adjacent to the elevated PCB concentration in the floodplain.

GLACIAL TILL LAYER

The Millennium site is underlain by a layer of stiff, dry, grey clay known as glacial till. This layer occurs at elevations ranging from 612 to 630 feet, and slopes to the north towards Lake Erie, as presented in Figure 3-5. This clay layer has very low permeability and therefore was the designated endpoint for the borings. Glacial till was encountered in all 37 deep borings, and samples of this clay were taken for PCB analysis. PCBs were not detected in 33 of the till samples. PCB concentrations in the remaining four samples were at very low levels (6.6, 0.79, 0.75, and 0.46 mg/kg). Therefore, the glacial till underlying the Millennium site acts as an effective barrier to vertical PCB migration. These data support previous modeling by Gradient and analyses by WCC indicating that groundwater was not a pathway for recontamination of Fields Brook.

TABLE 3-1. DELINEATION SAMPLING PROGRAM SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.	AREA	MOISTURE CONTENT
	MIN (ft)	MAX (ft)	(mg/kg)		(%)
X1	0	0.5	0.77	Non-Traffic Area	35.2
X2	0	2	< 0.2	Non-Traffic Area	18.2
X2	2	4	< 0.2	Non-Traffic Area	14.6
X2	4	6	< 0.2	Non-Traffic Area	18.7
X2	6	8	< 0.2	Non-Traffic Area	12.2
X3	0	2	< 0.2	Non-Traffic Area	17.2
X3	2	4	< 0.2	Non-Traffic Area	14.6
X3	4	6	< 0.2	Non-Traffic Area	21.1
X3	6	8	< 0.2	Non-Traffic Area	20.2
X3	8	10	< 0.2	Non-Traffic Area	21.6
X3	10	12	< 0.2	Non-Traffic Area	11.9
X4	0	2	< 0.2	Non-Traffic Area	25.5
X4	2	4	< 0.2	Non-Traffic Area	18.7
X4	4	6	< 0.2	Non-Traffic Area	15.0
X4	6	8	< 0.2	Non-Traffic Area	12.7
X5	0	2	19.7	Non-Traffic Area	19.6
X5	2	4	< 0.2	Non-Traffic Area	23.5
X5	4	6	< 0.2	Non-Traffic Area	16.1
X5	6	8	< 0.2	Non-Traffic Area	13.9
X5	8	10	< 0.2	Non-Traffic Area	10.5
X6	0	0.5	< 0.2	North Traffic Area	18.4
X7	0	0.5	0.27	North Traffic Area	16.0
X8	0	2	1.94	North Traffic Area	16.4
X8	2	4	6.41	North Traffic Area	18.4
X8	4	6	11.5	North Traffic Area	20.3
X8	6	8	3.9	North Traffic Area	19.2
X8	8	10	< 0.2	North Traffic Area	17.1
X8	10	12	< 0.16	North Traffic Area	19.0
X8	12	14	< 0.2	North Traffic Area	18.4
X8	14	16	0.27	North Traffic Area	19.9
X8	16	18	< 0.2	North Traffic Area	10.3

TABLE 3-1. DELINEATION SAMPLING PROGRAM SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.	AREA	MOISTURE CONTENT
	MIN (ft)	MAX (ft)	(mg/kg)		(%)
X9	0	2	132	North Traffic Area	18.0
X9	2	4	170	North Traffic Area	16.0
X9	4	6	13.1	North Traffic Area	22.1
X9	6	8	0.42	North Traffic Area	15.9
X9	8	10	0.26	North Traffic Area	17.0
X9	10	12	< 0.2	North Traffic Area	22.7
X9	12	14	< 0.2	North Traffic Area	14.7
X9	14	16	< 0.2	North Traffic Area	10.6
X10	0	2	1.54	North Traffic Area	17.8
X10	2	4	< 0.2	North Traffic Area	19.9
X10	4	6	< 0.2	North Traffic Area	22.5
X10	6	8	< 0.2	North Traffic Area	15.0
X10	8	10	< 0.2	North Traffic Area	15.6
X11	0	2	16.9	North Traffic Area	19.2
X11	2	4	17.6	North Traffic Area	26.9
X11	4	6	< 0.2	North Traffic Area	13.1
X11	6	8	< 0.2	North Traffic Area	13.7
X11	8	10	< 0.2	North Traffic Area	10.1
X12	0	2	23.4	Mining Residuals Pile	22.9
X12	2	4	13.4	Mining Residuals Pile	19.8
X12	4	6	10.7	Mining Residuals Pile	22.7
X12	6	8	9.1	Mining Residuals Pile	19.3
X12	8	10	< 0.2	Mining Residuals Pile	21.8
X12	10	12	< 0.2	Mining Residuals Pile	14.1
X12	12	14	< 0.2	Mining Residuals Pile	11.0
X12	14	16	< 0.2	Mining Residuals Pile	11.3
X13	0	2	9.6	Mining Residuals Pile	58.9
X13	2	4	136	Mining Residuals Pile	40.0
X13	4	6	18.2	Mining Residuals Pile	31.2
X13	6	8	< 0.2	Mining Residuals Pile	17.3
X13	8	10	< 0.2	Mining Residuals Pile	12.9
X13	10	12	< 0.2	Mining Residuals Pile	10.0
X14	0	2	9.4	Mining Residuals Pile	63.1
X14	2	4	46.4	Mining Residuals Pile	34.3
X14	4	6	< 0.2	Mining Residuals Pile	20.2
X14	6	8	< 0.2	Mining Residuals Pile	13.0

TABLE 3-1. DELINEATION SAMPLING PROGRAM SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.	AREA	MOISTURE CONTENT
	MIN (ft)	MAX (ft)	(mg/kg)		(%)
X15	0	2	9.5	Mining Residuals Pile	40.5
X15	2	4	5.8	Mining Residuals Pile	22.8
X15	4	6	5.1	Mining Residuals Pile	22.6
X15	6	8	8.2	Mining Residuals Pile	21.5
X15	8	10	< 0.2	Mining Residuals Pile	19.2
X15	10	12	< 0.2	Mining Residuals Pile	14.9
X16	0	2	3	Mining Residuals Pile	44.0
X16	2	4	11.1	Mining Residuals Pile	30.8
X16	4	6	23.2	Mining Residuals Pile	40.9
X16	6	8	23.6	Mining Residuals Pile	34.1
X16	8	10	< 0.2	Mining Residuals Pile	21.4
X16	10	12	< 0.2	Mining Residuals Pile	18.1
X16	12	14	< 0.2	Mining Residuals Pile	16.2
X16	14	16	< 0.2	Mining Residuals Pile	14.2
X17	0	2	15.8	Mining Residuals Pile	42.6
X17	2	4	32.4	Mining Residuals Pile	35.6
X17	4	6	25.9	Mining Residuals Pile	36.2
X17	6	8	52	Mining Residuals Pile	17.7
X17	8	10	124	Mining Residuals Pile	36.5
X17	10	12	0.37	Mining Residuals Pile	13.4
X17	12	14	58	Mining Residuals Pile	33.9
X17	14	16	< 0.2	Mining Residuals Pile	12.5
X17	16	18	6.6	Mining Residuals Pile	14.7
X18	0	2	19.6	Mining Residuals Pile	59.2
X18	2	4	9.8	Mining Residuals Pile	45.3
X18	4	6	0.46	Mining Residuals Pile	18.2
X18	6	8	< 0.2	Mining Residuals Pile	34.3
X18	8	10	< 0.2	Mining Residuals Pile	18.3
X18	10	12	< 0.2	Mining Residuals Pile	13.5
X18	12	14	0.79	Mining Residuals Pile	10.0

TABLE 3-1. DELINEATION SAMPLING PROGRAM SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.	AREA	MOISTURE CONTENT
	MIN (ft)	MAX (ft)	(mg/kg)		(%)
X19	0	2	18.2	Mining Residuals Pile	19.4
X19	2	4	20.1	Mining Residuals Pile	26.1
X19	4	6	25.1	Mining Residuals Pile	29.2
X19	6	8	23.3	Mining Residuals Pile	16.6
X19	8	10	18.9	Mining Residuals Pile	17.0
X19	10	12	< 0.2	Mining Residuals Pile	14.6
X19	12	14	< 0.2	Mining Residuals Pile	14.2
X19	14	16	< 0.2	Mining Residuals Pile	14.0
X19	16	18	< 0.2	Mining Residuals Pile	13.5
X19	18	20	< 0.2	Mining Residuals Pile	12.6
X20	0	2	62	Mining Residuals Pile	28.2
X20	2	4	125	Mining Residuals Pile	29.3
X20	4	6	0.25	Mining Residuals Pile	14.6
X20	6	8	0.3	Mining Residuals Pile	14.4
X20	8	10	< 0.2	Mining Residuals Pile	15.3
X20	10	12	0.62	Mining Residuals Pile	14.3
X20	12	14	< 0.2	Mining Residuals Pile	13.9
X20	14	16	< 0.2	Mining Residuals Pile	12.0
X21	0	2	452	Mining Residuals Pile	33.7
X21	2	4	2.73	Mining Residuals Pile	52.5
X21	4	6	132	Mining Residuals Pile	38.5
X21	6	8	< 0.2	Mining Residuals Pile	17.3
X21	8	10	< 0.2	Mining Residuals Pile	16.4
X21	10	12	< 0.2	Mining Residuals Pile	14.2
X21	12	14	0.28	Mining Residuals Pile	12.7
X21	14	16	< 0.2	Mining Residuals Pile	12.1
X21	16	18	< 0.2	Mining Residuals Pile	11.1
X22	0	2	18	Mining Residuals Pile	33.7
X22	2	4	15	Mining Residuals Pile	31.8
X22	4	6	23.8	Mining Residuals Pile	33.2
X22	6	8	32.5	Mining Residuals Pile	31.2
X22	8	10	< 0.2	Mining Residuals Pile	16.2
X22	10	12	< 0.2	Mining Residuals Pile	15.7
X22	12	14	< 0.2	Mining Residuals Pile	10.6
X23	0	0.5	1.7	Process Area	16.8

TABLE 3-1. DELINEATION SAMPLING PROGRAM SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.	AREA	MOISTURE CONTENT
	MIN (ft)	MAX (ft)	(mg/kg)		(%)
X24	0	2	0.87	North Traffic Area	15.0
X24	2	4	0.39	North Traffic Area	19.7
X24	4	6	0.32	North Traffic Area	13.2
X24	6	8	58.1	North Traffic Area	14.7
X24	8	10	6.4	North Traffic Area	15.8
X24	10	12	< 0.2	North Traffic Area	12.0
X24	12	14	< 0.2	North Traffic Area	10.6
X24	14	16	< 0.2	North Traffic Area	10.4
X25	0	2	77	Mining Residuals Pile	35.3
X25	2	4	65	Mining Residuals Pile	17.6
X25	4	6	70	Mining Residuals Pile	22.0
X25	6	8	92	Mining Residuals Pile	18.7
X25	8	10	143	Mining Residuals Pile	29.3
X25	10	12	308	Mining Residuals Pile	34.0
X25	12	14	0.34	Mining Residuals Pile	29.3
X25	14	16	< 0.2	Mining Residuals Pile	24.1
X25	16	18	0.75	Mining Residuals Pile	11.3
X26	0	2	27.1	Mining Residuals Pile	46.1
X26	2	4	17.8	Mining Residuals Pile	24.7
X26	4	6	26.1	Mining Residuals Pile	38.6
X26	6	8	23.8	Mining Residuals Pile	45.0
X26	8	10	32.2	Mining Residuals Pile	19.6
X26	10	12	102	Mining Residuals Pile	25.4
X26	12	14	124	Mining Residuals Pile	28.4
X26	14	16	2.76	Mining Residuals Pile	29.7
X26	16	18	< 0.2	Mining Residuals Pile	12.9
X27	0	2	< 0.2	Mining Residuals Pile	25.1
X27	2	4	< 0.2	Mining Residuals Pile	19.3
X27	4	6	< 0.2	Mining Residuals Pile	16.9
X28	0	2	24.1	Mining Residuals Pile	43.7
X28	2	4	2.79	Mining Residuals Pile	34.5
X28	4	6	< 0.2	Mining Residuals Pile	18.6
X28	6	8	< 0.2	Mining Residuals Pile	11.4

TABLE 3-1. DELINEATION SAMPLING PROGRAM SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.	AREA	MOISTURE CONTENT
	MIN (ft)	MAX (ft)	(mg/kg)		(%)
X29	0	2	3.3	Mining Residuals Pile	55.8
X29	2	4	2.34	Mining Residuals Pile	14.7
X29	4	6	2.9	Mining Residuals Pile	18.6
X29	6	8	0.44	Mining Residuals Pile	20.0
X29	8	10	0.35	Mining Residuals Pile	17.0
X29	10	12	27.9	Mining Residuals Pile	18.1
X29	12	14	< 0.2	Mining Residuals Pile	13.2
X29	14	16	0.46	Mining Residuals Pile	15.0
X30	0	2	30	Mining Residuals Pile	30.2
X30	2	4	11.8	Mining Residuals Pile	48.1
X30	6	7	44	Mining Residuals Pile	30.6
X30	7	8	19.3	Mining Residuals Pile	30.6
X30	8	10	67	Mining Residuals Pile	21.2
X30	10	12	78	Mining Residuals Pile	28.0
X30	12	14	70	Mining Residuals Pile	27.9
X30	14	16	0.29	Mining Residuals Pile	22.7
X30	16	18	< 0.2	Mining Residuals Pile	12.6
X30	18	20	0.54	Mining Residuals Pile	11.5
X30	20	22	< 0.2	Mining Residuals Pile	10.7
X31	0	1	1.61	Mining Residuals Pile	31.5
X31	1	2	0.89	Mining Residuals Pile	22.7
X31	2	3	< 0.2	Mining Residuals Pile	20.4
X31	3	4	< 0.2	Mining Residuals Pile	23.1
X31	4	5	< 0.2	Mining Residuals Pile	28.1
X31	5	6	< 0.2	Mining Residuals Pile	25.4
X32	0	1	0.98	Mining Residuals Pile	18.0
X32	1	2	< 0.2	Mining Residuals Pile	18.2
X32	2	3	< 0.2	Mining Residuals Pile	16.9
X32	3	4	< 0.2	Mining Residuals Pile	25.5
X32	3	5	< 0.2	Mining Residuals Pile	25.8
X32	5	6	< 0.2	Mining Residuals Pile	26.8

TABLE 3-1. DELINEATION SAMPLING PROGRAM SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.	AREA	MOISTURE CONTENT
	MIN (ft)	MAX (ft)	(mg/kg)		(%)
X33	0	2	6.4	Mining Residuals Pile	53.0
X33	2	4	11.7	Mining Residuals Pile	57.4
X33	4	6	0.99	Mining Residuals Pile	58.7
X33	6	8	< 0.2	Mining Residuals Pile	18.5
X33	8	10	< 0.2	Mining Residuals Pile	16.1
X33	10	12	< 0.2	Mining Residuals Pile	14.6
X33	12	14	< 0.2	Mining Residuals Pile	15.4
X33	14	16	< 0.2	Mining Residuals Pile	12.0
X34	0	2	18.8	Mining Residuals Pile	48.9
X34	2	4	35	Mining Residuals Pile	40.7
X34	4	6	144	Mining Residuals Pile	29.8
X34	6	8	< 0.2	Mining Residuals Pile	16.7
X34	8	10	< 0.2	Mining Residuals Pile	13.8
X34	10	12	< 0.2	Mining Residuals Pile	12.5
X34	12	14	< 0.2	Mining Residuals Pile	11.9
X35	0	1	0.8	Mining Residuals Pile	22.9
X35	1	2	< 0.2	Mining Residuals Pile	18.4
X35	2	3	< 0.2	Mining Residuals Pile	19.5
X35	3	4	< 0.2	Mining Residuals Pile	20.6
X35	4	5	< 0.2	Mining Residuals Pile	24.4
X35	5	6	< 0.2	Mining Residuals Pile	31.1
X36	0	1	1.24	Mining Residuals Pile	19.9
X36	1	2	0.23	Mining Residuals Pile	17.9
X36	2	3	< 0.2	Mining Residuals Pile	16.9
X36	3	4	< 0.2	Mining Residuals Pile	17.0
X36	4	5	< 0.2	Mining Residuals Pile	17.1
X36	5	6	< 0.2	Mining Residuals Pile	16.0
X37	0	2	< 2	Mining Residuals Pile	60.5
X37	4	5	76	Mining Residuals Pile	49.1
X37	5	6	3.5	Mining Residuals Pile	63.0
X37	6	8	1.4	Mining Residuals Pile	17.6
X37	8	10	< 0.2	Mining Residuals Pile	13.7
X37	10	12	< 0.2	Mining Residuals Pile	12.6
X37	12	14	< 0.2	Mining Residuals Pile	10.6

TABLE 3-1. DELINEATION SAMPLING PROGRAM SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.	AREA	MOISTURE CONTENT
	MIN (ft)	MAX (ft)	(mg/kg)		(%)
X38	0	2	13.3	Mining Residuals Pile	47.1
X38	2	4	9.2	Mining Residuals Pile	30.7
X38	4	6	< 0.2	Mining Residuals Pile	17.0
X38	6	8	< 0.2	Mining Residuals Pile	13.4
X38	8	10	< 0.2	Mining Residuals Pile	12.9
X38	10	12	< 0.2	Mining Residuals Pile	10.9
X39	0	1	1.45	Mining Residuals Pile	20.1
X39	1	2	< 0.2	Mining Residuals Pile	14.5
X39	2	3	0.2	Mining Residuals Pile	19.1
X39	3	4	< 0.2	Mining Residuals Pile	18.8
X39	4	5	< 0.2	Mining Residuals Pile	20.3
X39	5	6	< 0.2	Mining Residuals Pile	17.4
X40	0	1	1.47	Mining Residuals Pile	17.5
X40	1	2	< 0.2	Mining Residuals Pile	15.3
X40	2	3	< 0.2	Mining Residuals Pile	17.8
X40	3	4	< 0.2	Mining Residuals Pile	20.7
X40	5	7	< 0.2	Mining Residuals Pile	14.9
X40	7	8	< 0.2	Mining Residuals Pile	16.0
X41	0	1	8.4	Mining Residuals Pile	16.8
X41	1	2	0.52	Mining Residuals Pile	19.6
X41	2	3	0.27	Mining Residuals Pile	17.1
X41	3	5	0.2	Mining Residuals Pile	17.3
X41	5	6	< 0.2	Mining Residuals Pile	18.9
X42	0	1	3.4	Mining Residuals Pile	14.1
X42	1	2	1.04	Mining Residuals Pile	15.0
X42	2	3	< 0.2	Mining Residuals Pile	14.5
X42	3	4	0.69	Mining Residuals Pile	22.2
X42	4	5	< 0.2	Mining Residuals Pile	21.1
X42	5	6	< 0.2	Mining Residuals Pile	19.9
X43	0	2	2.29	Mining Residuals Pile	52.3
X43	2	4	13.5	Mining Residuals Pile	15.3
X43	4	6	1.08	Mining Residuals Pile	24.4
X43	6	8	< 0.2	Mining Residuals Pile	17.5
X43	8	10	< 0.2	Mining Residuals Pile	14.4
X43	10	12	0.28	Mining Residuals Pile	13.0
X43	12	14	< 0.2	Mining Residuals Pile	11.1

TABLE 3-1. DELINEATION SAMPLING PROGRAM SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.	AREA	MOISTURE CONTENT
	MIN (ft)	MAX (ft)	(mg/kg)		(%)
Z1	0	0.5	< 0.2	North Traffic Area	16.8
Z2	0	0.5	30.2	Process Area	16.1
Z3	0	2	0.37	Process Area	19.1
Z4	0	2	< 0.2	Process Area	17.0
Z5	0	2	< 0.2	Process Area	17.6
Z5	4	6	< 0.2	Process Area	14.0
Z5	8	10	< 0.2	Process Area	11.3
Z6	1	3	1.2	Laydown Area	20.0
Z7	0	0.5	< 0.2	Process Area	10.7
Z8	0	0.5	0.68	Process Area	19.6
Z9	0	2	0.33	Laydown Area	13.0
Z10	2	4	92	Mining Residuals Pile	26.0
Z11	0	0.5	17.9	Mining Residuals Pile	20.7
Z12	0	0.5	1.89	Process Area	12.8
Z13	0	0.5	< 0.2	Process Area	15.8
Z14	0	0.5	1.07	Laydown Area	17.7
Z15	0	2	0.25	Mining Residuals Pile	19.8
Z15	4	6	0.36	Mining Residuals Pile	16.7
Z15	8	10	< 0.2	Mining Residuals Pile	11.2
Z16	0	2	< 0.2	Mining Residuals Pile	18.8
Z16	4	6	< 0.2	Mining Residuals Pile	11.2
Z16	8	10	< 0.2	Mining Residuals Pile	11.7
R1	0	0.5	< 0.2	Random Surface Sample	19.3
R2	0	0.5	1.24	Random Surface Sample	24.9
R3	0	0.5	0.39	Random Surface Sample	25.7

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
A1	0.0	1.0	5.27
A1	1.0	1.5	5.67
A1	1.5	3.0	0.967
A1	3.0	4.5	1.79
A1	4.5	6.0	< 0.536
A1	6.0	7.5	1.81
A2	0.0	1.0	52.7
A2	1.0	2.0	60.4
A2	2.0	3.5	1.41
A2	3.5	5.0	0.973
A2	5.0	6.5	0.896
A3	0.0	1.5	51.1
A3	1.5	3.0	1,100
A3	3.0	4.5	184
A3	4.5	6.0	24.6
A3	6.0	7.5	< 0.517
A4	0.0	1.5	1,410
A4	1.5	3.0	47.7
A4	3.0	4.5	8.11
A4	4.5	6.0	0.611
A4	6.0	7.5	< 0.495
A5	0.0	1.0	1.33
A5	1.0	1.5	0.78
A5	1.5	3.0	< 0.529
A5	3.0	4.5	< 0.543
A5	4.5	6.0	< 0.535
A5	6.6	7.0	< 6.63
A5	8.5	9.5	< 0.529
A6	0.0	1.5	10.4
A6	1.5	2.5	177
A6	2.5	3.0	6.09
A6	3.0	4.5	< 0.511
A6	4.5	6.0	< 0.516

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
A7	0.0	0.5	6.26
A7	0.5	1.5	4.25
A7	1.5	3.0	< 0.496
A7	3.0	4.5	1.67
A7	4.5	6.0	< 0.548
A8	0.0	0.7	18.7
A8	0.7	1.7	101
A8	1.7	3.3	< 0.498
A8	3.3	4.8	< 0.513
A8	4.8	6.3	< 0.536
A9	0.0	0.7	11.6
A9	0.7	1.7	36.6
A9	1.7	3.2	< 0.5
A9	3.2	4.7	< 0.502
A9	4.7	6.2	< 0.525
A10	0.0	1.0	< 0.515
A10	1.0	2.5	0.9
A10	2.5	4.0	< 0.509
A10	4.0	5.5	177
A10	5.5	7.0	21.5
A11	0.0	0.8	5.46
A11	0.8	1.8	175
A11	1.8	3.3	84
A11	3.3	4.8	1.29
A11	4.8	6.3	0.789
A12	0.0	0.8	12.2
A12	0.8	1.8	< 0.491
A12	1.8	3.3	< 0.54
A12	3.3	4.8	< 0.605
A12	4.8	6.3	< 0.548
B25	0.0	0.5	5.16
B25	0.5	2.0	32.8
B25	2.0	3.5	< 1.22
B25	3.5	5.0	< 0.534

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
B26	0.0	0.5	84.8
B26	0.5	2.0	< 1.22
B26	2.0	3.5	< 1.22
B27	0.0	0.5	1.22
B27	2.0	2.4	< 1.21
B27	2.6	3.0	< 1.18
B28	0.0	0.5	25.3
B28	0.5	2.0	259
B28	2.0	3.5	3.23
B28	3.5	5.0	< 0.519
B28	5.0	6.5	< 0.506
B28A	0.0	1.5	369
B28A	1.5	2.0	3.75
B28A	2.0	3.0	< 0.477
B28A	3.0	4.5	< 0.052
B28A	4.5	6.0	< 0.522
B29	0.0	2.0	22.4
B29A	0.0	2.0	61.8
B29A	2.0	3.0	11.6
B29A	3.0	4.5	< 0.532
B29A	4.5	6.0	1.8
B30	0.0	1.0	380
B30	1.0	1.5	25.9
B30	1.5	3.0	1.92
B30	3.0	4.5	33.3
B30	4.5	6.0	< 0.528
B31	0.0	0.8	88.5
B31	0.8	1.8	25.1
B31	1.8	3.3	0.0705
B31	3.3	4.8	< 0.529

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
B32	0.0	0.8	3.16
B32	0.8	1.8	0.796
B32	1.8	3.3	< 0.515
B33	0.0	0.5	9.1
B33	0.5	1.5	2.19
B33	1.5	3.0	< 0.0525
B33	3.0	4.5	< 0.525
B34	0.0	1.0	922
B34	1.0	1.5	32.9
B34	1.5	3.0	1.2
B34	3.0	4.5	53.3
B34	4.5	6.0	5.31
B35	0.0	0.8	< 1.07
B35	0.8	1.8	< 1.19
B35	1.8	3.3	< 0.0517
B36	0.0	0.7	1.99
B36	0.7	2.2	1.08
B36	2.2	3.7	< 0.512
B37	0.0	0.5	2,120
B37	1.0	1.5	609
B37	1.5	3.0	9.68
B37	3.0	4.5	2.42
B37	4.5	6.0	66.5
B37	6.0	7.5	80.1
B38	0.0	0.7	< 1.06
B38	0.7	2.2	1.42
B38	2.2	3.7	< 1.18
B38	3.7	5.2	0.971
B39	0.0	0.8	17,800
B39	0.8	2.3	360
B39	2.3	3.8	2.57
B39	3.8	5.3	1.04
B39	5.3	6.8	0.854

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH			PCB CONC.
	MIN (ft)	MAX (ft)		(mg/kg)
B40	0.0	0.8	<	1.06
B40	0.8	1.8	<	1.08
B40	1.8	3.3		1.22
B40	3.3	4.8	<	0.526
B40	4.8	6.3	<	0.521
B41	0.0	0.7		9.52
B41	0.7	1.7	<	1.11
B41	1.7	3.2	<	0.0506
B42	0.0	2.0		785
B42A	0.0	2.0		382
B42A	2.0	3.5		34.1
B42A	3.5	3.8		15
B42A	3.8	5.0	<	0.529
B42A	5.0	6.5		0.787
B43	0.0	0.2		0.771
B43A	0.2	1.5		108
B43A	1.5	1.9		135
B43A	1.9	3.0		0.801
B43A	3.0	4.5	<	0.444
C50	0.0	0.8		14.2
C50	0.8	1.8	<	0.491
C50	1.8	3.3	<	0.499
C51	0.0	1.0	<	0.91
C51	1.0	2.0		4.95
C51	2.0	3.5	<	0.507
C51	3.5	5.0		0.924
C52	0.0	0.8	<	0.909
C52	1.8	3.3	<	0.519
C52	3.3	4.8	<	0.522
C54	0.0	1.0		1.34
C54	1.0	2.0	<	0.485

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
C55	0.0	1.0	< 0.908
C55	1.0	2.0	9.67
C55	2.0	3.5	< 0.508
C55	2.0	3.5	< 0.503
C55	3.5	5.0	< 0.489
C56	0.0	1.5	< 0.942
C56	1.5	3.0	0.517
C56	3.0	4.5	< 0.532
C57	0.0	0.5	< 0.896
C57	0.5	1.5	110
C57	2.0	3.0	< 0.5
C57	1.6	2.0	< 0.509
C57	3.0	4.5	< 0.52
C58	0.0	0.8	0.617
C58	0.8	1.8	< 1.09
C58	0.8	1.8	< 0.551
C58	1.8	3.3	< 0.525
C59	0.0	1.0	257
C59	1.0	2.0	< 0.54
C59	2.0	3.5	< 0.523
C60	0.0	0.8	37
C60	0.8	1.8	0.636
C60	1.8	3.3	0.545
C61	0.0	0.8	< 0.926
C61	0.8	1.8	2.71
C61	1.8	3.3	< 0.537
C61	3.3	4.8	< 0.545
D75	0.0	2.0	78.9
D75	3.5	5.0	6.55
D75	5.0	6.5	< 0.543
D75	6.5	8.0	6.54

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
D76	0.0	0.4	63.6
D76	0.4	1.9	97
D77	0.0	0.6	3.3
D77	0.6	1.0	2.04
D77	1.0	2.0	0.944
D78	0.0	0.5	9.72
D78	0.5	1.5	0.555
D78	1.5	3.0	< 0.51
D79	0.0	1.0	< 0.46
D79	1.0	2.0	< 0.514
D79	2.0	3.5	0.667
D80	0.0	0.7	< 0.442
D80	0.7	1.7	< 2.31
D80	1.7	3.2	< 0.51
D81	0.7	0.9	< 0.56
D82	0.9	1.1	5.48
D83	0.9	1.1	29.5
D84	0.8	1.1	2.06
MA301	0.0	0.5	15.9
MA301	0.5	1.5	7.2
MA301	1.5	2.5	1.53
MA301	2.5	4.0	0.144
MA301	4.0	5.5	< 0.108
MA301	5.5	7.0	< 0.0549

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
MA302	0.0	1.5	31.2
MA302	1.5	3.0	0.974
MA302	3.0	4.5	0.2
MA302	6.0	7.5	< 0.0552
MA302	7.5	9.0	< 0.0538
MA302	9.0	10.5	< 0.0518
MA302	10.5	12.0	< 0.0497
MA302	12.0	13.5	< 0.0499
MA302	13.5	15.0	< 0.0495
MA302	15.0	16.5	< 0.0496
MA303	0.0	1.0	1.14
MA303	1.5	2.0	< 0.0501
MA303	3.0	4.5	< 0.0529
MA303	4.5	6.0	< 0.0527
MA303	6.0	7.5	< 1.19
MA303	7.5	9.0	< 1.16
MA303	9.0	10.5	< 0.5
MA303	10.5	12.0	< 0.0499
MA303	12.0	13.5	< 0.0492
MA303	13.5	15.0	< 0.0495
MA304	0.0	1.5	6.14
MA304	1.5	2.2	31.6
MA304	2.2	3.0	82.3
MA304	3.0	4.5	2.66
MA304	4.5	6.0	30.5
MA305	0.0	1.5	18.1
MA305	1.5	2.2	2,620
MA305	2.2	3.0	58.9
MA305	3.0	4.5	< 0.0521
MA305	4.5	6.0	< 0.0498

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
MA306	0.0	1.5	16.2
MA306	1.5	2.4	1.53
MA306	2.4	3.0	5.15
MA306	3.0	4.5	27.8
MA306	4.5	6.0	294
MA306	6.0	7.5	0.089
MA306	7.5	9.5	0.0487
MA306	9.5	11.0	< 0.049
MA306	11.0	12.5	< 0.0491
MA306	11.0	12.5	< 0.0464
MA306	12.5	14.0	< 0.049
MA306	14.0	15.5	< 0.0498
MC321	0.0	1.5	24
MC321	1.5	2.3	25.3
MC321	2.3	3.0	5.51
MC321	3.0	4.5	0.604
MC321	4.5	6.0	< 0.0513
MC322	0.0	1.5	13.3
MC322	3.0	4.5	< 0.05
MC322	4.5	6.0	< 0.0511
MC322	6.0	7.5	< 0.0502
K261	0.0	3.0	15.8
K261	3.0	4.5	0.0739
K261	4.5	6.0	2.47
K261	6.0	7.5	< 0.0533
K261	7.5	9.0	< 0.0518
K261	9.0	10.5	< 0.0501
K261	10.5	12.0	< 0.0494
K261	12.0	13.5	< 0.0498
K261	13.5	15.0	< 0.0481
MA308	0.5	2.0	2.57
MA308	2.0	2.5	122
MA308	2.5	3.0	21.3
MA308	3.0	4.5	< 0.521
MA308	4.5	6.0	0.0874

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
MB311	0.0	1.5	0.54
MB311	3.0	4.0	< 0.533
MB311	4.0	4.5	< 0.0541
MB311	4.5	6.0	< 0.0514
MB312	0.0	0.5	42
MB312	0.5	1.5	3.8
MB312	1.5	3.0	< 0.0521
MB312	3.0	4.5	< 0.0538
MB312	4.5	6.0	< 0.0515
MB312	6.5	8.0	< 0.0509
MB312	8.0	9.5	< 0.0497
MB312	11.0	12.5	< 0.0493
MB312	13.5	15.0	< 0.0497
K262	1.0	2.5	< 0.0522
K262	3.5	4.0	< 0.0514
K262	4.0	5.5	< 0.0503
K262	5.5	7.0	< 0.0529
MC323	0.0	1.5	6.2
MC323	1.5	3.0	6.79
MC323	3.0	4.5	0.163
MC323	4.5	6.0	1.17
MC323	6.0	7.5	22
MC323	8.0	9.0	0.254
MC324	0.0	0.5	< 3.1
MC324	0.5	1.5	< 0.0576
MC324	1.5	3.0	< 0.0533
MC325	0.0	1.5	0.343
MC325	2.0	3.0	0.697
MC325	3.0	4.5	0.171
MC325	4.5	6.0	1.12

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.	
	MIN (ft)	MAX (ft)		(mg/kg)
MC326	0.0	1.5		0.226
MC326	1.5	2.3	<	0.0526
MC326	2.3	3.0	<	0.52
MC326	3.0	4.5	<	0.499
MC326	4.5	6.0	<	0.0514
MC326	6.0	7.5	<	0.0522
MC326	7.5	9.0		0.0512
MC326	9.0	10.5	<	0.0503
MC326	10.5	12.0	<	0.0496
MC326	12.0	13.5	<	0.0497
MC326	13.5	15.0	<	0.0498
MC327	0.0	0.5		254
MC327	0.0	0.5		1.2
MC327	0.5	1.5	<	0.0533
MC327	1.5	3.0	<	0.0541
MC327	3.0	4.5	<	0.0537
MC327	4.5	6.0	<	0.0561
MC328	0.0	0.5		14.6
MC328	0.5	1.5	<	0.0547
MC328	1.5	3.0	<	0.0528
MC328	3.0	4.5	<	0.0536
MC328	4.5	6.0	<	0.0544
MC329	0.0	0.5		3,580
MC329	0.5	1.5		74.7
MC329	1.5	3.0		107
MC329	3.0	4.5	<	0.55
MC329	4.5	6.0		0.133
MB313	0.0	1.5	<	0.0468
MB313	1.5	2.3		0.0663
MB313	2.3	3.0	<	0.0551
MB313	3.0	4.5	<	0.0565
MB313	4.5	6.0	<	0.0536

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
MD331	0.0	1.5	7.73
MD331	1.5	3.0	< 0.0529
MD331	1.5	3.0	< 0.0513
MD331	3.0	4.5	< 0.0564
MD331	4.5	6.0	< 0.0539
MD332	0.0	1.5	2.43
MD332	1.5	3.0	< 0.0523
MD332	1.5	3.0	< 0.0505
MD332	3.0	4.5	< 0.0493
MD332	4.5	6.0	< 0.0521
MD332	6.0	7.5	< 0.052
MD332	7.5	9.0	< 0.0488
MD332	9.0	10.5	< 0.0491
MD332	10.5	12.0	< 0.0489
MD332	12.0	13.5	< 0.0488
MD332	13.5	15.0	< 0.0493
E201	0.0	0.5	< 0.0463
E201	1.0	1.5	< 0.0477
E201	2.5	3.0	< 0.0511
E201	4.0	4.5	< 0.0486
E201	5.5	6.0	< 0.0505
E202	0.0	0.9	< 0.486
E202	0.9	1.9	< 0.0519
E202	1.9	2.5	< 0.0555
E202	4.0	4.5	< 0.0536
E202	5.5	6.0	< 0.0516
E203	0.0	1.5	5.85
E203	1.5	2.5	< 0.052
E203	2.5	3.0	< 0.054
E203	3.0	4.5	< 0.0523
E203	4.5	6.0	< 0.0502

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.	
	MIN (ft)	MAX (ft)		(mg/kg)
E203A	1.0	1.5	<	0.0491
E203A	1.5	3.0	<	1.01
E203A	1.5	3.0	<	0.0522
E203A	3.0	4.5	<	0.0533
E203A	4.5	6.0	<	0.0512
E204	0.0	1.5	<	0.502
E204	1.5	3.0	<	0.522
E204	3.0	4.5	<	0.0525
E204	4.5	6.0	<	0.0527
E204	4.5	6.0	<	0.518
E205	0.5	1.5	<	0.473
E205	1.5	3.0	<	0.0529
E205	1.5	3.0	<	0.0517
E205	3.0	4.5	<	0.0516
E205	4.5	6.0	<	0.0516
E206	0.5	1.5		45.3
E206	1.5	3.0	<	0.48
E206	1.5	3.0		0.664
E206	3.0	4.5	<	0.0519
E206	4.5	6.0	<	0.0529
E208	0.5	1.5		3.31
E208	1.5	3.0	<	0.0479
E208	1.5	3.0	<	0.052
E208	3.3	4.5	<	0.502
E208	6.0	7.5		9.23
G223	0.0	1.5		4.63
G223	2.0	2.5		27.5
G223	2.5	3.0		11.9
G223	3.5	4.0		2.76
G223	4.5	6.0	<	0.543

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
H231	0.0	1.5	1.75
H231	1.5	2.5	0.385
H231	2.5	3.0	< 0.527
H231	3.0	4.5	< 0.0525
H231	4.5	6.0	< 1.1
H231	6.0	7.5	< 0.516
H232	0.0	1.5	3.86
H232	1.5	3.0	46.6
H232	1.5	3.0	9.47
H232	3.0	4.5	19.4
H232	4.5	6.0	< 1.03
H233	0.5	1.0	19.8
H233	1.5	3.0	8.85
H233	1.5	3.0	3.51
H233	3.0	4.5	< 0.0527
H233	4.5	6.0	< 0.0527
H233	6.0	7.5	< 0.051
I241	0.5	1.5	< 0.0511
I241	1.5	3.0	0.0625
I241	3.0	4.5	< 1.09
I241	3.0	4.5	< 0.0529
I241	4.5	6.0	< 0.046
I241	6.0	7.5	< 0.0517
I242	1.0	1.5	4.85
I242	1.5	3.0	15.7
I242	1.5	3.0	0.399
I242	3.0	4.5	0.136
I242	4.5	6.0	< 0.0539
L271	0.0	0.5	1.73
L271	1.0	1.5	1.33
L271	1.5	3.0	37.9
L271	3.0	4.5	< 0.566
L271	4.5	6.0	< 0.0526
L271	6.0	7.5	0.348
L271	8.5	10.0	0.0503

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
L272	1.0	1.5	1.77
L272	1.5	3.0	1.75
L272	3.0	4.5	0.134
L272	4.5	6.0	3.33
L272	6.0	7.5	< 0.558
L272	7.5	9.0	0.114
L273	4.0	4.5	648
L273	5.0	5.5	745
L273	8.0	8.5	304
L273	9.5	10.0	7
L273	11.0	11.5	3.88
L273	12.5	13.0	1.83
L274	6.0	6.5	44.4
L274	7.0	7.5	5.3
L274	8.5	9.0	46
L274	10.0	10.5	0.225
L274	11.5	12.0	0.138
L274	13.0	13.5	< 0.054
L275	0.0	0.5	9.37
L275	1.0	1.5	0.161
L275	1.5	3.0	0.061
L275	3.0	4.5	0.0812
L275	4.5	6.0	< 0.0493
L275	6.0	7.5	< 0.0494
L275	7.5	9.0	< 0.0499
SCCSS04	0.0	0.5	6.68
SCCSS05	0.0	0.5	807
SCCSS06	0.0	0.5	8.84
SCCSS07	0.0	0.5	601
SCCSS08D	0.0	0.5	32
SCCSS09	0.0	0.5	77

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
SCCSS10	0.0	0.5	8.7
SCCSS11	0.0	0.5	623
SCCSS12	0.0	0.5	0.84
SCCSS13	0.0	0.5	7.32
SCCSB02	12.5	15.0	0.04
SCCSB02	15.0	17.5	0.047
SCCSB03	15.0	17.5	360
SCCSB03	17.5	20.0	0.041
1A	3.0	5.0	1.03
1A	7.0	9.0	< 0.677
1A	9.0	11.0	< 0.697
1A	9.0	11.0	< 0.696
1B	1.0	3.0	0.706
1B	3.0	5.0	3.94
1B	5.0	7.0	< 0.772
1B	7.0	9.0	< 0.707
1B	9.0	11.0	< 0.681
1C	1.0	3.0	< 0.682
1C	3.0	5.0	< 0.722
1C	5.0	7.0	< 0.726
1C	7.0	9.0	< 0.699
1C	9.0	11.0	< 0.684
1C	4.6	5.0	1.04
FP-12	1.0	3.0	< 0.696
FP-12	3.0	5.0	< 0.659
FP-12	5.0	7.0	< 0.687
FP-12	7.0	9.0	1.45
FP-12	9.0	11.0	< 0.667

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
B1-1	4.2	4.8	3.4
B1-2	8.5	8.9	5.52
B1-3	10.5	10.9	1.53
B12-1	3.0	5.0	1.25
B3-1	5.6	6.0	67.1
B3-2	11.8	12.2	5.49
B3-3	13.8	14.2	1.53
FP-3	1.0	3.0	< 0.658
FP-3	3.0	5.0	< 0.664
FP-3	5.0	7.0	0.712
FP-3	7.0	9.0	< 0.703
FP-3	9.0	11.0	< 0.682
FP-4	1.0	3.0	< 0.68
FP-4	3.0	5.0	< 0.728
FP-4	5.0	7.0	< 0.783
FP-4	7.0	9.0	< 0.689
FP-4	9.0	11.0	< 0.71
FP-5	1.0	3.0	< 0.718
FP-5	3.0	5.0	< 0.696
FP-5	5.0	7.0	< 0.693
FP-5	7.0	9.0	< 0.68
FP-5	9.0	11.0	< 0.777
FP-6	1.0	3.0	< 0.661
FP-6	3.0	5.0	< 0.717
FP-6	5.0	7.0	< 0.756
FP-6	7.0	9.0	< 0.688
FP-6	9.0	11.0	< 0.683
FP-2	1.0	3.0	< 0.718
FP-2	3.0	5.0	1.84
FP-2	5.0	7.0	< 0.709
FP-2	7.0	9.0	< 0.692
FP-2	9.0	11.0	< 0.701

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
FP-7	1.0	3.0	< 0.686
FP-7	3.0	5.0	< 0.774
FP-7	5.0	7.0	< 0.717
FP-7	7.0	9.0	< 0.694
FP-7	9.0	11.0	< 0.695
FP-8	1.0	3.0	< 0.684
FP-8	3.0	5.0	< 0.712
FP-8	5.0	7.0	< 0.717
FP-8	9.0	11.0	< 0.682
FP-9	1.0	3.0	< 0.656
FP-9	3.0	5.0	< 0.654
FP-9	5.0	7.0	< 0.663
FP-9	7.0	9.0	< 0.66
FP-9	9.0	11.0	< 0.687
FP-10	7.0	9.0	< 0.676
FP-10	9.0	11.0	< 0.684
FP-11	1.0	3.0	< 0.672
FP-11	3.0	5.0	< 0.669
FP-11	5.0	7.0	< 0.677
FP-11	7.0	9.0	< 0.677
FP-11	9.0	11.0	< 0.675
B11-1	4.2	4.8	235
B11-2	5.6	6.0	19.2
G221	0.0	1.5	5.61
G221	1.5	2.3	5.37
G221	2.3	3.0	34
G221	3.0	4.5	2.47
G221	4.5	6.0	< 0.543
G221	6.0	7.5	< 0.276

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
G222	0.0	1.5	4.64
G222	1.5	2.3	21.1
G222	2.3	3.0	0.308
G222	3.0	4.5	0.148
G222	6.0	7.5	< 0.278
G222	7.5	9.0	< 0.0552
G222	9.0	9.5	0.0725
MA307	0.0	2.0	3.85
MA307	2.0	3.0	29.8
MA307	3.0	3.8	2.04
MA307	3.8	4.5	0.92
MA307	4.5	6.0	0.0543
F212	0.0	1.0	5.85
F212	1.7	3.0	2.45
F212	3.0	4.5	3.97
F212	4.5	6.0	2.28
1	0	2	6.2
1	4	6	14.9
1	8	10	12.6
1	12	14	0.2
1	16	18	0.36
2	0	2	29
2	4	6	19.1
2	8	10	0.86
2	12	14	4.4
3	0	2	20.3
3	4	6	8.9
3	8	10	2
3	12	14	3.5
3	16	18	2

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
4	0	2	19.8
4	4	6	21.1
4	8	10	10.3
4	12	14	2
4	16	18	3
5	0	2	47
5	4	6	19.1
5	8	10	4.2
5	12	14	0.3
6	0	2	158
6	4	6	11.8
6	8	10	0.2
6	12	14	14.9
7	0	2	45.9
7	4	6	9.2
7	8	10	2.2
7	12	14	0.35
8	0	2	11.3
8	4	6	29.9
8	8	10	0.32
8	12	14	0.2
9	0	2	48.8
9	4	6	44.5
9	8	10	40.9
9	12	14	8.1
9	16	18	12.5
10	0	2	44
10	4	6	18.1
10	8	10	109
10	12	14	83
10	16	18	2
10	20	22	2

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
11	0	2	33.1
11	4	6	19
11	8	10	2
11	12	14	4.2
12	0	2	26.1
12	4	6	0.79
12	8	10	2
12	12	14	2
13	0	2	76
13	2	4	96
13	6	8	2
13	10	12	17.1
14	0	2	24.7
14	2	4	10.6
14	6	8	0.42
15	0	2	91
15	2	4	30
15	6	8	0.26
15	10	12	13.5
16	0	2	5.1
16	4	6	11.4
16	8	10	0.85
16	12	14	0.25
17	0	2	28.2
17	4	6	23.8
17	8	10	2
17	12	14	5.2
18	0	2	760
18	4	6	202
18	8	10	105
18	12	14	3.3

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
19	0	2	56.2
19	4	6	68
19	8	10	7
19	12	14	2
20	0	2	144
20	4	6	115
20	8	10	9.1
20	12	14	2
21	0	2	125
21	4	6	34.6
21	8	10	11.1
22	0	2	204
22	4	6	10.1
22	8	10	12.4
22	12	14	2
23	0	2	7.2
23	2	4	3.6
23	6	8	2
23	8	10	2
24	0	2	2
24	2	4	32.3
24	6	8	4.2
24	10	12	4.2
25	0	2	2.9
25	2	4	6.5
25	6	8	2
X1	0	0.5	0.77
X2	0	2	< 0.2
X2	2	4	< 0.2
X2	4	6	< 0.2
X2	6	8	< 0.2

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
X3	0	2	< 0.2
X3	2	4	< 0.2
X3	4	6	< 0.2
X3	6	8	< 0.2
X3	8	10	< 0.2
X3	10	12	< 0.2
X4	0	2	< 0.2
X4	2	4	< 0.2
X4	4	6	< 0.2
X4	6	8	< 0.2
X5	0	2	19.7
X5	2	4	< 0.2
X5	4	6	< 0.2
X5	6	8	< 0.2
X5	8	10	< 0.2
X6	0	0.5	< 0.2
X7	0	0.5	0.27
X8	0	2	1.94
X8	2	4	6.41
X8	4	6	11.5
X8	6	8	3.9
X8	8	10	< 0.2
X8	10	12	< 0.16
X8	12	14	< 0.2
X8	14	16	0.27
X8	16	18	< 0.2
X9	0	2	132
X9	2	4	170
X9	4	6	13.1
X9	6	8	0.42
X9	8	10	0.26
X9	10	12	< 0.2
X9	12	14	< 0.2
X9	14	16	< 0.2

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
X10	0	2	1.54
X10	2	4	< 0.2
X10	4	6	< 0.2
X10	6	8	< 0.2
X10	8	10	< 0.2
X11	0	2	16.9
X11	2	4	17.6
X11	4	6	< 0.2
X11	6	8	< 0.2
X11	8	10	< 0.2
X12	0	2	23.4
X12	2	4	13.4
X12	4	6	10.7
X12	6	8	9.1
X12	8	10	< 0.2
X12	10	12	< 0.2
X12	12	14	< 0.2
X12	14	16	< 0.2
X13	0	2	9.6
X13	2	4	136
X13	4	6	18.2
X13	6	8	< 0.2
X13	8	10	< 0.2
X13	10	12	< 0.2
X14	0	2	9.4
X14	2	4	46.4
X14	4	6	< 0.2
X14	6	8	< 0.2
X15	0	2	9.5
X15	2	4	5.8
X15	4	6	5.1
X15	6	8	8.2
X15	8	10	< 0.2
X15	10	12	< 0.2

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
X16	0	2	3
X16	2	4	11.1
X16	4	6	23.2
X16	6	8	23.6
X16	8	10	0.2
X16	10	12	0.2
X16	12	14	0.2
X16	14	16	0.2
X17	0	2	15.8
X17	2	4	32.4
X17	4	6	25.9
X17	6	8	52
X17	8	10	124
X17	10	12	0.37
X17	12	14	58
X17	14	16	0.2
X17	16	18	6.6
X18	0	2	19.6
X18	2	4	9.8
X18	4	6	0.46
X18	6	8	< 0.2
X18	8	10	< 0.2
X18	10	12	< 0.2
X18	12	14	0.79
X19	0	2	18.2
X19	2	4	20.1
X19	4	6	25.1
X19	6	8	23.3
X19	8	10	18.9
X19	10	12	< 0.2
X19	12	14	< 0.2
X19	14	16	< 0.2
X19	16	18	< 0.2
X19	18	20	< 0.2

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
X20	0	2	62
X20	2	4	125
X20	4	6	0.25
X20	6	8	0.3
X20	8	10	< 0.2
X20	10	12	0.62
X20	12	14	< 0.2
X20	14	16	< 0.2
X21	0	2	452
X21	2	4	2.73
X21	4	6	132
X21	6	8	< 0.2
X21	8	10	< 0.2
X21	10	12	< 0.2
X21	12	14	0.28
X21	14	16	< 0.2
X21	16	18	< 0.2
X22	0	2	18
X22	2	4	15
X22	4	6	23.8
X22	6	8	32.5
X22	8	10	< 0.2
X22	10	12	< 0.2
X22	12	14	< 0.2
X23	0	0.5	1.7
X24	0	2	0.87
X24	2	4	0.39
X24	4	6	0.32
X24	6	8	58.1
X24	8	10	6.4
X24	10	12	< 0.2
X24	12	14	< 0.2
X24	14	16	< 0.2

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
X25	0	2	77
X25	2	4	65
X25	4	6	70
X25	6	8	92
X25	8	10	143
X25	10	12	308
X25	12	14	0.34
X25	14	16	< 0.2
X25	16	18	0.75
X26	0	2	27.1
X26	2	4	17.8
X26	4	6	26.1
X26	6	8	23.8
X26	8	10	32.2
X26	10	12	102
X26	12	14	124
X26	14	16	2.76
X26	16	18	< 0.2
X27	0	2	< 0.2
X27	2	4	< 0.2
X27	4	6	< 0.2
X28	0	2	24.1
X28	2	4	2.79
X28	4	6	0.2
X28	6	8	0.2
X29	0	2	3.3
X29	2	4	2.34
X29	4	6	2.9
X29	6	8	0.44
X29	8	10	0.35
X29	10	12	27.9
X29	12	14	< 0.2
X29	14	16	0.46

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
X30	0	2	30
X30	2	4	11.8
X30	6	7	44
X30	7	8	19.3
X30	8	10	67
X30	10	12	78
X30	12	14	70
X30	14	16	0.29
X30	16	18	< 0.2
X30	18	20	0.54
X30	20	22	< 0.2
X31	0	1	1.61
X31	1	2	0.89
X31	2	3	0.2
X31	3	4	0.2
X31	4	5	0.2
X31	5	6	0.2
X32	0	1	0.98
X32	1	2	0.2
X32	2	3	0.2
X32	3	4	0.2
X32	3	5	0.2
X32	5	6	0.2
X33	0	2	6.4
X33	2	4	11.7
X33	4	6	0.99
X33	6	8	< 0.2
X33	8	10	< 0.2
X33	10	12	< 0.2
X33	12	14	< 0.2
X33	14	16	< 0.2

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
X34	0	2	18.8
X34	2	4	35
X34	4	6	144
X34	6	8	< 0.2
X34	8	10	< 0.2
X34	10	12	< 0.2
X34	12	14	< 0.2
X35	0	1	0.8
X35	1	2	0.2
X35	2	3	0.2
X35	3	4	0.2
X35	4	5	< 0.2
X35	5	6	< 0.2
X36	0	1	1.24
X36	1	2	0.23
X36	2	3	0.2
X36	3	4	0.2
X36	4	5	0.2
X36	5	6	0.2
X37	0	2	< 2
X37	4	5	76
X37	5	6	3.5
X37	6	8	1.4
X37	8	10	< 0.2
X37	10	12	< 0.2
X37	12	14	< 0.2
X38	0	2	13.3
X38	2	4	9.2
X38	4	6	< 0.2
X38	6	8	< 0.2
X38	8	10	< 0.2
X38	10	12	< 0.2

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
X39	0	1	1.45
X39	1	2	0.2
X39	2	3	0.2
X39	3	4	0.2
X39	4	5	0.2
X39	5	6	0.2
X40	0	1	1.47
X40	1	2	0.2
X40	2	3	0.2
X40	3	4	0.2
X40	5	7	0.2
X40	7	8	0.2
X41	0	1	8.4
X41	1	2	0.52
X41	2	3	0.27
X41	3	5	0.2
X41	5	6	0.2
X42	0	1	3.4
X42	1	2	1.04
X42	2	3	0.2
X42	3	4	0.69
X42	4	5	0.2
X42	5	6	0.2
X43	0	2	2.29
X43	2	4	13.5
X43	4	6	1.08
X43	6	8	< 0.2
X43	8	10	0.2
X43	10	12	0.28
X43	12	14	< 0.2
Z1	0	0.5	< 0.2
Z2	0	0.5	30.2
Z3	0	2	0.37

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
Z4	0	2	0.2
Z5	0	2	0.2
Z5	4	6	0.2
Z5	8	10	0.2
Z6	1	3	1.2
Z7	0	0.5	0.2
Z8	0	0.5	0.68
Z9	0	2	0.33
Z10	2	4	92
Z11	0	0.5	17.9
Z12	0	0.5	1.89
Z13	0	0.5	0.2
Z14	0	0.5	1.07
Z15	0	2	0.25
Z15	4	6	0.36
Z15	8	10	< 0.2
Z16	0	2	< 0.2
Z16	4	6	< 0.2
Z16	8	10	< 0.2
R1	0	0.5	< 0.2
R2	0	0.5	1.24
R3	0	0.5	0.39
CS08AS	0	0.5	(1)

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
CS12AS	0	0.5	< 3.6
CS13AS	0	0.5	40.4
FF1DS2	0	0.5	3.6
FF1DS3	0	0.5	16
FF1DS4	0	0.5	42
FF1DS5	0	0.5	0.73
FF1DS6	0	0.5	15
FG1GS1	0	0.5	5.5
FG1GS2	0	0.5	3.88
FG1GS3	0	0.5	0.55
FG1GS4	0	0.5	6.52
FG1GS5	0	0.5	0.64
FG1GS6	0	0.5	79
FL06103S-11	0	0.5	35.4
FL06107S-11	0	0.5	ND
FL07102S-11	0	0.5	1.83
FL1BS1	0	0.5	< 190
FL1BS2	0	0.5	< 92
FL1BS3	0	0.5	< 0.49
FL1BS4	0	0.5	3.2

TABLE 3-2. HISTORICAL SITE SAMPLE RESULTS

SAMPLE ID	SAMPLE DEPTH		PCB CONC.
	MIN (ft)	MAX (ft)	(mg/kg)
FL1BS5	0	0.5	0.42
FL1BS6	0	0.5	< 0.043
H8N01S	0	0.5	64
H8N02S	0	0.5	59
H8N03S	0	0.5	67
H8N04S	0	0.5	20
H8N05S	0	0.5	4.8
H8N06S	0	0.5	2
H8N07S	0	0.5	2
H8S02S	0	0.5	110
H8S03S	0	0.5	120
H8S04S	0	0.5	140
H8S06S	0	0.5	13
H8S07S	0	0.5	16
H8S08S	0	0.5	16
H8S09S	0	0.5	3
H8S10S	0	0.5	13
H8S11S	0	0.5	2
H8S8S	0	0.5	(1)

NOTE:

(1) Historical concentration was not located.

TABLE 3-3. PCB DUPLICATE DATA SUMMARY

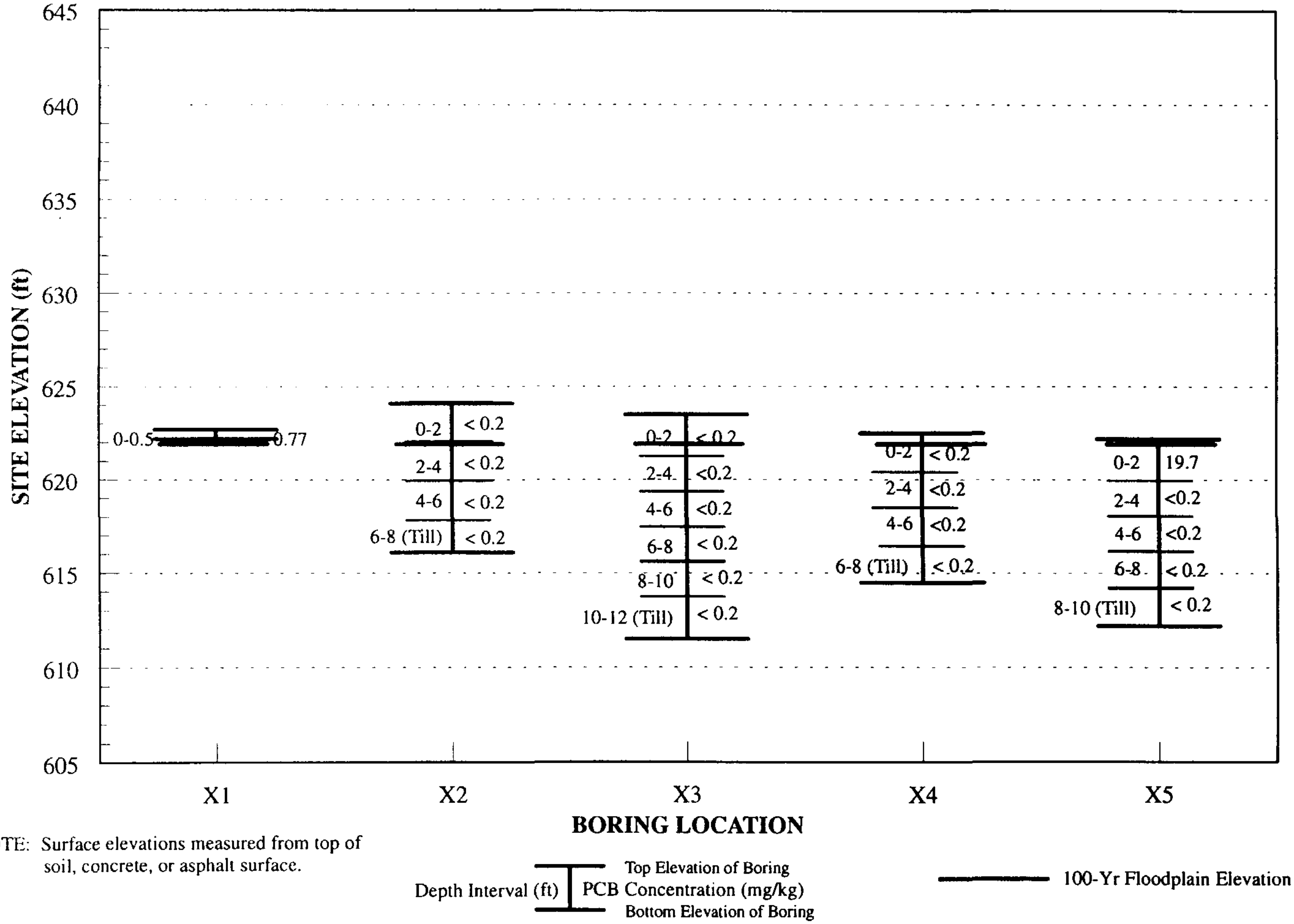
SAMPLE ID	SAMPLE DEPTH		ORIGINAL SAMPLE PCB CONC. (mg/kg)	DUPLICATE SAMPLE PCB CONC. (mg/kg)	ORIGINAL SAMPLE MOISTURE CONTENT (%)	DUPLICATE SAMPLE MOISTURE CONTENT (%)
	MIN (ft)	MAX (ft)				
X3	10	12	< 0.2	< 0.2	11.9	12.1
X5	6	8	< 0.2	< 0.2	13.9	13.8
X8	8	10	< 0.2	0.26	17.1	17.7
X14	4	6	< 0.2	0.94	20.2	28.1
X17	6	8	52	45	17.7	16.9
X19	18	20	< 0.2	< 0.2	12.6	12.2
X21	14	16	< 0.2	< 0.2	12.1	14.2
X26	4	6	26.1	17.7	38.6	35.8
X29	4	6	2.9	4.2	18.6	17.9
X30	14	16	0.29	0.73	22.7	22.9
X31	0	1	1.61	1.41	31.5	27
X35	0	1	0.8	0.85	22.9	23.4
X38	2	4	9.2	4.6	30.7	51.4
X39	0	1	1.45	5.4	20.1	26.4
Z15	4	6	0.36	0.6	16.7	15.9
Z16	8	10	< 0.2	< 0.2	11.7	14.3

TABLE 3-4. WIPE SAMPLE RESULTS

WIPE SAMPLE ID	PCB CONC. (μg/100 cm²)	DATE COLLECTED
Auger 1	< 1.0	June 10, 1997
Auger 2	< 1.0	June 10, 1997
Auger 1A	< 1.0	June 11, 1997
Auger 2A	< 1.0	June 11, 1997
Auger 1B	< 1.0	June 12, 1997
Auger 2B	1.1	June 12, 1997
Split Spoon 1	< 1.0	June 10, 1997
Split Spoon 2	< 1.0	June 10, 1997
Split Spoon 3	< 1.0	June 10, 1997
Split Spoon 1A	< 1.0	June 11, 1997
Split Spoon 2A	< 1.0	June 11, 1997
Split Spoon 3A	< 1.0	June 11, 1997
Split Spoon 1B	< 1.0	June 12, 1997
Split Spoon 2B	< 1.0	June 12, 1997
Split Spoon 3B	< 1.0	June 12, 1997

FIGURE 3-1

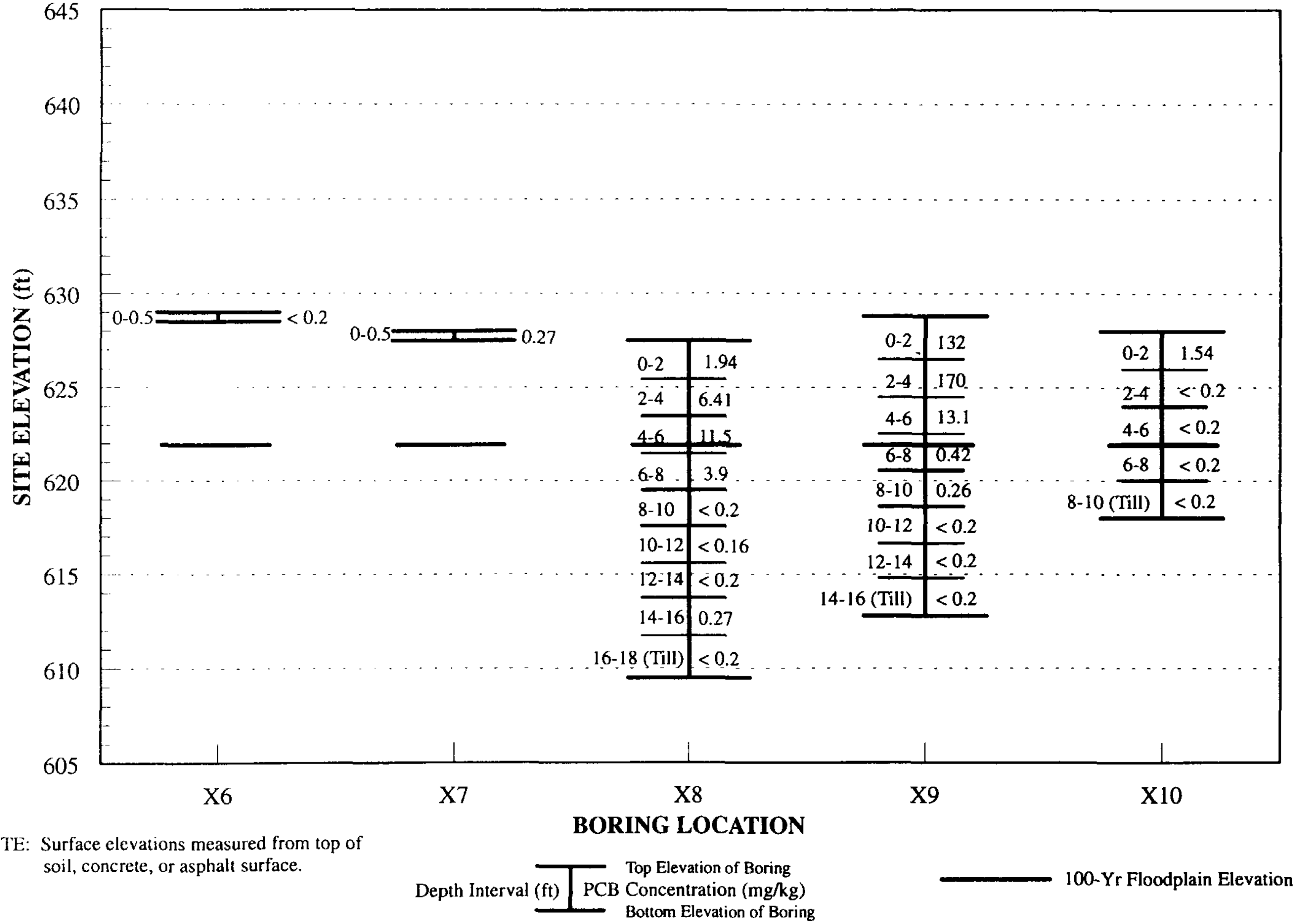
COMPARISON OF BORING DEPTHS



NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.

FIGURE 3-1 (continued)

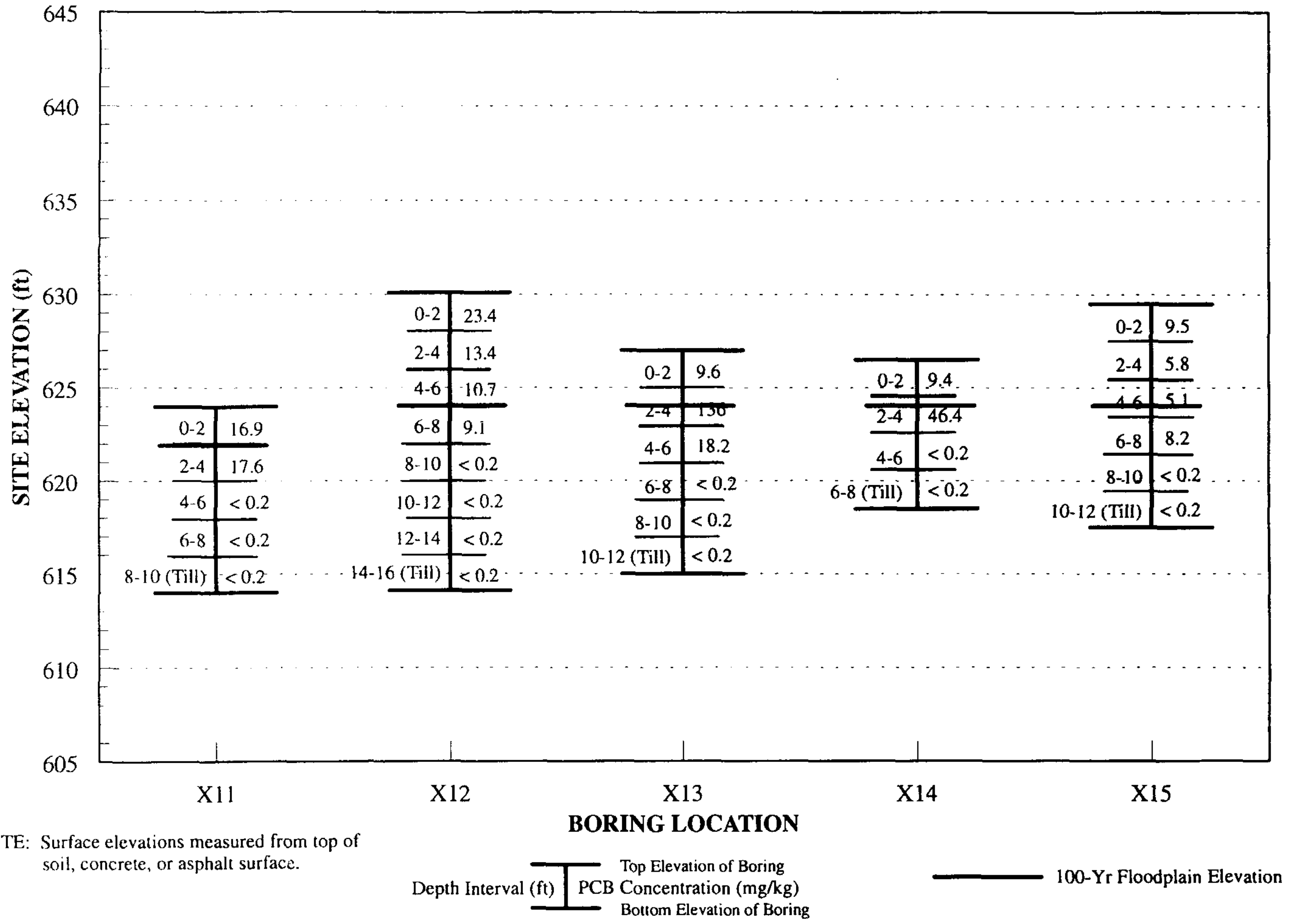
COMPARISON OF BORING DEPTHS



NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.

FIGURE 3-1 (continued)

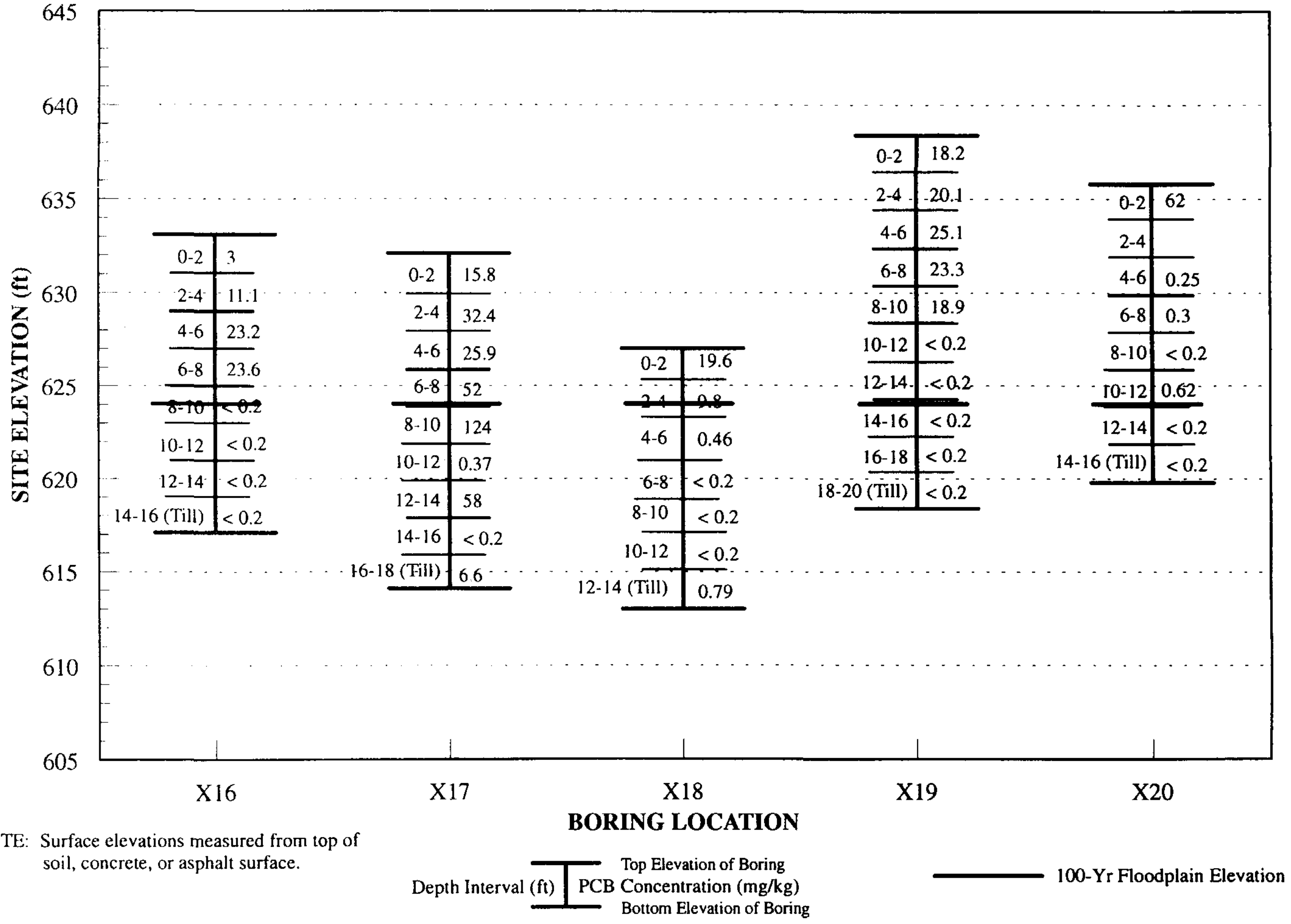
COMPARISON OF BORING DEPTHS



NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.

FIGURE 3-1 (continued)

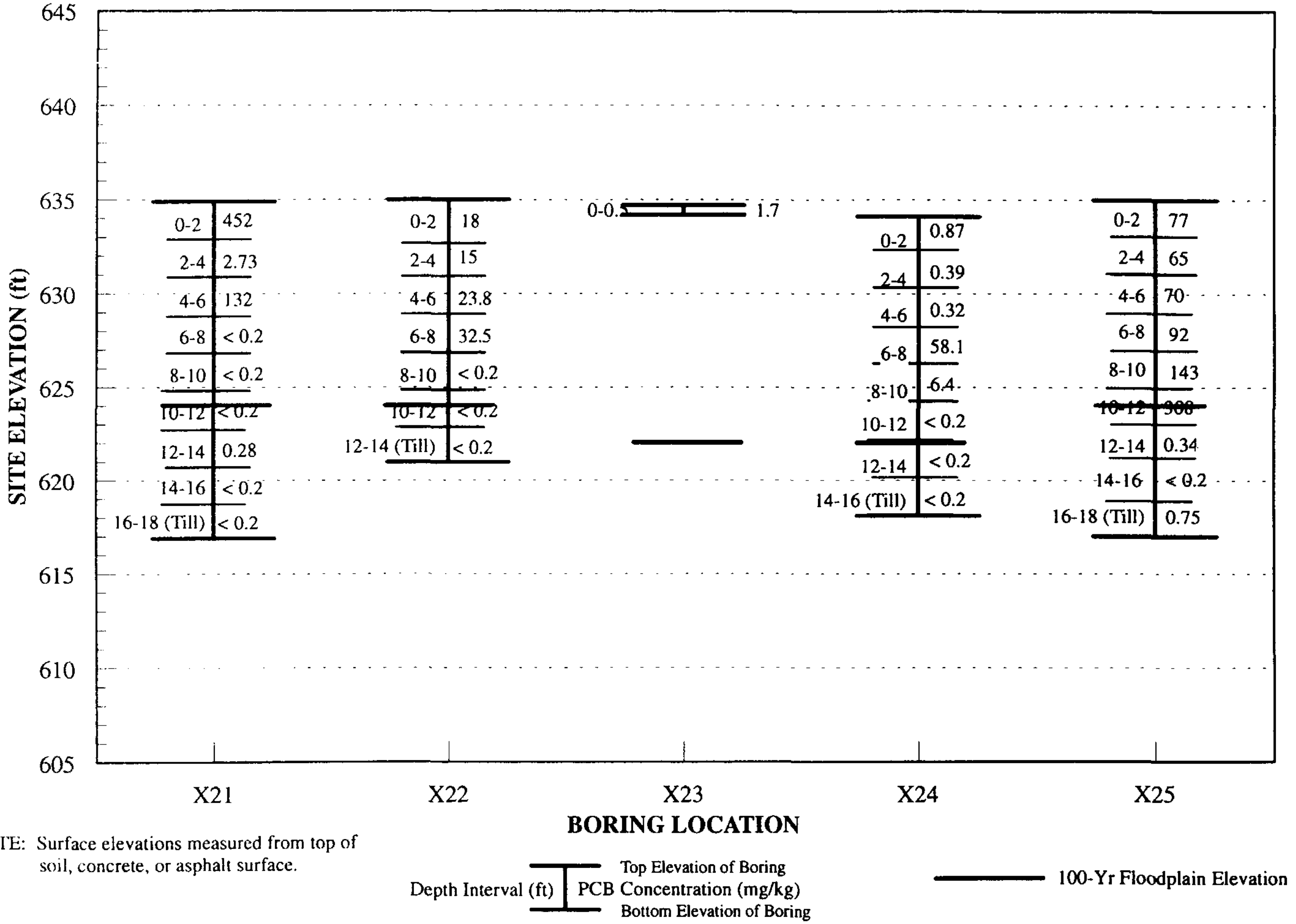
COMPARISON OF BORING DEPTHS



NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.

FIGURE 3-1 (continued)

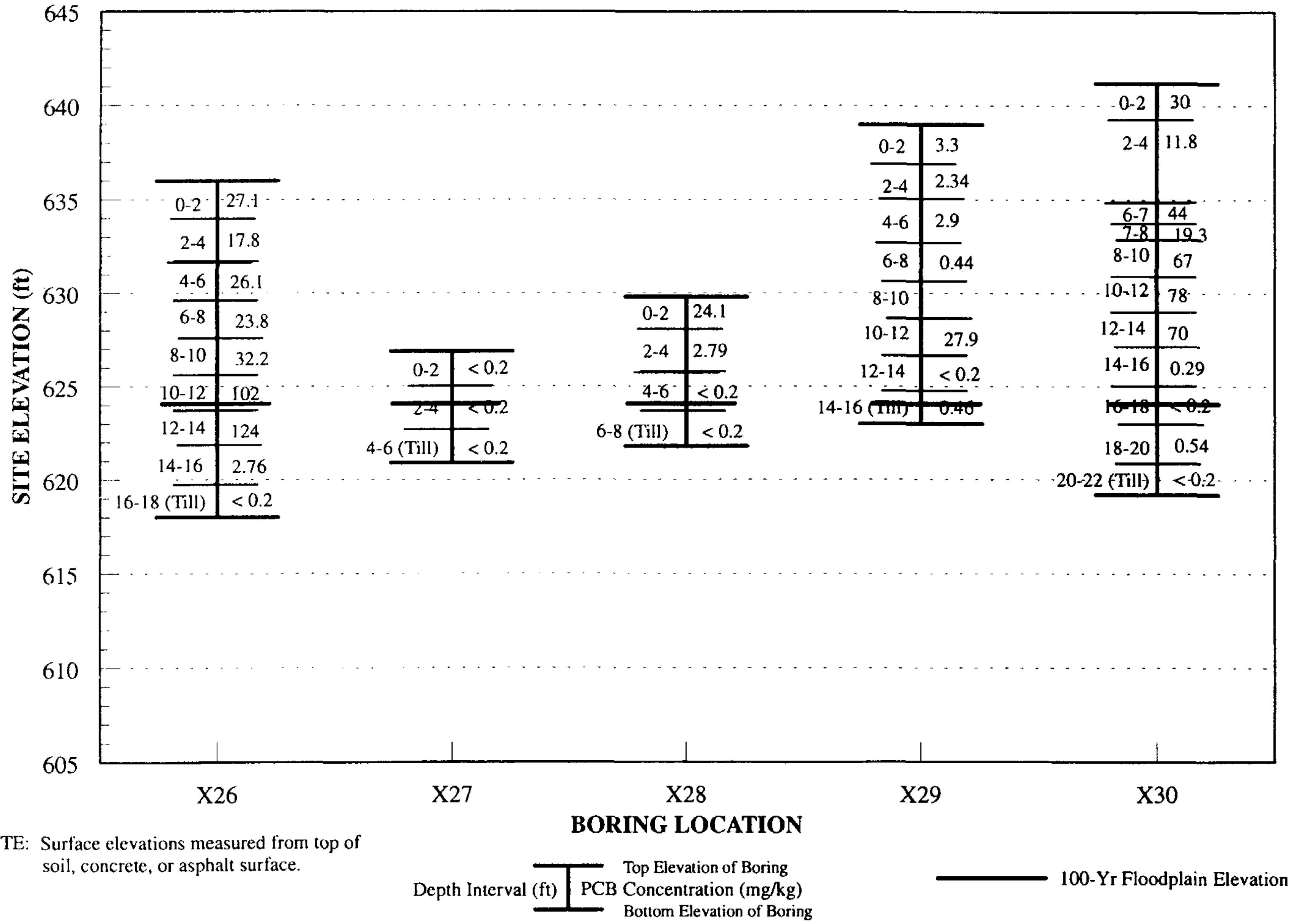
COMPARISON OF BORING DEPTHS



NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.

FIGURE 3-1 (continued)

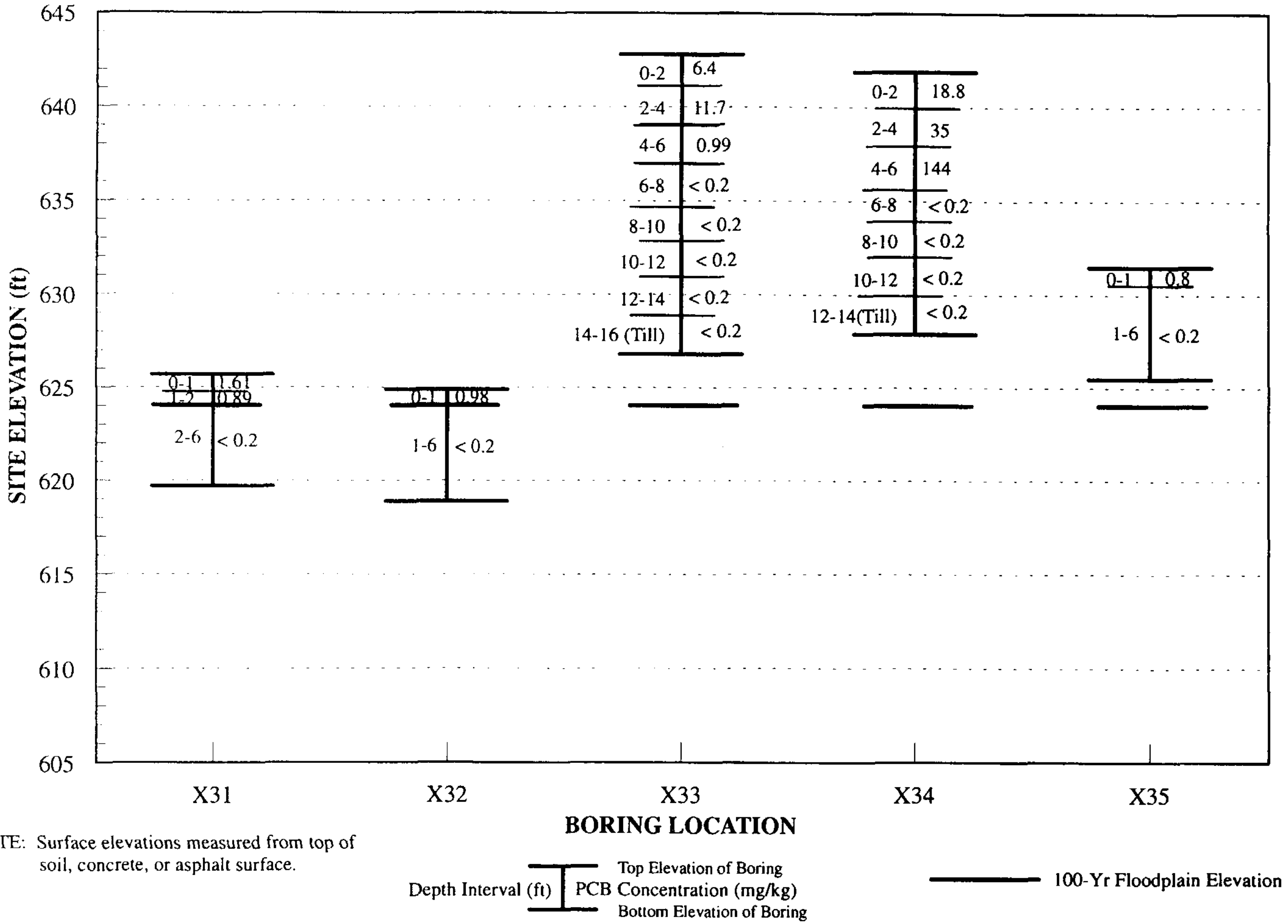
COMPARISON OF BORING DEPTHS



NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.

FIGURE 3-1 (continued)

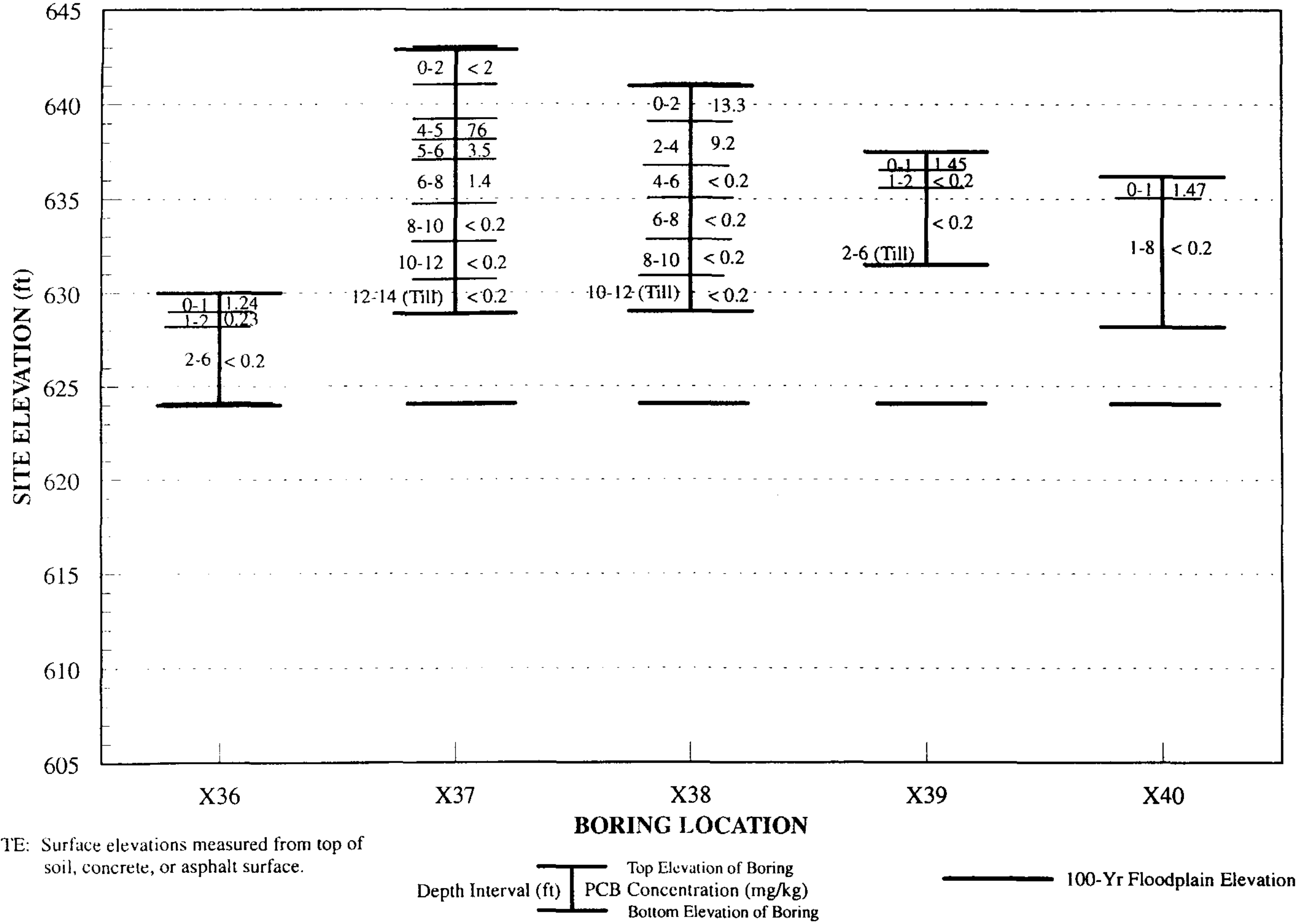
COMPARISON OF BORING DEPTHS



NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.

FIGURE 3-1 (continued)

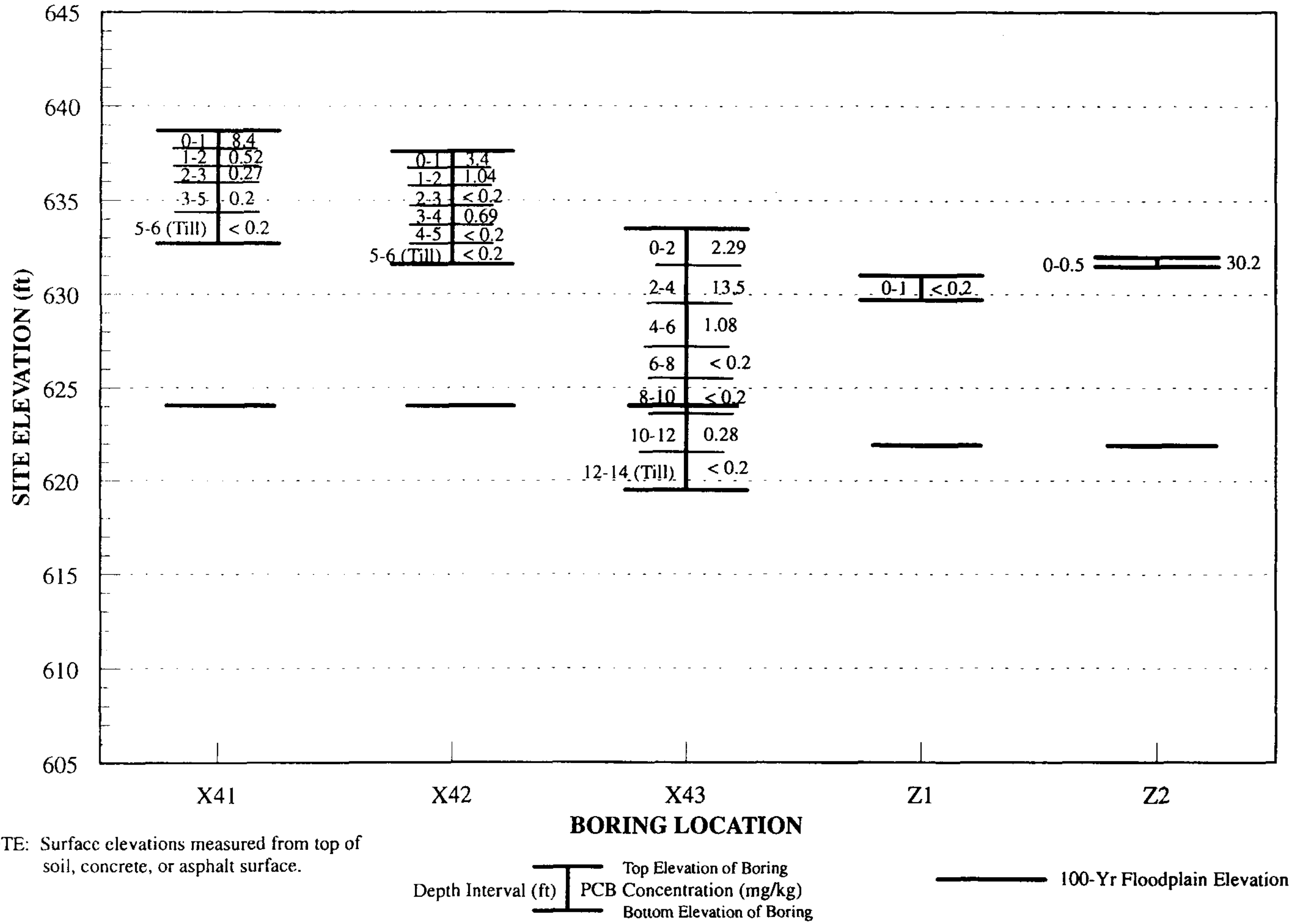
COMPARISON OF BORING DEPTHS



NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.

FIGURE 3-1 (continued)

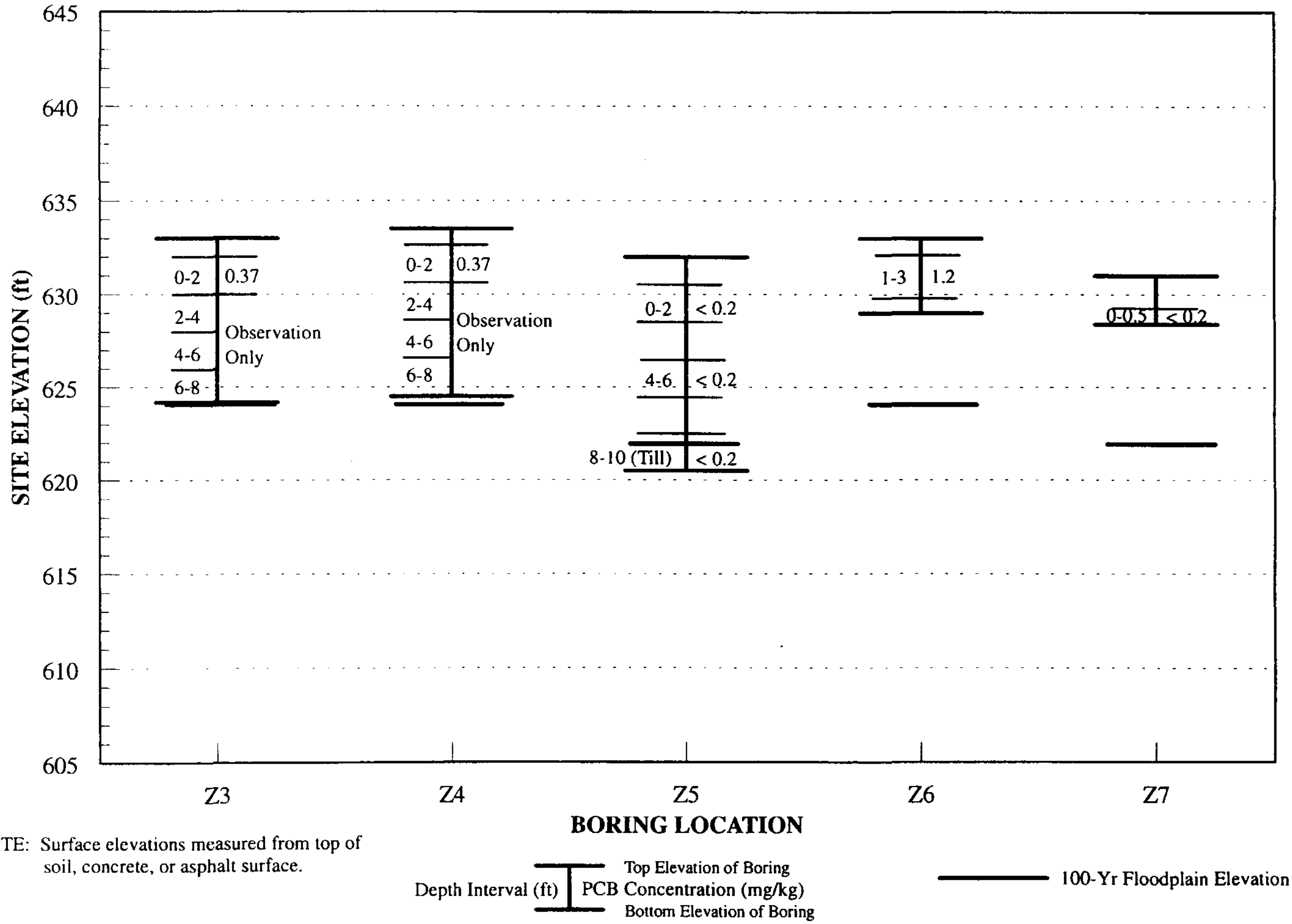
COMPARISON OF BORING DEPTHS



NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.

FIGURE 3-1 (continued)

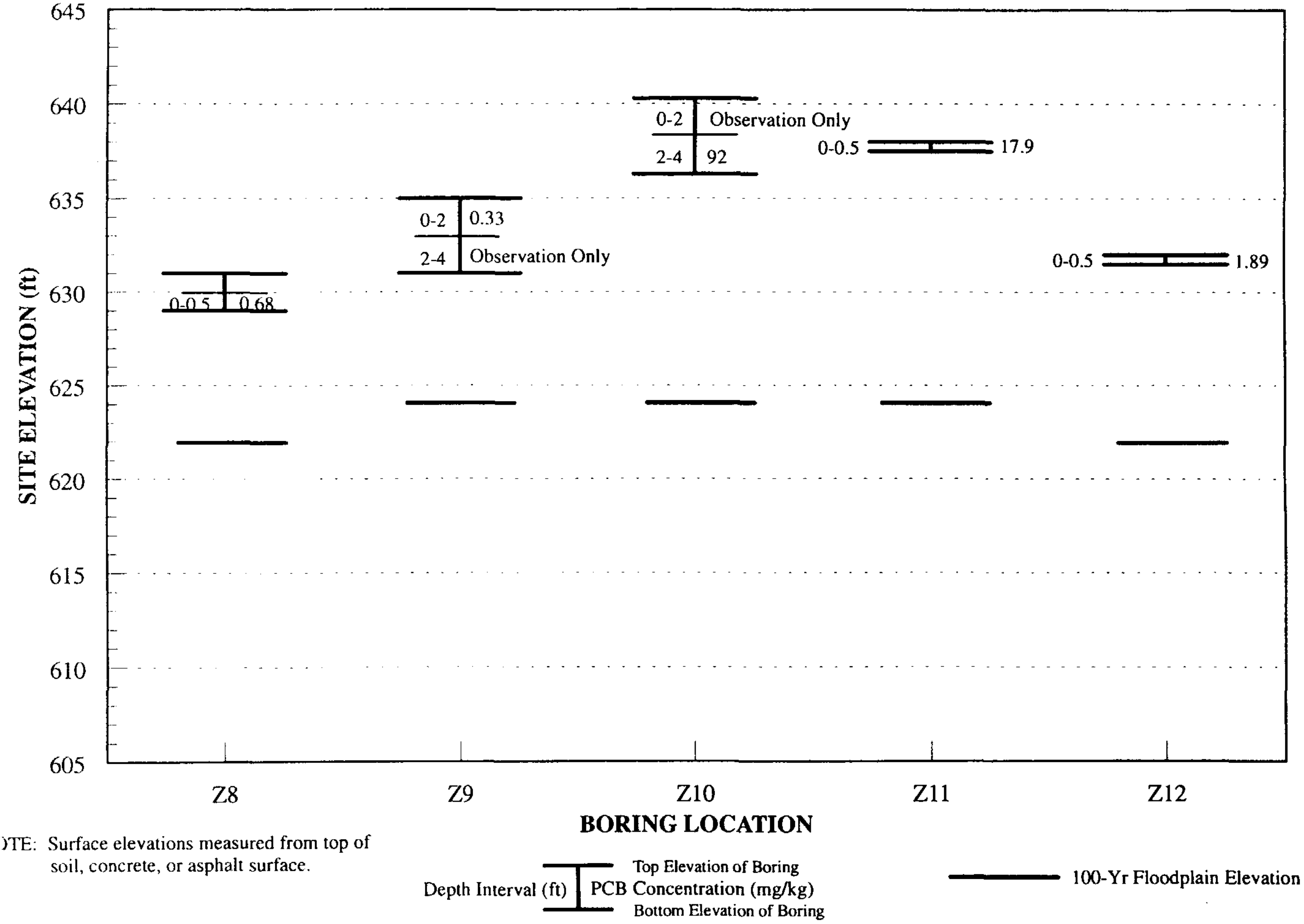
COMPARISON OF BORING DEPTHS



NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.

FIGURE 3-1 (continued)

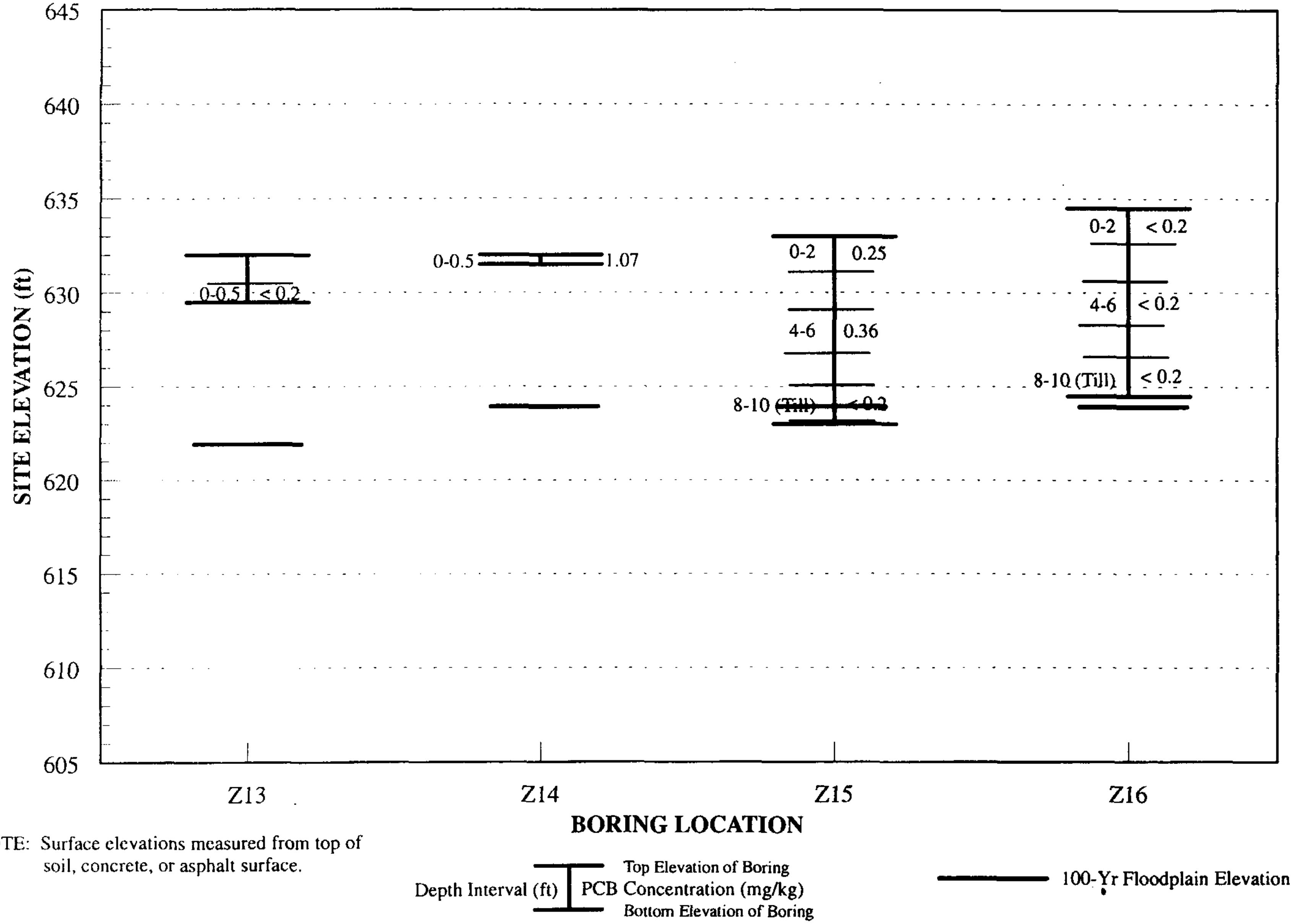
COMPARISON OF BORING DEPTHS



NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.

FIGURE 3-1 (continued)

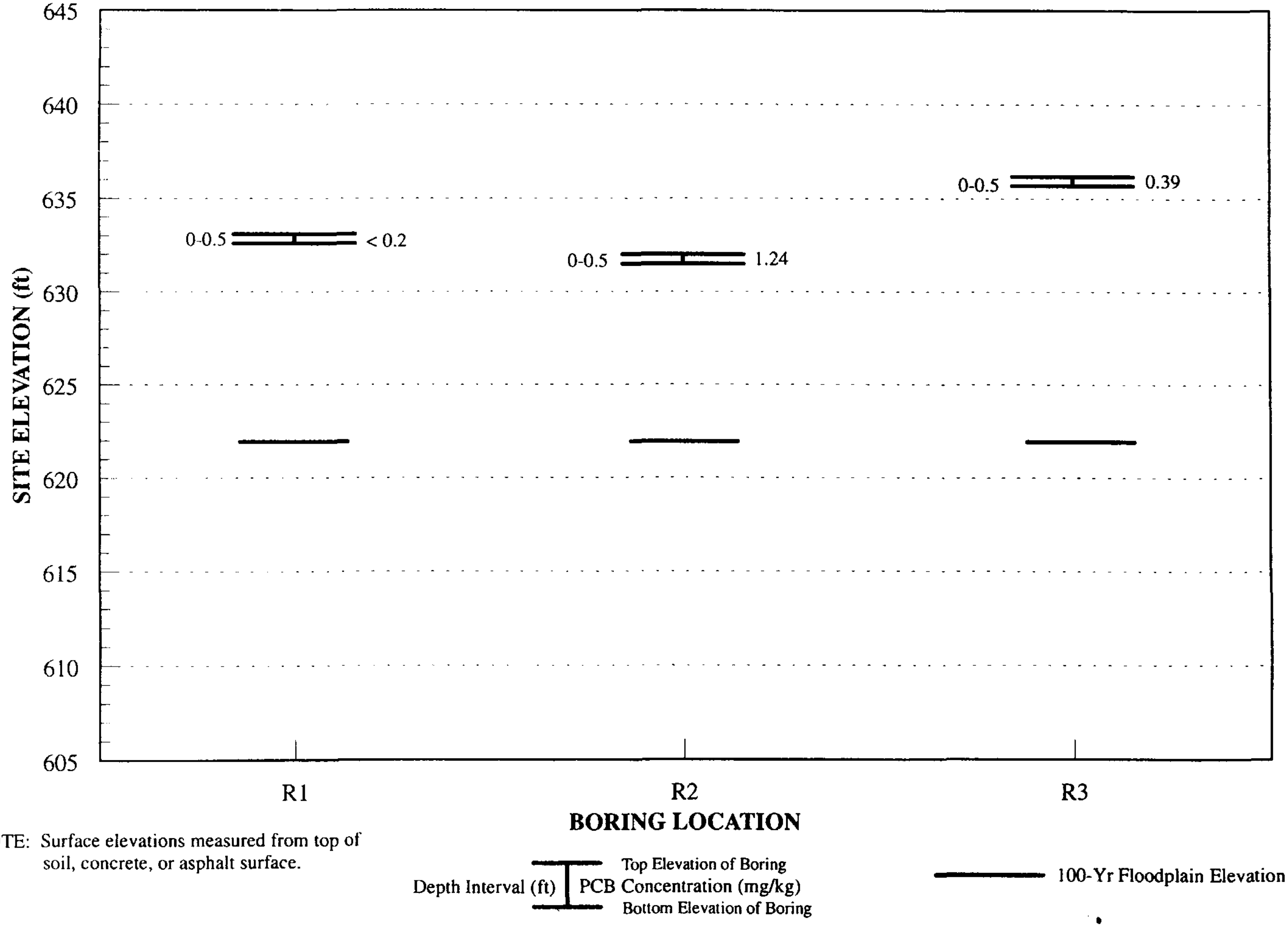
COMPARISON OF BORING DEPTHS



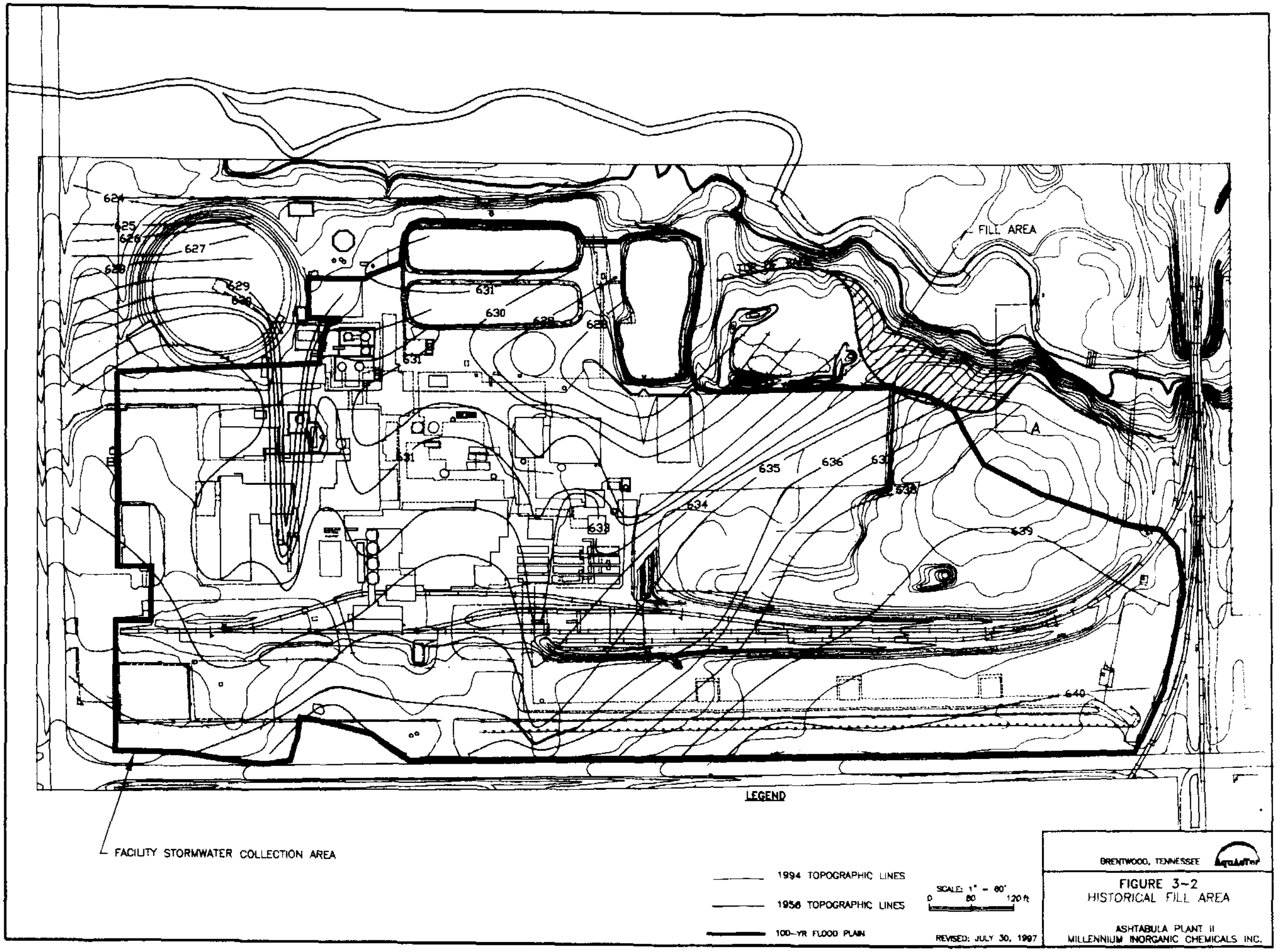
NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.

FIGURE 3-1 (continued)

COMPARISON OF BORING DEPTHS



NOTE: Surface elevations measured from top of soil, concrete, or asphalt surface.



LEGEND

—— 1994 TOPOGRAPHIC LINES

—— 1956 TOPOGRAPHIC LINES

━━ 100-YR FLOOD PLAIN

SCALE: 1" = 60'
0 60 120 ft

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BRENTWOOD, TENNESSEE AquAeTer

FIGURE 3-2
HISTORICAL FILL AREA

ASHTABULA PLANT II
MILLENNIUM INORGANIC CHEMICALS INC.

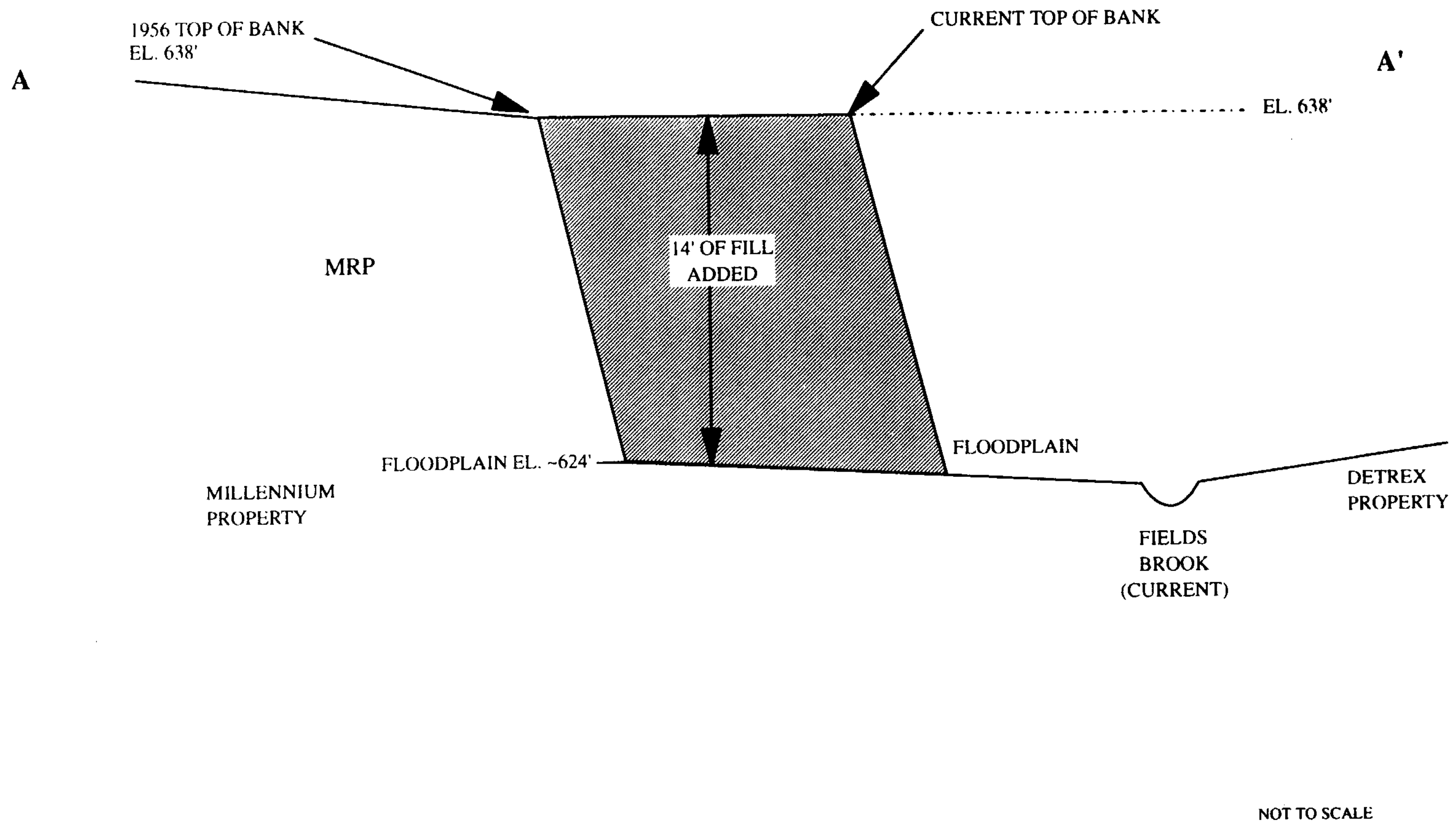


FIGURE 3-3

SIMPLIFIED CROSS-SECTION OF A-A'

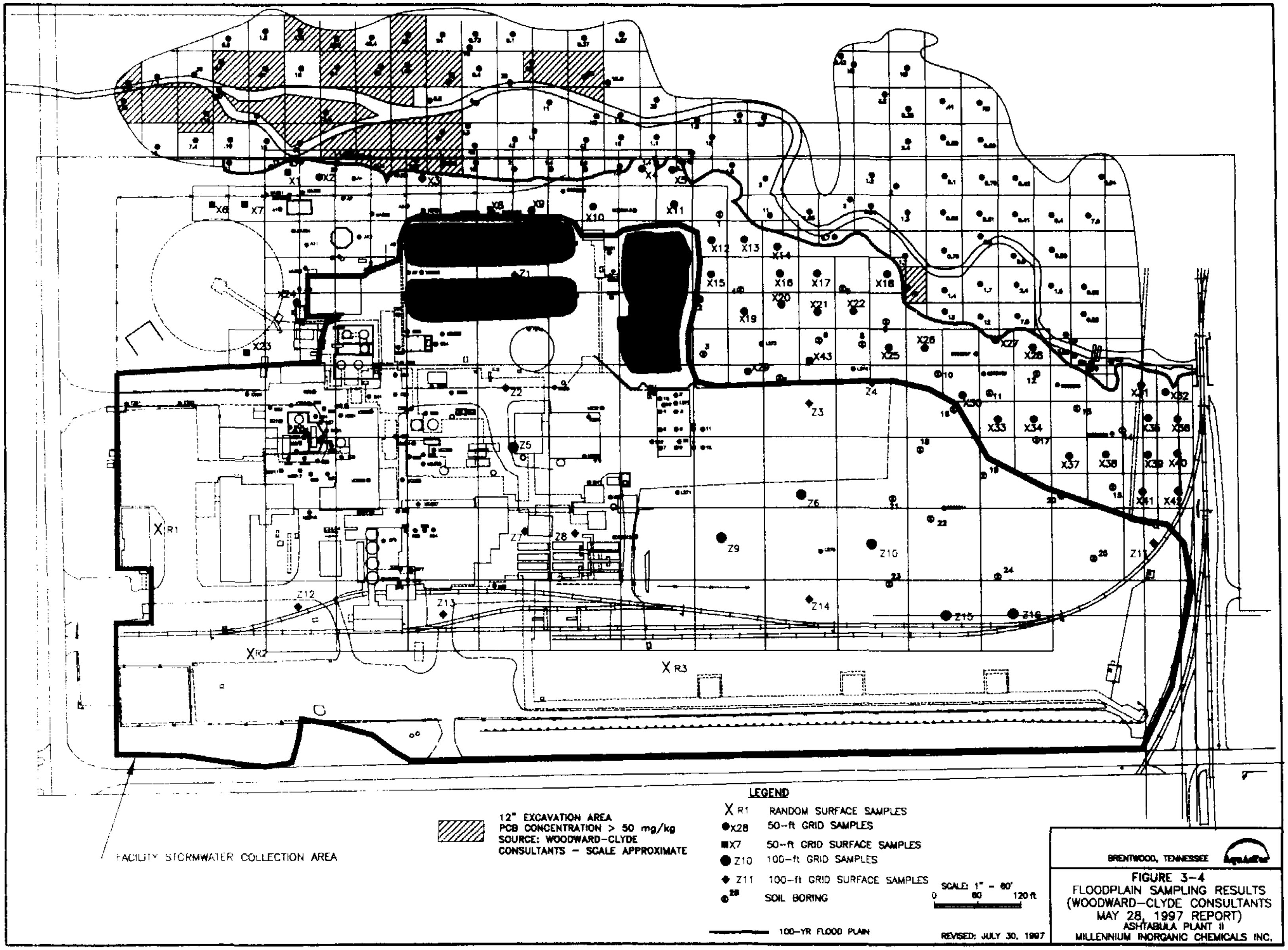
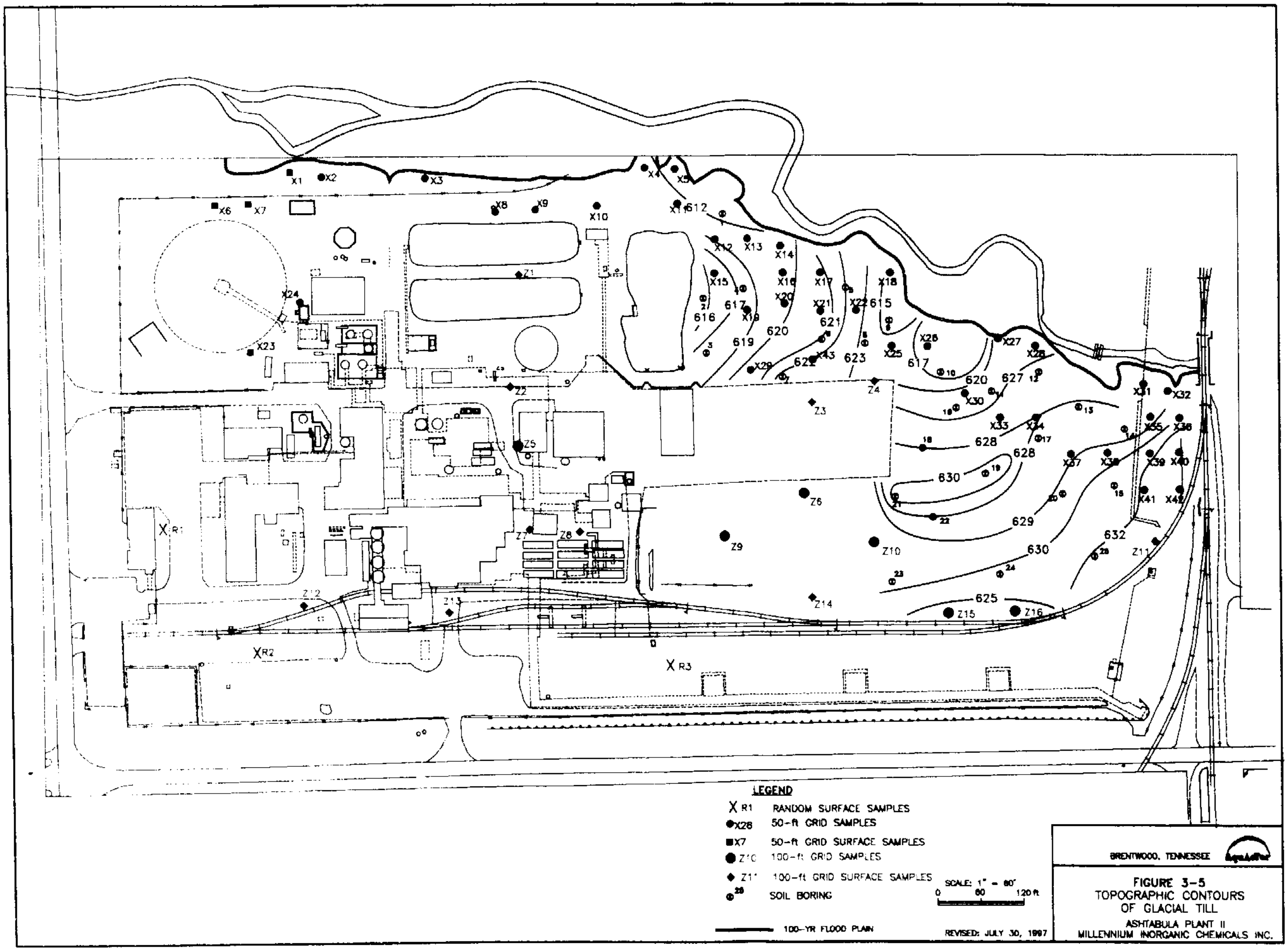


FIGURE 3-4
FLOODPLAIN SAMPLING RESULTS
(WOODWARD-CLYDE CONSULTANTS
MAY 28, 1997 REPORT)
ASHTABULA PLANT II
MILLENNIUM INORGANIC CHEMICALS INC.



REVISED: JULY 30, 1997

BRENTWOOD, TENNESSEE

FIGURE 3-5
TOPOGRAPHIC CONTOURS
OF GLACIAL TILL

ASHTABULA PLANT II
MILLENNIUM INORGANIC CHEMICALS INC.

4

SECTION 4

REVISED VOLUME ESTIMATES

Revised volume estimates for the five plant areas were calculated based on the laboratory results presented in Section 3. These results, in conjunction with previous sampling conducted for the site, were used to develop a preliminary estimate of the volume of contaminated soil based on PCB concentrations: 1) greater than or equal to 50 mg/kg; and 2) greater than 500 mg/kg. Results for soils with PCB contamination between 50 and 500 mg/kg were determined by subtraction.

VOLUME CALCULATION METHODOLOGY

The revised volume estimates were based on the PCB concentration results from **AquAeTer**, Woodward Clyde Consultants, Inc., and Millennium historical soil borings, as presented in Section 3. Excavation depths were calculated based on the soil boring laboratory results. The following steps were used for determining the excavation depths.

- The depth of contamination was determined for each soil boring.
- The borings and corresponding thicknesses were then plotted on a site map, as presented in Figure 4-1. Each thickness includes one extra foot of excavation beneath the contaminated zone.
- Areas for each thickness were drawn based on the soil boring and thickness locations plotted on the site maps by grouping boring sites with similar thicknesses.
- Soil volumes for each group were then calculated by multiplying the areas and thicknesses presented on the site maps. PCB concentrations of nearby points were considered when drawing group contamination areas.

The results of the revised volume estimates are summarized below. Area outlines presented in Figure 4-1 represent groups of borings with similar vertical contaminated thicknesses and may not be identical to the vertical depths at which contamination was encountered. The outlined shapes were influenced by the concentrations of surrounding points. An adjacent boring with a maximum concentration near (but less than) the excavation concentration under consideration (50 or 500 mg/kg) expanded the excavation area more than an adjacent boring with a very low maximum PCB concentration. Volumes of clean soil excavated and stockpiled in order to reach deeper contamination are not considered in these volume calculations. Therefore the volumes derived from Figure 4-1 represent volumes of contaminated soils only, and not the total volumes of soils to be actually excavated to reach and remove contaminated soils.

REVISED VOLUME ESTIMATES

PLANT AREA	**50 - 500 mg/kg ESTIMATED VOLUME (yd^3)**	**>500 mg/kg ESTIMATED VOLUME (yd^3)**
Non-Traffic Area	303	181
North Traffic Area	1,461	274
Laydown Area	0	0
Plant Process Area	725	317
Mining Residuals Pile	14,595	3,021
Total Volume	**17,084**	**3,793**

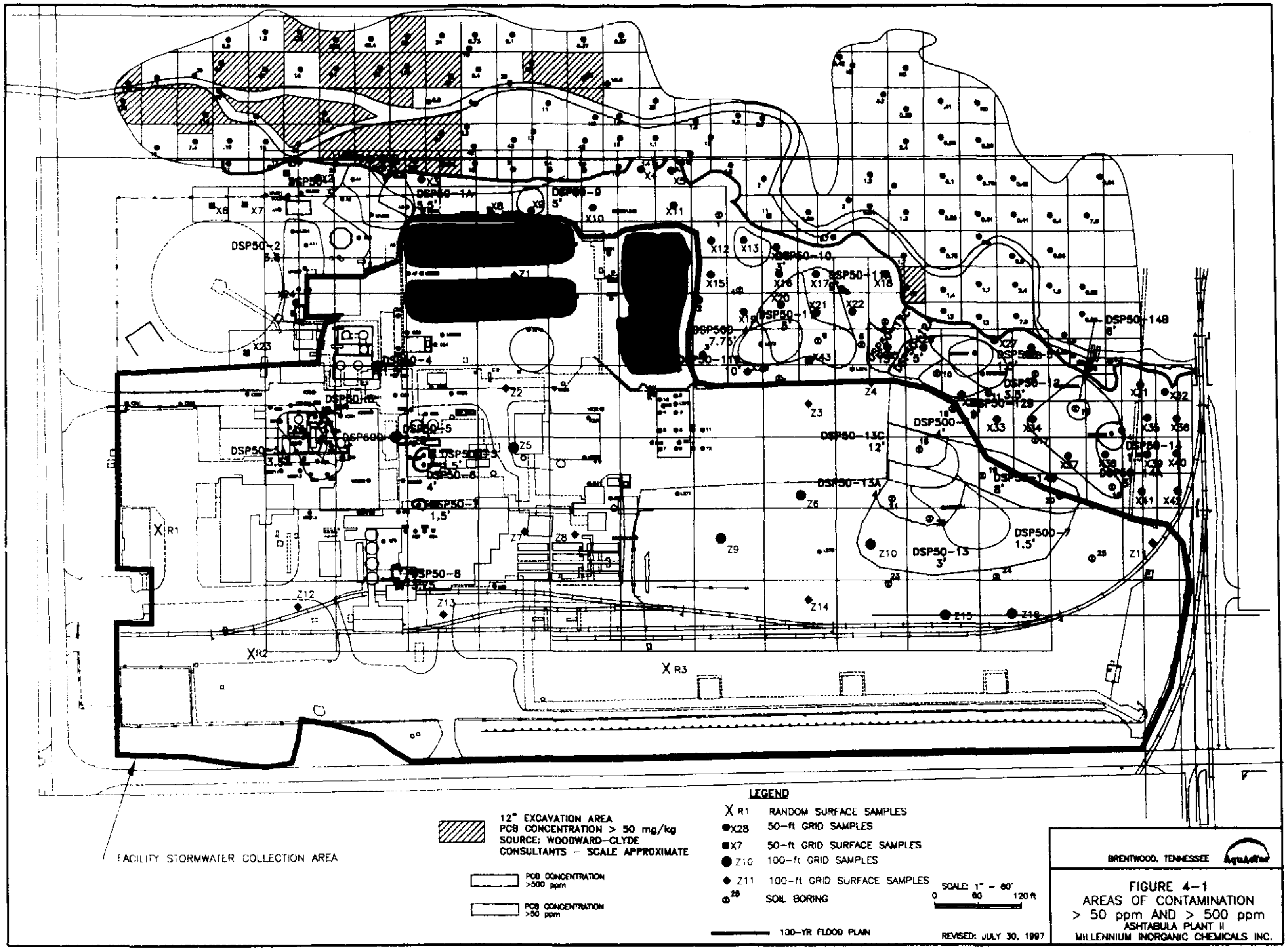


FIGURE 4-1
AREAS OF CONTAMINATION
> 50 ppm AND > 500 ppm
ASHTABULA PLANT II
MILLENNIUM INORGANIC CHEMICALS INC.

5

SECTION 5

REVISED COST ESTIMATES

INTRODUCTION

Based on the results of the revised volume estimates, remediation costs were revised for Alternative VI of Technical Memorandum 3 (TM-3). Alternative VI involves excavation of soil in excess of 50 mg/kg PCBs and disposal at an on-site or off-site landfill which complies with TSCA. The remaining soils on-site would contain less than 50 mg/kg PCBs and would be contained by pavement, gravel, or a soil cover. Alternative VI has been recommended by the USEPA as the selected remedy for the site.

DESCRIPTION OF REMEDIAL ALTERNATIVE

Under this alternative, soils with greater than 50 mg/kg of PCBs would be excavated and disposed at an on-site or off-site landfill which complies with TSCA. This alternative ensures that all plant areas with concentrations greater than 50 mg/kg PCBs will either be landfilled, paved, covered with 12 inches of soil, or covered with 6 inches of gravel. Therefore, soils from areas which exceed 50 mg/kg PCBs will neither erode to Fields Brook nor enter the facility wastewater treatment system. The following information details the remediation effort for each of the five plant areas.

Non-Traffic Area

Soils with greater than 50 mg/kg PCBs (approximately 484 cubic yards) will be excavated and landfilled. These areas will be backfilled with clean soil. The Non-Traffic Area will be covered with 12 inches of clean soil, an erosion blanket, and a vegetative cover.

North Traffic Area

Soils with greater than 50 mg/kg PCBs (approximately 1,735 cubic yards) will be excavated and landfilled. Areas of the North Traffic Area not already covered with gravel, structures, or non-erodible areas, will be covered with a geotextile and then 6 inches of gravel.

Laydown Area

The Laydown Area will be covered with a geotextile and then 6 inches of gravel. No PCB soil contamination greater than 50 mg/kg was detected in this area.

Plant Process Area

Where feasible, soils with greater than 50 mg/kg PCBs (approximately 1,042 cubic yards). including the area around the old Therminol Tank, will be excavated and landfilled. The Plant Process Area will be covered with structural-grade asphalt or concrete, as necessary. Areas that are not feasible to excavate due to safety or structural concerns are currently covered with asphalt, concrete, or structures, and will be left in-place.

Existing Soil Piles

The soil piles will be landfilled if they contain greater than 50 mg/kg PCBs. Any soils containing less than 50 mg/kg will be sent to a regulated industrial waste landfill.

Mining Residuals Pile

All soils and residuals in the Mining Residuals Pile containing greater than 50 mg/kg PCBs will be sent to an on-site or off-site landfill which complies with TSCA. The volume of material in the Mining Residuals Pile with greater than 50 mg/kg PCBs was previously estimated to be 11,163 cubic yards, as presented in the Mining Residuals Pile Volume Investigation (**AquAeTer, Inc.**, December 6, 1996). The current estimate of the volume of material in the Mining Residuals Pile with greater than 50 mg/kg PCBs is 17,616 cubic yards. The excavated areas on the Mining Residuals Pile will not be backfilled, but rather will be graded to lessen the overall height of the pile.

After soils to be landfilled have been excavated, a 12-inch soil or equivalent erosion control cover would be placed over the Mining Residuals Pile. An erosion blanket, followed by a vegetative or crushed stone layer would then be placed on top of the 12 inches of soil. The crushed stone layer would require less maintenance than a vegetative layer.

General Activities

A stability analysis will be conducted during the engineering design phase. Engineering design will ensure that appropriate controls are implemented to prevent problems associated with instability.

A concrete curb or wall would be placed between the concrete pad and the Mining Residuals Pile to prevent accidental damage to the erosion control cover from facility vehicles.

A silt curtain would be placed between the Mining Residuals Pile and Fields Brook to minimize erosion. Topography will be graded as necessary to control run-on to the Mining Residuals Pile. However, because the plant areas will be covered with clean materials, it will be unnecessary to treat surface water runoff from these areas in the wastewater treatment system or by any other method. Sheet-flow runoff from these areas will be adequate. All surface water controls will be maintained. Any decontamination waters generated during construction activities will be treated using an activated carbon drum; and, then the waters will be discharged, as appropriate. The carbon drum(s) will be sent off-site for incineration.

Institutional controls would be implemented for any area where hazardous substances, pollutants, or contaminants will remain above levels that allow for unlimited use and unrestricted exposure. Such institutional controls will include, as appropriate, deed restrictions, security fencing, and signs.

REVISED COST ESTIMATE

The three-phase costing process used by **AquAeTer** to develop the cost estimates follows current industry practices and is consistent with the methodology approved for TM-3. The **AquAeTer** cost-estimating process has found a high level of correlation between the three sources used in cost verification. First, all costs are originally developed using the RS Means 1996 Building Construction Data and the RS Means 1996 Environmental Restoration Unit Cost Book. These sources are detailed price guides for the construction and environmental industries. The unit costs provided by the Means books are prepared from the actual experience of thousands of contractors and suppliers, and are updated on a yearly basis. Information provided is detailed enough to allow fine-tuning of costs on a site or project-specific basis. The 1996 Means data were used to be consistent with previous costs presented in TM-3.

The second step in the **AquAeTer** costing process is to verify large cost items through actual vendor quotes. For example, the installed cost of gabions and cover system components, including the 40-mil liner and the Fabri-Net, were verified through discussions with vendors.

The third step in the **AquAeTer** costing process is to compare individual items with costs actually incurred at Millennium Ashtabula plants during similar activities. For example, the unit cost of paving with asphalt was compared with actual unit costs incurred by the Plant in the past. If necessary, the Means unit costs are adjusted to reflect the experienced Plant costs. Asphalt covers, soil movement, gravel costs and geotechnical investigation costs were all developed from actual Millennium experience.

The 30-year present worth costs to implement this alternative are estimated at $9,586,000. A summary of costs associated with the remediation and long-term operations and maintenance for the site are presented in Table 5-1.

6

SECTION 6

DESIGN PHASE DEVELOPMENT OF EXCAVATION LINES

The volume estimates presented in Section 4 of this report are preliminary only, and were developed for the purposes of remedy selection and cost estimation. In order for a remedy to be implemented, it will be necessary to develop exact cut lines for excavation, based upon existing site data. The excavation cut lines will be developed during the design phase of the project, after the remedy selection is finalized. At the request of USEPA, this section of the report has been included to outline some of the methods for determining excavation cut lines that are being evaluated for use during final design. At this time, no decision has been made as to which method of cut line development will be used. This section merely outlines some of the possibilities that exist for the design phase.

In order to determine which methods to evaluate, a review of commonly used methods was performed. These methods include interpolation of data using grid sampling, use of computer models, and excavation of entire grid areas which is being conducted in the Fields Brook floodplain.

AquAeTer has used a manual interpolation approach to develop the site iso concentration lines. This approach was discussed in Section 4 and is appropriate for gaussian plumes or for continuous plumes. For the Millennium site, all surrounding data points (over 1,000 PCB samples) were evaluated and used to influence the final iso concentration lines. This method compares favorably with preliminary screening results from the methods described below.

INTERPOLATION OF DATA USING GRID SAMPLING

In order to determine if there were better methods to use, two other independent agencies were contacted for guidance on interpolating grid data. USEPA, Region IV, will accept any reasonable method of interpolation between points, provided adequate documentation of the procedure is approved. Region IV recommends the interpolation of data using systematic grid sampling. Samples may be evaluated on a cell by cell basis, with a sampling radius rule of thumb of one-half to two-thirds the distance to the next uncontaminated point allowed for delineation purposes. Although Region IV accepts the use of computer programs such as Surfer®, they indicated that its output should be carefully interpreted, because it cannot account for many site specific factors, as will be discussed below.

The Michigan Department of Natural Resources (MDNR) has developed a guidance document, "Verification of Soil Remediation," Revision 1, (April 1994) to provide specific guidance for sampling soils to verify soil contamination. Detailed information is provided to determine excavation lines based on sampling data and the size of the site. A regimented grid method is specified to delineate the vertical and lateral extent of contamination. Grid intervals are related mathematically to the size of the grid area, and subgrids are defined to cover specific areas. Excavation depth is to the deepest point of contamination or the depth where acceptable levels are anticipated.

There is no clear best-way to delineate random placement of contamination. However, the Region IV method is very close to that traditionally used by **AquAeTer** and is close to what has been presented previously.

shape of the contaminated material. A representative 50 mg/kg isoconcentration line would be chosen for each contaminated area such that excavation of this line from the surface to the deepest contamination will result in the removal of all soil contaminated above 50 mg/kg. Contaminated areas defined by the program would be analyzed by this method to determine total excavation locations and volumes.

Due to the limitations of the program as described above, the model output would require interpretation to determine if the results were reasonable with respect to previous volume estimates, known concentration patterns, cut line locations relative to plant buildings and property lines, and the effects of existing obstacles and topography.

OUTCOME OF EVALUATION

A variety of methods of cut-line development are commonly used. Each method requires informed consideration of site specific details, and careful evaluation of results. The method to be used for the $TiCl_4$ facility has not been determined at this time; however, development of final excavation cut lines will not be conducted until the design phase of the project.

7

SECTION 7

CONCLUSIONS

This report provides the results of a Delineation Sampling Program implemented at the Plant II $TiCl_4$ facility. The DSP was implemented by agreement between Millennium and USEPA, Region V, Office of Superfund. The purpose of the sampling was to better define PCB contamination in site soils.

The most recent remedial alternative proposed for the facility involves the excavation of site materials with greater than 50 mg/kg PCBs. In order to better define potential excavation areas in the five plant areas for use during the engineering design phase, the DSP was developed. The field activities for the DSP were conducted from June 2, 1997 through June 19, 1997, by Millennium and **AquAeTer.** The investigation consisted of a field study that included the following: **1)** the placement of 62 soil borings; **2)** laboratory analyses of the 291 soil samples for PCB content; and **3)** preliminary volume calculations based on the laboratory results. Presently there are over 1,000 PCB analyses associated with this site. USEPA has determined that this level of sampling is sufficient to progress to the design stage for excavation and landfill disposal of soils with PCB concentrations greater than 50 mg/kg.

Previously identified PCB contaminated areas were further defined by the results of the DSP. Contaminated soils were generally found in areas predicted by past sampling events. Boring results indicated that the site is underlain by dry, stiff grey clay (glacial till) encountered at boring depths to 22 feet. The moisture content of the soils averaged 23 percent.

DSP sampling data, as well as historical sampling data, were used to revise the estimated volumes of contaminated soil at the Plant II $TiCl_4$ facility. Revised volume estimates for each of the five plant areas are identified below.

REVISED VOLUME ESTIMATES

PLANT AREA	50 - 500 mg/kg ESTIMATED VOLUME (yd^3)	>500 mg/kg ESTIMATED VOLUME (yd^3)
Non-Traffic Area	303	181
North Traffic Area	1,461	274
Laydown Area	0	0
Plant Process Area	725	317
Mining Residuals Pile	14,595	3,021
Total Volume	**17,084**	**3,793**

Based on the preliminary volume calculations, the estimated 30-year present worth cost to implement Alternative VI of TM-3 are $9,586,000. This cost is based on disposal at the Model City, New York TSCA landfill.