# *Addendum to MCP Supplemental Phase II/RCRA Facility Investigation Proposal for Lyman Street/USEPA Area 5A Site*

## Volume I of V

General Electric Company
Pittsfield, Massachusetts

October 1997

**BBL**
BLASLAND, BOUCK & LEE, INC.
*engineers & scientists*

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# 1. Introduction

## 1.1 General

In June 1996, the General Electric Company (GE) submitted to the Massachusetts Department of Environmental Protection (MDEP) an *MCP Supplemental Phase II/RCRA Facility Investigation Report for Lyman Street/USEPA Area 5A Site* (Phase II/RFI Report) [Blasland, Bouck & Lee, Inc. (BBL), 1996a]. Upon review of that document, the MDEP and the United States Environmental Protection Agency (the Agencies) sent GE a letter dated July 22, 1997, directing GE to: 1) submit within 90 days a Phase II/RFI Proposal Addendum addressing the Agencies' July 22, 1997 comments; and 2) upon completion of additional investigations, prepare further revisions to the Risk Assessment Proposal (as necessary), and submit a Revised Phase II Report presenting the results of the additional investigations (Cutler and Olson, 1997a). The Agencies also sent GE a letter dated September 24, 1997 requesting surficial and subsurface soil sampling at a residential property located at Parcel I9-8-9 (Cutler and Olson, 1997b). This document represents GE's Phase II/RFI Proposal Addendum for the Lyman Street/USEPA Area 5A Site (hereafter referred to as the Lyman Street Site or the Site), including the soil sampling requested in the September 24, 1997 letter.

## 1.2 Proposal Format

Section 2 of this document provides a brief summary of background information related to the Lyman Street Site. In accordance with the Agencies' letter of July 22, 1997, Section 2 also presents and discusses previously collected data which require further analysis or clarification, including:

- Analytical results for a light non-aqueous phase (LNAPL) sample collected in April 1992;
- Laboratory data sheets for all samples collected during the Phase II/RFI work in 1995/1996;
- Review of monthly and quarterly well gauging results;
- Iso-concentration contour data for polychorinated biphenyls (PCBs) in soil;
- Figures indicating the location of the fence on the Western Massachusetts Electric Company (WMECO) property and that area where PCB-containing soil has been excavated and replaced with clean soil;
- Analytical results for groundwater samples from wells LS-12, LS-38, LS-43, LS-44, and LS-45 in August 1997;
- Iso-concentration contour maps for groups of Appendix IX+3 constituents (Appendix IX+3 refers to those constituents listed in Appendix IX of 40 CFR Part 264 plus three additional constituents--benzidine, 2-chloroethylvinyl ether, and 1,2-diphenylhydrazine);
- An analysis of the ability of the silt layer to restrict the downward migration of dense non-aqueous phase liquids (DNAPLs); and
- A figure indicating where and to what extent DNAPL and/or LNAPL have been observed.

Section 3 describes the proposed additional investigative activities required by the Agencies' July 22, 1997 and September 24, 1997 letters. These activities include:

- A discussion of additional analyses to determine whether the stormwater pipe and associated bedding materials provide a potential preferential pathway for groundwater flow, and whether other preferential migration pathways exist along the western perimeter of the Site.
- Additional surface and subsurface soil sampling to determine the extent of constituents along the western perimeter of the Site and on the 10 Lyman Street (Parcel I9-4-23) property.
- Additional soil sampling in the area of the 772 East Street (Parcel I9-8-7) property.
- Additional surface and subsurface soil sampling transects along the river bank.
- Surficial and subsurface soil sampling at Parcel I9-8-9.
- Installation of an additional boring and monitoring well east of well LS-31 to evaluate the top of the silt layer and better define the horizontal extent of DNAPL and/or dissolved phase constituents.

- Collection and analysis of a surface water sample adjacent to the storm water outfall (i.e., near sample location LS-HR2).

Section 4 of this document presents a proposed schedule for completion of the investigative activities described in Section 3, submission of the revised Supplemental Phase II/RFI Report, and revisions to the Proposal for Human Health and Environmental Risk Assessment for this Site.

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# 2. Background and Supplementary Investigatory Information

## 2.1 General

Prior to about 1940, the stretch of the Housatonic River which flows through Pittsfield, Massachusetts, was characterized as a meandering stream. As such, the river contained a series of alternating bends, or oxbows, and lowland areas. In an effort to reduce the flooding potential of the Housatonic River, the City of Pittsfield, in a joint program with the U.S. Army Corps of Engineers during the late 1930s and/or early 1940s, altered the natural course of the river to form a relatively straight channel. In order to accomplish this, a total of 11 oxbows or low-lying areas, which had previously conveyed river flows, were isolated from the newly formed channel of the river.

These former oxbows were subsequently filled with various materials. There are no known records as to the specific sources or types of material used as fill (apart from recent sampling data). Oxbow Area D, one of the 11 areas which had been isolated from the river channel and then filled, was later paved for use as the existing Lyman Street parking lot. This lot is surrounded by a fence, except along the steep, vegetated riverbank (where a guardrail is present). The parking lot was used for parking for GE employees until GE discontinued use of the lot in April 1992 and locked the access gates to further restrict access. The lot is paved except for relatively narrow grass strips along the fence line. The northwestern portions of GE Lots No. 1 and 2, located immediately to the north of the Lyman Street parking lot, are paved. The remainder of the parcels are unpaved and vacant.

Oxbow Area E, which is located on the WMECO property adjacent to the Lyman Street parking lot, has been subject to little development except for maintenance of an overhead powerline utility right-of-way. Currently Oxbow Area E and the WMECO parcel are mainly covered by grass and brush. With the exception of the northern portion of the WMECO parcel and along the riverbank, all four of the areas comprising the Lyman Street Site are surrounded by locked, chain link fence. A general site plan is provided as Figure 1.

## 2.2 History of Investigations

A significant number of investigations have been conducted at and near the Lyman Street Site. A brief discussion of these studies, along with a history of the Agencies' review of Site activities, can be found in the Phase II/RFI Report (BBL, 1996a).

## 2.3 Supplemental Historical Data

The Agencies determined in their July 22, 1997 letter that the Phase II/RFI Investigations are not complete and that additional information would be required to complete the investigations (Cutler and Olson, 1997a). The purpose of this section is to: 1) provide specific data requested by the Agencies (e.g., LNAPL analytical results) referenced in the Phase II/RFI Report; 2) provide further analysis of existing data; and 3) present the analytical results for groundwater samples collected from wells LS-12, LS-38, and LS-43 through LS-45 in August 1997.

### 2.3.1 LNAPL Constituents

In Comment 1 of the July 22, 1997 letter, the Agencies requested information regarding the constituents found in an LNAPL sample collected in April 1992. The LNAPL sample was collected as a composite from three adjacent wells (LS-4, LS-23, and RW-1) on April 30, 1992. The analytical results for this sample (LS423R1C1) are presented in Table 2-1. The laboratory report is included in Appendix A.

### 2.3.2 Laboratory Data Sheets

Laboratory analytical summary data sheets for all groundwater, soil, air, and surface water samples collected as part of Phase II/RFI work conducted between 1995 and 1996 are included in Appendix D as requested in Comment 3 of the Agencies' July 22, 1997 letter.

### 2.3.3 Well Gauging

In response to Comment 4 of the July 22, 1997 letter, a review of weekly, monthly and quarterly gauging of monitoring and recovery wells at the Lyman Street Site was conducted. The review indicates that weekly and monthly gauging of wells specified by the Agencies has been and is now occurring as required, and monthly reports containing this information have been submitted regularly to the Agencies by GE. Quarterly gauging of wells specified by the Agencies inadvertently lapsed during the last three quarters of 1996. However, quarterly monitoring was reinitiated in 1997 and continues at present. The data for the first three monitoring events of 1997 are included in Appendix B.

### 2.3.4 Iso-concentration Contours for PCBs in Soil

The June 1996 Phase II/RFI Report delineated the horizontal and vertical extent of PCB-impacted soil and fill at the Lyman Street Site using laboratory data generated during investigations conducted between 1987 and 1995 (BBL, 1996a). Preliminary soil volume estimates were developed for the Site and the adjacent off-site area west of Lyman Street. Soil volumes were determined for four PCB concentration ranges: 1 to 10 ppm; 10 to 50 ppm; 50 to 1,000 ppm; and greater than 1,000 ppm. As discussed in the Phase II/RFI Report, these concentration ranges were selected to adequately differentiate PCB-contaminated soil without creating undue complexity; these concentration ranges do not necessarily represent levels of regulatory significance for this Site.

Figure 2 illustrates the iso-concentration contours developed for PCBs in soil. The contours were drawn based on the maximum PCB concentration observed at each boring location, and therefore are conservative. The average thickness of soil corresponding to each concentration range was calculated. These values were then multiplied by the corresponding surface areas for each contour interval as determined with a digital planimeter. The estimated volumes resulting from this calculation were presented in Section 4.6 of the Phase II/RFI Report:

1 to 10 ppm: 170,000 cy
10 to 50 ppm: 90,000 cy
50 to 1,000 ppm: 60,000 cy
greater than 1,000 pm = 30,000 cy

Surficial soil data available for the WMECO portion of the Site bordering the Housatonic River were not used for the preliminary volume estimates. The PCB distribution map and volume estimates will be revised following the completion of the proposed sampling and analysis program and presented in the revised Supplemental Phase II/RFI Report.

### 2.3.5 1995 Immediate Response Action/1995 Release Abatement Measure

As noted by the Agencies in their July 22, 1997 comment letter, an Immediate Response Action (IRA) was completed at the Site in 1995. The IRA included soil sampling and construction of a fence to restrict access to the WMECO and Lyman Street Site properties. The location of the fence is depicted on Figure 1. In addition to the IRA, a Release Abatement Measure (RAM) was completed in 1995. The RAM consisted of soil sampling, removal and disposal of PCB-containing soil, installation of a pipeline (which transfers groundwater from on-site recovery wells to GE's groundwater treatment system), and backfill of the trench with clean soil. An area approximately 250 feet long and 4 feet wide was excavated for the pipeline route across the WMECO property. Approximately 16 soil sample locations were selected along the route (see Figure 3). Soil samples were collected from depths of 0 to 0.5 feet at eleven locations (LS-GWP-6 through LS-GWP-16) and from 0-1.75 feet and 1.75 to 3.5 feet at five locations (LS-GWP-1 through LS-GWP-5). The data indicated PCB-containing soils were present along the pipeline route (see Phase II/RFI Report for PCB results) and as result, all excavated soils were removed and properly disposed. The excavation was backfilled with clean soil. A RAM completion report for this project was submitted to the Agencies February 28, 1995.

### 2.3.6 Analytical Results for August 1997 Sampling Event

In accordance with the Agencies' Comment 11, monitoring wells LS-38, LS-43, LS-44, and LS-45 were sampled in August 1997 for laboratory analysis of Appendix IX+3 constituents. In addition, monitoring well LS-12 was sampled for Appendix IX+3 analysis to confirm earlier analytical results. Laboratory results are summarized in Table 2-2 and the analytical reports are included in Appendix D. The August 1997 analytical data are discussed below in Section 2.3.7.

### 2.3.7 Iso-concentration Contours for Group Appendix IX+3 Compounds in Groundwater

The distribution of dissolved phase Appendix IX+3 compounds at the Lyman Street Site was described in detail in the Phase II/RFI Report. Maps summarizing the analytical results for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), PCBs, pesticides/herbicides, dioxins/furans, and inorganic constituents also were presented. At the request of the Agencies, the maps submitted previously have been revised to more clearly illustrate the distributions of the constituents in groundwater (Figures 4 through 9). Analytical data for each location sampled are posted in color-coded format according to year. Additionally, if elevated concentrations were consistently present and spatially continuous, iso-concentration contours for constituent groups are depicted. These contours were generated using data from all of the sampling events, and therefore should be considered to be conceptual in nature. Results for the August 1997 sampling event (monitoring wells LS-12, LS-38, LS-43, LS-44, LS-45) have been included on the figures. Dissolved phase constituent distributions are discussed below.

#### *Volatile Organic Compounds*

VOCs were differentiated into the sum of benzene, toluene, ethylbenzene, and xylenes (BTEX) and total chlorinated hydrocarbons. The highest BTEX concentrations occur in the vicinity of the LNAPL zone along the southwestern perimeter of the Site (Figure 4). A conceptual 1 ppm contour has been sketched based on the data from all sampling events. BTEX compounds were not observed southwest of Lyman Street during the August 1997 sampling event. Historically, aromatic hydrocarbons have been observed at upgradient locations; BTEX concentrations up to 0.012 ppm were noted at the 772 East Street property (Associated Environmental Scientists, 1992), and BTEX levels as high as 7.4 ppm were detected on the 10 Lyman Street parcel (O'Brien & Gere, 1993).

Chlorinated hydrocarbons are more widespread at the Site (Figure 5). Consistent with the BTEX distribution, the highest concentrations occur in the southwest portion of the parking lot. Total chlorinated solvent concentrations in monitoring wells LS-43, LS-44, and LS-45 in August 1997 ranged from 0.005 to 0.28 ppm.

#### *Semi-Volatile Organic Compounds*

Total SVOC concentrations are illustrated on Figure 6. Similar to the VOC distribution, elevated SVOC concentrations occur in the southern portion of the Site. Additionally, SVOCs are also slightly elevated where

DNAPL has been detected in LS-12 and LS-34. On the 10 Lyman Street property, SVOCs were present only in monitoring well LS-43 (0.006 ppm). Conceptual 1 ppm contours have been drawn on Figure 6 where appropriate.

### *Polychlorinated Biphenyls*

PCBs are widely distributed in groundwater of the Site as documented in the Supplemental Phase II/RFI Report. Figure 7 reveals that the highest PCB concentrations for filtered samples occur near Lyman Street in monitoring wells LS-12 and LS-34. The highest unfiltered sample concentrations also occur in LS-12 and LS-34, although there is significant variability in the unfiltered sample concentrations for these wells. For example, the PCB concentration in the unfiltered LS-12 sample in August 1997 (1.0 ppm) was significantly lower than the concentration observed during the previous sampling event in 1995 (25 ppm). The filtered LS-12 sample concentration in August 1997, in contrast, was 0.0052 ppm. The August 1997 results also revealed that PCBs occurred in filtered samples only in monitoring well LS-43 (0.0051 ppm) on the 10 Lyman Street property.

Typically, the PCB results for filtered and unfiltered samples from a given monitoring well display significant differences, with the greatest discrepancies observed for LS-12 (200-fold difference between filtered and unfiltered samples in August 1997) and LS-34 (three order of magnitude difference between filtered and unfiltered samples in November 1995). On one or more dates, the unfiltered sample concentrations for wells LS-2, LS-11, LS-12, LS-13, LS-32, LS-33 and LS-34 exceeded the aqueous solubility of Aroclor 1254 (0.05 ppm). In contrast, no filtered sample results exceeded the Aroclor 1254 solubility. These considerations suggest that the presence of NAPL "droplets" or PCBs adsorbed to fine-grained particulates in the unfiltered samples may be responsible for the observed differences.

### *Pesticides/Herbicides*

Pesticides/herbicides have been detected in monitoring wells in the southern portion of the Site at concentrations significantly below 1 ppm. The highest concentrations occur in wells LS-12 and LS-34 (Figure 8). Total pesticide/herbicide levels observed on the 10 Lyman Street property ranged from 0.000016 to 0.0011 ppm in August 1997. A conceptual 0.2 ppm contour is shown on Figure 8.

### *Dioxins/Furans*

Total dioxin/furan Toxicity Equivalency Factors (TEFs) are plotted on Figure 9. Dioxin/furan compounds were observed only in the vicinity of Oxbow Area D; monitoring wells located on the WMECO parcel and the 10 Lyman Street property contained no detectable dioxins or furans. A conceptual TEF iso-concentration contour (0.01 ppb) is depicted along the southwestern edge of the Lyman Street parking lot, illustrating a distribution consistent with that observed for other constituents.

### *Inorganic Constituents*

Metals and other inorganic constituents have not been contoured because many are naturally occurring, there are wide variations between dissolved (filtered ) sample and total (unfiltered) sample results, and there are limited data available concerning background levels in the Site vicinity. The distribution of inorganic constituents will be re-evaluated following the completion of both the proposed investigation activities and the previously submitted background sampling plan.

***Summary***

The distribution of dissolved phase Appendix IX+3 constituents at the Lyman Street Site demonstrates that contiguous, high-concentration groundwater plumes are not present at the Site. The most significant impacts to groundwater occur principally in the southwest portion of the former Oxbow D area. This distribution is consistent with the occurrence of NAPL in this vicinity (see Section 2.3.8).

### 2.3.8 Interpreted Extent of Non-Aqueous Phase Liquid

The extent of LNAPL and DNAPL occurrences in the subsurface have been determined from NAPL thickness measurements in monitoring wells and soil observations made during drilling (Figure 10). Figure 10 illustrates that NAPL has been detected only in wells within the former Lyman Street parking lot. The extent of LNAPL coincides approximately with the former Oxbow D of the Housatonic River. DNAPL occurs within an "L"- shaped area extending from the center of the parking lot toward Lyman Street.

### 2.3.9 Analysis of Silt Confining Layer

The Agencies requested a detailed analysis of the potential of the silt layer to prevent downward DNAPL migration at the Site (Cutler and Olson, 1997a, Comment 20). This analysis was performed by HSI GeoTrans and is included in Appendix C.

The evaluation considered the three separate and distinct forces which affect DNAPL migration in groundwater. These are: a buoyancy force which results from the density difference between DNAPL and groundwater; a capillary pressure force which results from the interfacial tension that exists when DNAPL and groundwater are in contact with each other; and a hydrodynamic force due to the hydraulic gradient of groundwater.

Utilizing Site-specific hydrogeologic data collected between 1991 and 1996, along with physical property measurements from DNAPL collected at the Site, evaluation of these forces indicate that it is likely that natural conditions beneath the Site are an effective barrier to downward DNAPL migration. The combination of upward vertical gradients observed at the Site and the capillary barrier created by the silt aquitard act to restrict downward DNAPL migration. However, because low-level PCBs were detected in a groundwater sample collected from the sand unit beneath the silt aquitard, further sampling/evaluation of well LS-25 is proposed (See Section 3.6).

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# 3. Proposed Supplemental Phase II/RFI Activities

## 3.1 General

Section 3 presents the investigation activities proposed in response to the Agencies' July 22 and September 24, 1997 requests. An evaluation of the potential for utility corridors near Lyman Street to behave as preferential migration pathways is presented in Section 3.2. Proposed surface and subsurface soil sampling activities are described in Section 3.3. Monitoring well installation and surface water sampling activities are presented in Sections 3.4 and 3.5, respectively.

## 3.2 Potential for Utilities to Act as Preferential Pathways of Migration

BBL has further reviewed construction information for the storm sewer that discharges near the west edge of the Lyman Street bridge to evaluate whether the sewer may act "as a preferential pathway for contaminated groundwater", as suggested in Comment 13 of the Agencies' July 22, 1997 letter. This information was initially reviewed as part of the Phase II/RFI Investigation, and a discussion of the effects of the storm sewer was presented in the Phase II/RFI Report as Section 7.3.2.5. The following discussion presents a more complete evaluation of the potential for the storm sewer, and other subsurface utilities along Lyman Street, to act as preferential pathways for contaminant migration.

Based on maps provided by the City of Pittsfield Engineer (Appendix A of the Phase II/RFI Report), the storm sewer is comprised of two catch basins, located on either side of Lyman Street (north of the Lyman Street bridge), that convey storm-water runoff to a manhole located in the center of the street, as shown on Figure 11. A 12-inch diameter, vitreous clay pipe runs from the manhole to an outfall near the bridge. The distance from the catch basins (the start of the storm sewer) to the outfall is about 140 feet. The invert elevations for the sewer pipe at the manhole and the outfall are shown to be 977.60 and 976.92 feet above mean sea level (AMSL), respectively. This agrees with the slope of the sewer reported on the map (0.5 feet per 100 feet). For a storm sewer of this type installed in stable soils, no more than six inches of bedding material would typically be required beneath the pipe; therefore, the elevation of the base of the storm-sewer bedding along the sewer would be expected to be 977.1 feet AMSL at the manhole and 976.42 feet AMSL at the outfall. There appears to be a slight discrepancy between the invert elevation for the manhole provided above and an elevation presented on Figure 1 of a document prepared by Golder Associates entitled *Revised MCP Phase II Scope of Work for Lyman Street Parking Lot (Oxbow Area D) and Proposal for RCRA Facility Investigation for USEPA Area 5A Pittsfield, Massachusetts (January, 1995)* (Golder Associates, 1995). The elevation provided in the Golder Associates report (977.04 feet AMSL) is 0.56 feet lower than the elevation reported on the map provided by the City Engineer. However, this minor discrepancy is not significant enough to affect the evaluation. Using the slope reported above, the outfall elevation is calculated to be 976.36 (an outfall elevation was not provided by Golder Associates).

BBL identified two other utilities that run along Lyman Street, an eight-inch diameter, vitreous clay sanitary sewer and an eight-inch diameter water main. The sanitary sewer begins near the start of the storm sewer as a standpipe, then runs north, in the opposite direction of the storm sewer and away from the river, where it connects to an east-west oriented sanitary sewer that parallels East Street (Figure 11). The map provided by the City of Pittsfield Engineer provides invert elevations for the two manholes located between the standpipe and the sanitary-sewer junction at East Street (978.21 and 977.25 feet AMSL from south to north, respectively) and for the manhole located at the junction itself (976.00 feet AMSL). The water main runs down the center of Lyman Street, and although no elevation data are available, water mains in the geographic region of the Site are typically installed at a depth of about five feet, to ensure they are below the frost line, which would put the elevation of the water line near that of the storm sewer (i.e., about 977.3 feet AMSL), based on the grade elevation of the storm-sewer manhole of 983.34 feet AMSL provided on Figure 1 of the Golder Associates document.

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Using the information provided above, the cross sections contained in the Phase II/RFI Report as Figures 2-3 and 2-4 have been revised (Figures 12 and 13 in this proposal) to depict the location of the storm and sanitary sewers. Since these utilities are generally about the same depth or deeper than the inferred depth of the water line, the water line is not depicted on the figures. The figures demonstrate that the entire lengths of both utilities are above the water table measured April 18, 1996. The April 18, 1996 data set was employed because it represents the highest water table elevation measured since the installation of monitoring wells LS-12, LS-34, and LS-38 adjacent to the utility corridors. The highest groundwater levels recorded at the Site were measured during the April 14, 1994 monitoring event; for wells present for both events, water table elevations in April 1994 typically were 1 to 1.5 feet higher than in April 1996. As reported in the *Assessment of Potential Preferential Pathways in East Street Area 2/USEPA Area 4* (BBL, 1996b), the April 1994 water table elevation extreme probably recurs with a maximum frequency of once every 15 years. These observations suggest that the utilities in question rarely encounter the water table, and therefore are not likely to be significant preferential pathways for contaminated groundwater.

To further evaluate the possibility that the utility corridors influence contaminant migration in the vicinity, GE proposes to continue the preferential pathway investigation in this area. The stormwater manhole invert nearest to the Lyman Street bridge and the base of the storm drain pipe which flows to the Housatonic River will be resurveyed to evaluate the discrepancy discussed previously. Engineering or construction drawings for the bridge abutment, if available, will be examined for evidence that this feature is a factor. Additionally, GE will conduct weekly inspections of the storm drain pipe outfall to determine if seeps or sheens are present. Lastly, GE proposes to construct a water table elevation map for the April 14, 1994 high groundwater conditions using wells in existence at that time, and incorporating projected water table elevations for wells that have been installed since.

### 3.3 Soil Boring and Sampling

The Agencies determined that additional surface and subsurface soil sampling is required to better delineate the extent of constituents in soils at four areas near the Site (Cutler and Olson, 1997a, Comments 5, 6, 9; Cutler and Olson, 1997b). These four areas include:

- The north bank of the East Branch of the Housatonic River (the river), along the entire length of Site;
- The commercial property located southwest of the Lyman Street Site (10 Lyman Street; Parcel I9-4-23);
- The commercial property located at 772 East Street (Parcel I9-8-7); and
- The residential property at 762 East Street (Parcel I9-8-9).

The sampling proposed for each area is discussed in the following sections. These activities will be performed in accordance with the procedures presented in GE's Sampling and Analysis Plan/Data Collection and Analysis Quality Assurance Plan (SAP/DCAQAP) (BBL, 1994), with subsequent revisions approved by the Agencies. All analyses for Appendix IX+3 constituents will include chlorinated pesticides detected by EPA Method 8080.

### 3.3.1 North Bank of the River

Prior investigations have determined that PCBs are present in surface soil (0-0.5 feet below grade) at several locations along the northern river bank at the Site; however, sampling was limited to the surface. Additionally, limited sampling was conducted along the top of the riverbank on the WMECO property. Soil samples were collected from the borings for monitoring wells E-3 and E-4 at the top of the riverbank and were analyzed for PCBs at two-foot intervals from the surface to 22 feet below grade.

To better delineate the extent of PCBs in surface soils and in subsurface soils along river bank throughout the length of the Site, surface and subsurface soil samples will be collected along eight transects (Figure 14). Each transect will be oriented perpendicular to the river and consist of three boring locations representing: 1) the top of the bank (top of bank), 2) the middle of the bank (mid-bank), and 3) the base of the bank (lower bank). Since the river bank is not clearly depicted on Figure 14, the transect locations are approximate and may be modified in the field slightly to facilitate access and ensure collection of samples from the top, middle, and base of the river bank. Where possible, transect locations were selected to include previous sampling locations (e.g. E-4). Soil borings will be advanced using a hand auger, and samples will be collected manually. Sampling intervals at each location will consist of the following: 0 to 0.5 feet below grade (fbg), 0.5 to 2.0 fbg, and 2.0 to 4.0 fbg. Sampling locations and intervals where pre-existing data are available will not be re-sampled. Samples collected from each of these intervals will be submitted for laboratory analysis of PCBs (USEPA Method 8080). All sampling and analysis will be conducted in accordance with the previously approved Sampling and Analysis Plan/Data Collection and Analysis Quality Assurance Plan (SAP/DCAQAP) for the Site (BBL, 1994).

### 3.3.2 10 Lyman Street Property

The 10 Lyman Street property abuts the Lyman Street Site to the southwest. Although a portion of this property is within the Oxbow Area B, four soil borings were completed on the 10 Lyman Street parcel in 1995 as part of the Supplemental Phase II/RFI for the Lyman Street Site. PCBs were detected in the two-to-four-foot sample collected from boring LS-45 (Figure 14). VOCs, SVOCs, and PCBs also were detected in samples collected from the boring for well LS-43, including the 22-to-24-foot sample. Additionally, PCBs were detected at a depth of 15 feet in the boring for monitoring well MW-4, which is located approximately 300 feet west of LS-45 (Figure 14). Monitoring well MW-4 is one of six monitoring wells installed on the property as part of property assessments. Four of the six wells (MW-1 through MW-4) were installed during a property assessment performed by Scalise-Knysh Associates, Inc. (SKA) that was completed in February 1988 (SKA, 1988). The remaining two monitoring wells (MW-5 and MW-6) were installed by O'Brien & Gere Engineers, Inc. (OBG) during and investigation completed in March 1993 (OBG, 1993). The purpose of the OBG investigation was to bring the SKA report into general conformance with the MDEP MCP regulations for conducting a Phase I Limited Site Assessment (OBG, 1993). Based upon a review of the existing data, it is apparent that PCBs were detected in concentrations greater than 1 ppm only along the southern and eastern sides of the building on this property.

Further delineation of the lateral and vertical extent of constituents in soil at the 10 Lyman Street property will be accomplished by advancing two borings, one near MW-4 and one north of LS-42, and by analyzing the samples collected from transects T-1, T-2 and T-3 of the riverbank sampling effort (Figure 14). The boring north of LS-42 will extend to a depth two feet below the base of fill or to the water table, whichever is deeper, to define the extent of contamination in this area. The boring adjacent to MW-4 will be advanced to a minimum depth of 20 feet due to the occurrence of PCBs 15 feet below grade in the MW-4 boring. The depth of this boring may be increased if fill or visual evidence of contamination exist at the 20-foot depth. Samples will be collected in continuous two-foot intervals throughout the boring. Upon collection, each soil sample will be screened in the field for VOCs using a photoionization detector (PID), and submitted for analysis for PCBs (USEPA Method 8080). One sample will be selected from each boring for Appendix IX+3 analysis based on criteria presented in the SAP/DCAQAP.

To further define the extent of contamination in surficial soil at the Site, samples will be collected from transects T-1, T-2, and T-3. These transects are located along the riverbank, the only unpaved portion of the area in question. Sample intervals at each location will 0-0.5 feet, 0.5-2 feet, and 2-4 feet below grade.

Although the Agencies expressed concern in their July 22, 1997 comment letter regarding the distribution of constituents near borings LS-43 and LS-45, existing data address these concerns. Specifically, PCB results available for the MW-1 boring adjacent to LS-45 indicate that PCBs occur in concentrations less than 10 ppm in the uppermost 4.5 feet of the soil profile, and are present at levels below 1 ppm at nine feet below grade. Similarly, the presence of PCBs in the 22-24 foot interval of boring LS-43 apparently is an isolated occurrence given the sampling results available for adjacent borings LS-42 and LS-44.

### 3.3.3 772 East Street Property

In 1992 an investigation of the 772 East Street by property was performed by Associated Environmental Scientists, Inc. (AES). The AES report entitled "21E Limited Site Investigation for Hazardous Materials & Oil, 772 East Street, Pittsfield, MA" indicated that PCBs were detected at a concentration of 6.1 mg/kg in a composite soil sample collected from surface and a depth of 5 to 7 feet below surface in the boring for monitoring well MW-3. The intervals composited for the sample consisted of the surface and the five-to-seven-foot interval; therefore, the vertical distribution of PCBs at the MW-3 location is unclear. The horizontal extent of PCBs also requires further definition.

To more clearly delineate the extent of PCBs in the surface and subsurface soil in this area, three soil borings will be advanced, one near MW-3, a second 50 feet north of MW-3, and a third 50 feet west of MW-3, as depicted on Figure 14. At each soil-boring location, samples will be collected from the following intervals: 0 - 0.5 feet, 0.5 - 2.0 feet, and at two-foot intervals thereafter. Soil borings will be advanced using direct-push or hollow stem auger technology. Drilling and sampling will continue to a depth of two feet below either the base of fill material or the water table, whichever is deeper. All samples will be submitted for PCB analysis.

### 3.3.4 Soil Sampling at Parcel I9-8-9

In accordance with the Agencies' September 24, 1997 request, surficial and subsurface soil will be sampled at Parcel I9-8-9 (the 762 East Street residential property) and analyzed for PCBs. Initially, surficial soil will be sampled on the entire property using a 25-foot grid spacing; the sample grid will be established in the field parallel to the southern and western parcel boundaries. The grid will consist of seven nodes along the western parcel perimeter (approximately 150 feet), and four nodes along the southern boundary (approximately 75 feet). Soil samples will not be collected where the grid intersects the two structures on the property, or any other physical barrier. Surficial soil samples will be collected in accordance with the procedures outlined in the SAP/DCAQAP. The samples will be submitted for laboratory characterization of PCBs.

The surficial soil analytical results and a brief written analysis proposing a minimum of three soil boring locations will be submitted to the Agencies within approximately one month of surficial soil sample collection. Upon Agency approval, the soil borings will be advanced to the water table or two feet below the base of the fill, whichever is deeper. The borings will be sampled in continuous two-foot intervals following the procedures described in the previously referenced SAP/DCAQAP. The soil samples will be submitted for laboratory characterization of PCBs by EPA Method 8080 as requested by the Agencies.

## 3.4 Monitoring Well Installation

As requested by the Agencies, the top of the silt unit and the extent of DNAPL will be further defined. One soil boring completed as a groundwater monitoring well will be installed east of monitoring well LS-31 as shown on Figure 14 to determine the elevation of the top of the silt unit and to define the eastern extent of DNAPL observed in LS-31. If DNAPL is encountered in this well, GE will propose one or more additional borings to the east to define the lateral extent of DNAPL in this area.

The soil boring will be advanced using direct push techniques or hollow stem augers. Soil samples will be collected continuously to the base of the boring in two-foot intervals and submitted for PCB analysis. One sample interval will be selected for analysis of Appendix IX+3 constituents based on the protocol described in the SAP/DCAQAP. The monitoring well will be constructed of PVC with 0.010-inch machine slot screen and a one foot sump below the screen facilitate the collection of DNAPL if it is present. All methods used in the advancement of the soil boring, collection of soil samples and the installation of the monitoring well are described in detail in the previously referenced SAP/DCAQAP.

### 3.5 Surface Water Sampling

Consistent with prior surface water sampling in this area, a sample will be collected from the Housatonic River adjacent to the storm water outfall located on the western side of the Lyman Street bridge if a sheen is observed in this vicinity. The sample will be collected near the bank in the same location sample LS-HR2 (October 13, 1995) was obtained in accordance with the procedures outlined in the SAP/DCAQAP. Aliquots will be placed in the appropriate containers, preserved, and submitted for laboratory analysis of Appendix IX+3 compounds (including both total and dissolved metals).

### 3.6 Additional Hydrogeologic Evaluation of the Lower Sand Unit

The analysis presented in Section 2.3.9 of this document indicated that the properties of the silt aquitard, alone or in conjunction with the upward hydraulic gradient through the confining unit, should provide an effective barrier to downward DNAPL migration at the Site. However, low PCB concentrations have been detected in the lower sand unit in monitoring well LS-25. Well LS-25 was installed using the hollow stem auger drilling method with telescoping casing; the external casing was grouted into the silt confining layer as a precautionary measure. Therefore, there is a low likelihood that contamination was introduced to the lower aquifer during well installation. It is possible that low levels of PCBs were inadvertently introduced to the well during sampling or routine well gauging activities. To evaluate the possibility that the PCBs observed in LS-25 arose through cross-contamination, GE proposes to redevelop LS-25 and then sample the well using the low-flow procedure described in the SAP/DCAQAP. The data, and an assessment of whether additional characterization of the lower sand unit is required, will be presented in the revised Supplemental Phase II/RFI Report.

### 3.7 Additional PCB Groundwater Sampling

Historically, groundwater samples for laboratory analysis of PCBs and other constituents have been collected manually with dedicated bailers. The conventional bailer method often yields turbid groundwater samples, a distinct disadvantage for analytes such as PCBs that exist in the aquifer predominantly adsorbed to particulate surfaces. As the data compiled in the Supplemental Phase II/RFI Report and Figure 7 illustrate, PCB concentrations derived from these samples often fluctuate erratically through time. Additionally, significant discrepancies exist between filtered and unfiltered samples collected from the same well during a given sampling event. PCB concentrations in unfiltered samples, in fact, often exceed the solubility of specific Aroclors by a significant margin. These observations indicate that conventional sampling methods may significantly overestimate dissolved phase PCB levels in groundwater.

A low-flow sampling procedure was employed to collect groundwater samples from monitoring wells LS-12, LS-38, LS-43, LS-44, and LS-45 in August 1997. The August 1997 results suggest that, in contrast to samples collected with a bailer, the laboratory analysis of filtered groundwater samples collected using low-flow methods provide the most consistent, and perhaps most scientifically meaningful, PCB concentrations. Although the data set is limited at present, the low-flow, filtered sample analytical results seem to be more consistent across the Site, and the concentrations are well within established solubility limits.

Accordingly, GE proposes to sample several additional monitoring wells at the Lyman Street Site using the low-flow technique previously approved by the Agencies. Specifically, two upgradient wells (LS-10 and E-7) and six downgradient perimeter wells (E-3, E-4, LS-11, LS-20, LS-24, LS-36) that do not contain LNAPL and have not been sampled using the low-flow technique, will be targeted. The samples will be submitted for laboratory characterization of PCBs only by EPA Method 8080.

# 4. Schedule

Upon approval of this Phase II/RFI Proposal Addendum, GE will proceed with the activities proposed in Section 3 of this document. The investigation will be completed and the Revised Supplemental Phase II/RFI Report will be submitted to the Agencies within approximately 180 days of approval of this Phase II/RFI Proposal Addendum. If further data gaps are identified during the course of this work, the Revised Supplemental Phase II/RFI Report will propose additional investigation activities to address these gaps. Revisions to the Proposal for Human Health and Environmental Risk Assessment will be submitted simultaneously with the Revised Supplemental Phase II/RFI Report.

# 5. References

Associated Environmental Scientists, Inc. 1992. *21E Limited Site Investigation For 772 East Street, Pittsfield, MA.* West Springfield, MA: June 1992.

Blasland, Bouck & Lee, Inc. 1994. *Sampling and Analysis Plan/Data Collection and Analysis Quality Assurance Plan.* Syracuse, NY: May 1994.

Blasland, Bouck & Lee, Inc. 1996a. *MCP Supplemental Phase II/RCRA Facility Investigation Report For Lyman Street/USEPA Area 5A Site.* Syracuse, NY: June 1996.

Blasland, Bouck & Lee, Inc. 1996b. *Assessment of Potential Preferential Pathways in East Street Area 2/USEPA Area 4.* Syracuse, NY: June 1996.

Cutler, J.W. (MDEP) and Olson, B. (USEPA). 1997a. Letter to Ms. Jane Magee (GE) re: Review of Phase II/RFI Report and Requirements for Additional Submittal. July 22, 1997.

Cutler, J.L. (MDEP) and Olson, B. (USEPA). 1997b. Letter to Ms. Jane Magee (GE) re: GE/Lyman Street Parking Lot: Requirements for Additional Sampling. September 24, 1997.

Golder Associates, Inc. 1995. *Revised MCP Phase II Scope of Work For Lyman Street Parking Lot (Oxbow Area D) and Proposal For RCRA Facility Investigation For USEPA Area 5A, Pittsfield, MA.* Mt. Laurel, NJ: January 1995.

O'Brien & Gere Engineers, Inc. 1993. *Letter to Mr. Louis Massery re: Site Assessment Update For 10 Lyman Street Property.* Syracuse, NY: March 1993.

Scalise-Knysh Associates, Inc. 1988. *MGL Chapter 21E Property Assessment, 10 Lyman Street Property, Pittsfield, MA.* February 1988.

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BLASLAND, BOUCK & LEE, INC.
engineers & scientists

# Tables

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## TABLE 2-1

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

LYMAN STREET

SUMMARY OF APPENDIX IX+3 DATA FOR SAMPLE LS423R1C1
(Collected April 30, 1992)
(Results are presented in parts per million, ppm)

| Analysis: | LS423R1C1 |
|---|---|
| **VOCs** | |
| Carbon tetrachloride | 180 |
| Chlorobenzene | 630 |
| 1,4-Dichlorobenzene | 140 |
| Ethylbenzene | 11 |
| Trichloroethene | 15 |
| Total Xylenes | 160 |
| **SVOCs** | |
| Acenaphthene | 1800 |
| 1,2,4-Trichlorobenzene | 1280 |
| 1,4-Dichlorobenzene | 1200 |
| Fluoranthene | 6200 |
| Di-n-butylphthalate | 3180 |
| Benzo(a)anthracene | 1700 |
| Benzo(b)fluoranthene | 1600 |
| Chrysene | 1600 |
| Anthracene | 1250 |
| Fluorene | 2300 |
| Phenanthrene | 6000 |
| Pyrene | 6600 |
| 1-Methyl naphthalene | 3800 |
| 2-Methyl naphthalene | 2300 |
| Dibenzofuran | 1000 |
| **Pesticides/Herbicides** | |
| None detected | -- |
| **Inorganics** | |
| Arsenic | 6.9 |
| Barium | 8.9 |
| Chromium | 9.4 |
| Copper | 19.2 |
| Lead | 10.6 |
| Tin | 36 |
| Vanadium | 2.9 |
| **PCBs** | |
| PCB-1254 | 27000 |
| **PCDDs/PCDFs** | |
| 2,3,7,8-TCDD | ND(0.043) [ND(0.0048)] |
| TCDD (total) | ND(0.043) [ND(0.0048)] |
| PeCDD (total) | ND(0.0091) [ND(0.0048)] |
| HxCDD (total) | 0.0346 [0.0408] |
| HpCDD (total) | 0.0848 [0.103] |
| OCDD | 0.619 [0.712] |
| 2,3,7,8-TCDF | ND(0.0346) [ND(0.0047)] |
| TCDF (total) | ND(0.0414) [ND(0.0067)] |
| PeCDF (total) | ND(0.0274) [0.163] |
| HxCDF (total) | 0.0727 [0.466] |
| HpCDF (total) | 0.0885 [0.272] |
| OCDF | 0.120 [0.213] |

## TABLE 2-2

## GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS
## LYMAN STREET INVESTIGATION

### SUMMARY OF ANALYTICAL DATA
(Results in mg/L)

| Sample ID | LS-12 | LS-12 Filtered | LS-38 | LS-38 Filtered |
|---|---|---|---|---|
| **Sample Date** | **08/28/97** | **08/28/97** | **08/28/97** | **08/28/97** |
| **Volatile Organics** | | | | |
| Chloroform | 0.011 | NS | 1.2 | NS |
| 1,1,1-Trichloroethane | ND(0.010) | NS | ND(0.50) | NS |
| Carbon tetrachloride | 0.0060 J | NS | 0.86 | NS |
| Trichloroethene | 0.027 | NS | 5.6 | NS |
| Tetrachloroethene | 0.0020 J | NS | ND(0.50) | NS |
| Toluene | ND(0.0050) | NS | 0.060 J | NS |
| Chlorobenzene | 0.0090 J | NS | 0.16 J | NS |
| Xylenes (Total) | 0.0030 J | NS | 0.54 J | NS |
| **Dioxins** | | | | |
| 1,2,3,4,6,7,8-HpCDD | 0.0000011 s | NS | ND(0.00000057) | NS |
| HpCDDs (total) | 0.0000011 | NS | ND(0.00000092) | NS |
| OCDD | 0.0000071 s | NS | 0.0000034 s | NS |
| **Furans** | | | | |
| 2,3,4,7,8-PeCDF | 0.0000023 s | NS | ND(0.0000019) | NS |
| PeCDFs (total) | 0.0000090 | NS | ND(0.0000019) | NS |
| 1,2,3,4,7,8-HxCDF | 0.000010 s | NS | ND(0.0000015) | NS |
| 1,2,3,6,7,8-HxCDF | 0.0000039 s | NS | ND(0.00000065) | NS |
| 2,3,4,6,7,8-HxCDF | 0.0000020 s | NS | ND(0.00000038) | NS |
| HxCDFs (total) | 0.000029 | NS | ND(0.0000042) | NS |
| 1,2,3,4,6,7,8-HpCDF | 0.0000039 s | NS | ND(0.00000081) | NS |
| 1,2,3,4,7,8,9-HpCDF | 0.0000031 s | NS | ND(0.00000068) | NS |
| HpCDFs (total) | 0.000012 | NS | ND(0.0000023) | NS |
| OCDF | 0.0000053 s | NS | ND(0.0000018) | NS |
| Total TEQs (MDEP TEFs) (see note 7) | 0.0000041 | NS | 0.0000000034 | NS |
| Total TEQs (EPA TEFs) (see note 7) | 0.0000028 | NS | 0.0000000034 | NS |
| **Pesticides/PCBs** | | | | |
| Alpha-BHC | ND(0.0010) | 0.000011 JP | 0.000020 P | ND(0.000020) |
| Gamma-BHC (Lindane) | ND(0.0025) | ND(0.000050) | 0.000012 J | ND(0.000050) |
| Heptachlor | ND(0.0025) | 0.000012 JP | 0.000017 JP | 0.000014 J |
| Aldrin | 0.0022 JP | 0.000047 JP | 0.000057 JP | 0.000029 JP |
| Heptachlor epoxide | 0.0030 P | 0.000030 JP | ND(0.000050) | 0.000057 P |
| Endosulfan I | 0.0042 P | 0.000068 P | 0.0000090 JP | ND(0.000050) |
| Dieldrin | 0.0011 JP | ND(0.000050) | 0.00011 P | 0.0000090 JP |
| Isodrin | 0.0040 J | ND(0.010) | 0.00011 J | 0.000056 J |
| 4,4'-DDE | 0.012 | 0.000075 J | ND(0.00010) | 0.000023 JP |
| Endrin | 0.0024 JP | ND(0.00010) | 0.000042 JP | ND(0.00010) |
| Endosulfan II | 0.0030 JP | ND(0.00010) | 0.000043 JP | ND(0.00010) |
| p,p'-Methoxychlor | ND(0.025) | ND(0.00050) | 0.00014 JP | 0.000014 JP |
| Alpha chlordane | 0.013 P | 0.000077 P | 0.00023 P | ND(0.000050) |
| Gamma chlordane | ND(0.0025) | ND(0.000050) | ND(0.000050) | ND(0.000050) |
| Aroclor 1254 | 1.0 | 0.0052 | 0.014 | ND(0.0010) |

(See notes on Page 7)

# TABLE 2-2

## GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS
## LYMAN STREET INVESTIGATION

### SUMMARY OF ANALYTICAL DATA
(Results in mg/L)

| Sample ID | LS-12 | LS-12 Filtered | LS-38 | LS-38 Filtered |
|---|---|---|---|---|
| Sample Date | 08/28/97 | 08/28/97 | 08/28/97 | 08/28/97 |
| **Semivolatiles** | | | | |
| 1,4-Dichlorobenzene | 0.0030 J | NS | 0.12 | NS |
| 1,3-Dichlorobenzene | ND(0.010) | NS | 0.0080 J | NS |
| 1,2-Dichlorobenzene | 0.0020 J | NS | 0.030 | NS |
| Acetophenone | ND(0.020) | NS | 0.0020 J | NS |
| 1,2,4-Trichlorobenzene | 0.10 | NS | 0.36 D | NS |
| Naphthalene | ND(0.0050) | NS | 0.014 | NS |
| 2-Methylnaphthalene | ND(0.010) | NS | 0.0050 J | NS |
| 1,2,4,5-Tetrachlorobenzene | 0.0030 J | NS | 0.006 J | NS |
| **Inorganics** | | | | |
| Arsenic | ND(0.0059) | 0.0095 J* | 0.0111 | 0.0196 |
| Barium | 0.200 J* | 0.196 J*E | 0.216 | 0.217 E |
| Beryllium | 0.00026 J* | ND(0.00010) | ND(0.00010) | ND(0.00010) |
| Chromium | 0.00016 J* | ND(0.00080) | 0.0010 J* | ND(0.00080) |
| Copper | 0.00030 J* | ND(0.00060) | 0.0026 J* | ND(0.00060) |
| Lead | 0.0029 J* | ND(0.0019) | ND(0.0019) | ND(0.0019) |
| Mercury | 0.00017 J* | ND(0.00010) N | 0.00020 | ND(0.00010) N |
| Nickel | 0.0029 J* | ND(0.0013) | ND(0.0013) | ND(0.0013) |
| Selenium | ND(0.0044) | 0.0314 | ND(0.0044) | 0.0241 |
| Thallium | ND(0.0050) | 0.0104 | ND(0.0050) | 0.0142 |
| Vanadium | 0.0011 J* | ND(0.00070) | ND(0.00070) | ND(0.00070) |
| Zinc | 0.0453 E* | 0.0064 J*E | 0.0281 E* | ND(0.00030) E |
| Total Cyanide | ND(0.010) N | NS | ND(0.010) N | NS |
| Total Sulfide | ND(0.050) | NS | ND(0.050) | NS |

(See notes on Page 7)

## TABLE 2-2

## GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS
## LYMAN STREET INVESTIGATION

### SUMMARY OF ANALYTICAL DATA
**(Results in mg/L)**

| **Sample ID** | **LS-43** | **LS-43 Filtered** | **LS-44** |
|---|---|---|---|
| **Sample Date** | **08/27/97** | **08/27/97** | **08/27/97** |
| **Volatile Organics** | | | |
| Chloroform | 0.0010 J | NS | 0.0020 J [0.0010 J] |
| 1,1,1-Trichloroethane | 0.0010 J | NS | 0.0010 J [ND(0.010)] |
| Carbon tetrachloride | 0.036 | NS | 0.12 [0.089] |
| Trichloroethene | 0.016 | NS | 0.14 [0.11] |
| Tetrachloroethene | 0.013 | NS | 0.016 [0.014] |
| Toluene | ND(0.0050) | NS | ND(0.0050) [ND(0.0050)] |
| Chlorobenzene | ND(0.010) | NS | ND(0.010) [ND(0.010)] |
| Xylenes (Total) | ND(0.015) | NS | ND(0.015) [ND(0.015)] |
| **Dioxins** | | | |
| 1,2,3,4,6,7,8-HpCDD | ND(0.00000053) | NS | ND(0.00000028) [ND(0.00000052)] |
| HpCDDs (total) | ND(0.00000053) | NS | ND(0.00000028) [ND(0.00000052)] |
| OCDD | ND(0.0000014) | NS | ND(0.00000087) [ND(0.0000008)] |
| **Furans** | | | |
| 2,3,4,7,8-PeCDF | ND(0.0000011) | NS | ND(0.00000092) [ND(0.00000084)] |
| PeCDFs (total) | ND(0.0000011) | NS | ND(0.00000092) [ND(0.00000084)] |
| 1,2,3,4,7,8-HxCDF | ND(0.00000077) | NS | ND(0.00000047) [ND(0.00000053)] |
| 1,2,3,6,7,8-HxCDF | ND(0.00000079) | NS | ND(0.00000048) [ND(0.00000054)] |
| 2,3,4,6,7,8-HxCDF | ND(0.00000077) | NS | ND(0.00000047) [ND(0.00000053)] |
| HxCDFs (total) | ND(0.00000077) | NS | ND(0.00000047) [ND(0.00000053)] |
| 1,2,3,4,6,7,8-HpCDF | ND(0.00000094) | NS | ND(0.00000068) [ND(0.00000093)] |
| 1,2,3,4,7,8,9-HpCDF | ND(0.0000011) | NS | ND(0.00000076) [ND(0.0000010)] |
| HpCDFs (total) | ND(0.00000094) | NS | ND(0.00000068) [ND(0.00000093)] |
| OCDF | ND(0.00000084) | NS | ND(0.00000078) [ND(0.00000066)] |
| Total TEQs (MDEP TEFs) (see note 7) | ND(0.0000014) | NS | ND(0.0000017) [ND(0.0000016)] |
| Total TEQs (EPA TEFs) (see note 7) | ND(0.0000014) | NS | ND(0.0000017) [ND(0.0000016)] |
| **Pesticides/PCBs** | | | |
| Alpha-BHC | ND(0.000020) | ND(0.000020) | ND(0.000020) [ND(0.000020)] |
| Gamma-BHC (Lindane) | ND(0.000050) | ND(0.000050) | ND(0.000050) [ND(0.000050)] |
| Heptachlor | 0.000016 JP | ND(0.000050) | ND(0.000050) [ND(0.000050)] |
| Aldrin | 0.00029 | ND(0.00010) | ND(0.00010) [0.000042 J] |
| Heptachlor epoxide | ND(0.000050) | 0.000029 P | 0.000020 JP [ND(0.000050)] |
| Endosulfan I | 0.000031 JP | 0.000047 JP | 0.000017 J [ND(0.000050)] |
| Dieldrin | ND(0.000050) | ND(0.000050) | 0.000028 J [ND(0.000050)] |
| Isodrin | 0.000094 JP | ND(0.010) | ND(0.010) [ND(0.010)] |
| 4,4'-DDE | 0.00019 | ND(0.00010) | ND(0.00010) [ND(0.00010)] |
| Endrin | ND(0.00010) | ND(0.00010) | ND(0.00010) [ND(0.00010)] |
| Endosulfan II | 0.000058 JP | ND(0.00010) | ND(0.00010) [ND(0.00010)] |
| p,p'-Methoxychlor | ND(0.00059) | ND(0.00050) | ND(0.00005) [ND(0.00005)] |
| Alpha chlordane | 0.00024 P | 0.000055 P | ND(0.00005) [ND(0.00005)] |
| Gamma chlordane | 0.00017 P | ND(0.000050) | ND(0.00005) [ND(0.00005)] |
| Aroclor 1254 | 0.017 | 0.0051 P | 0.0018 P [0.00085 JP] |

(See notes on Page 7)

## TABLE 2-2

## GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS
## LYMAN STREET INVESTIGATION

### SUMMARY OF ANALYTICAL DATA

**(Results in mg/L)**

| Sample ID | LS-43 | LS-43 Filtered | LS-44 |
|---|---|---|---|
| **Sample Date** | **08/27/97** | **08/27/97** | **08/27/97** |
| **Semivolatiles** | | | |
| 1,4-Dichlorobenzene | ND(0.010) | NS | ND(0.010) [ND(0.010)] |
| 1,3-Dichlorobenzene | ND(0.010) | NS | ND(0.010) [ND(0.010)] |
| 1,2-Dichlorobenzene | ND(0.010) | NS | ND(0.010) [ND(0.010)] |
| Acetophenone | ND(0.020) | NS | ND(0.020) [ND(0.020)] |
| 1,2,4-Trichlorobenzene | 0.006 | NS | ND(0.0050) [ND(0.0050)] |
| Naphthalene | ND(0.0050) | NS | ND(0.0050) [ND(0.0050)] |
| 2-Methylnaphthalene | ND(0.010) | NS | ND(0.010) [ND(0.010)] |
| 1,2,4,5-Tetrachlorobenzene | ND(0.015) | NS | ND(0.015) [ND(0.015)] |
| **Inorganics** | | | |
| Arsenic | ND(0.0059) | 0.0067 J* | ND(0.0059) [ND(0.0059)] |
| Barium | 0.0117 J* | 0.0071 J*E | 0.0090 J* [0.0087 J*] |
| Beryllium | 0.00011 J* | ND(0.00010) | ND(0.00010) [ND(0.00010)] |
| Chromium | 0.0014 J* | ND(0.00080) | 0.0023 J* [0.0015 J*] |
| Copper | 0.0042 J* | ND(0.00060) | 0.0076 J* [0.0066 J*] |
| Lead | ND(0.0019) | ND(0.0019) | 0.0038 [0.0296] |
| Mercury | 0.00015 J* | ND(0.00010) N | 0.00017 J* [0.00017 J*] |
| Nickel | 0.0022 J* | ND(0.0013) | 0.0038 J* [0.0034 J*] |
| Selenium | ND(0.0044) | 0.016 | ND(0.0044) [ND(0.0044)] |
| Thallium | ND(0.0050) | 0.0091 J* | ND(0.0050) [ND(0.0050)] |
| Vanadium | 0.0017 | ND(0.00070) | 0.0013 J* [0.00090 J*] |
| Zinc | 0.035 E* | 0.0196 J*E | 0.0442 E* [0.0478 E*] |
| Total Cyanide | ND(0.010) N | NS | ND(0.010) N [ND(0.010) N ] |
| Total Sulfide | ND(0.050) | NS | 0.12 [0.13] |

(See notes on Page 7)

## TABLE 2-2

## GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS
## LYMAN STREET INVESTIGATION

### SUMMARY OF ANALYTICAL DATA
**(Results in mg/L)**

| Sample ID | LS-44 Filtered | LS-45 | LS-45 Filtered |
|---|---|---|---|
| **Sample Date** | **08/27/97** | **08/27/97** | **08/27/97** |
| **Volatile Organics** | | | |
| Chloroform | NS | ND(0.0050) | NS |
| 1,1,1-Trichloroethane | NS | ND(0.010) | NS |
| Carbon tetrachloride | NS | ND(0.010) | NS |
| Trichloroethene | NS | ND(0.0050) | NS |
| Tetrachloroethene | NS | 0.0050 J | NS |
| Toluene | NS | ND(0.0050) | NS |
| Chlorobenzene | NS | ND(0.010) | NS |
| Xylenes (Total) | NS | ND(0.015) | NS |
| **Dioxins** | | | |
| 1,2,3,4,6,7,8-HpCDD | NS | ND(0.00000027) | NS |
| HpCDDs (total) | NS | ND(0.00000027) | NS |
| OCDD | NS | ND(0.00000086) | NS |
| **Furans** | | | |
| 2,3,4,7,8-PeCDF | NS | ND(0.00000083) | NS |
| PeCDFs (total) | NS | ND(0.00000083) | NS |
| 1,2,3,4,7,8-HxCDF | NS | ND(0.00000050) | NS |
| 1,2,3,6,7,8-HxCDF | NS | ND(0.00000050) | NS |
| 2,3,4,6,7,8-HxCDF | NS | ND(0.00000050) | NS |
| HxCDFs (total) | NS | ND(0.00000050) | NS |
| 1,2,3,4,6,7,8-HpCDF | NS | ND(0.00000076) | NS |
| 1,2,3,4,7,8,9-HpCDF | NS | ND(0.00000085) | NS |
| HpCDFs (total) | NS | ND(0.00000076) | NS |
| OCDF | NS | ND(0.00000046) | NS |
| Total TEQs (MDEP TEFs) (see note 7) | NS | ND(0.0000014) | NS |
| Total TEQs (EPA TEFs) (see note 7) | NS | ND(0.0000014) | NS |
| **Pesticides/PCBs** | | | |
| Alpha-BHC | ND(0.000020) [ND(0.000020)] | ND(0.000020) | ND(0.000020) |
| Gamma-BHC (Lindane) | ND(0.000050) [ND(0.000050)] | ND(0.000050) | ND(0.000050) |
| Heptachlor | ND(0.000050) [ND(0.000050)] | ND(0.000050) | ND(0.000050) |
| Aldrin | ND(0.00010) [ND(0.00010)] | ND(0.00010) | ND(0.00010) |
| Heptachlor epoxide | ND(0.000050) [ND(0.000050)] | ND(0.000050) | ND(0.000050) |
| Endosulfan I | ND(0.000050) [ND(0.000050)] | ND(0.000050) | ND(0.000050) |
| Dieldrin | 0.0000090 JP [ND(0.000050)] | 0.000016 JP | ND(0.000050) |
| Isodrin | ND(0.010) [ND(0.010)] | ND(0.010) | ND(0.010) |
| 4,4'-DDE | ND(0.00010) [ND(0.00010)] | ND(0.00010) | ND(0.00010) |
| Endrin | ND(0.00010) [ND(0.00010)] | ND(0.00010) | ND(0.00010) |
| Endosulfan II | ND(0.00010) [ND(0.00010)] | ND(0.00010) | ND(0.00010) |
| p,p'-Methoxychlor | ND(0.00005) [ND(0.00005)] | ND(0.00050) | ND(0.00050) |
| Alpha chlordane | ND(0.00005) [ND(0.00005)] | ND(0.000050) | ND(0.000050) |
| Gamma chlordane | ND(0.00005) [ND(0.00005)] | ND(0.000050) | ND(0.000050) |
| Aroclor 1254 | ND(0.0010) [ND(0.0010)] | 0.0012 P | ND(0.0010) |

(See notes on Page 7)

# TABLE 2-2

## GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS
## LYMAN STREET INVESTIGATION

## SUMMARY OF ANALYTICAL DATA
(Results in mg/L)

| Sample ID | LS-44 Filtered | LS-45 | LS-45 Filtered |
|---|---|---|---|
| **Sample Date** | **08/27/97** | **08/27/97** | **08/27/97** |
| **Semivolatiles** | | | |
| 1,4-Dichlorobenzene | NS | ND(0.010) | NS |
| 1,3-Dichlorobenzene | NS | ND(0.010) | NS |
| 1,2-Dichlorobenzene | NS | ND(0.010) | NS |
| Acetophenone | NS | ND(0.020) | NS |
| 1,2,4-Trichlorobenzene | NS | ND(0.0050) | NS |
| Naphthalene | NS | ND(0.0050) | NS |
| 2-Methylnaphthalene | NS | ND(0.010) | NS |
| 1,2,4,5-Tetrachlorobenzene | NS | ND(0.015) | NS |
| **Inorganics** | | | |
| Arsenic | 0.0077 J* [0.0088 J*] | ND(0.0059) | ND(0.0059) |
| Barium | 0.0055 J* E [0.0054 J* E] | 0.0081 J* | 0.0054 J*E |
| Beryllium | ND(0.00010) [ND(0.00010)] | ND(0.00010) | ND(0.00010) |
| Chromium | ND(0.00080) [ND(0.00080)] | 0.0021 J* | ND(0.00080) |
| Copper | ND(0.00060) [ND(0.00060)] | 0.0040 J* | ND(0.00060) |
| Lead | ND(0.0019) [ND(0.0019)] | ND(0.0019) | ND(0.0019) |
| Mercury | ND(0.00010) N [ND(0.00010) N] | 0.00021 | ND(0.00010) N |
| Nickel | ND(0.0013) [ND(0.0013)] | 0.0016 J* | ND(0.0013) |
| Selenium | 0.0224 [0.0222] | 0.0051 | 0.0212 |
| Thallium | 0.0117 [0.0107] | ND(0.0050) | 0.010 |
| Vanadium | ND(0.00070) [ND(0.00070)] | 0.00097 J* | ND(0.00070) |
| Zinc | ND(0.00030) E [ND(0.00030) E] | 0.0093 E* | ND(0.00030) E |
| Total Cyanide | NS | ND(0.010) N | NS |
| Total Sulfide | NS | ND(0.050) | NS |

(See notes on Page 7)

28

# TABLE 2-2

## GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS
## LYMAN STREET INVESTIGATION

## SUMMARY OF ANALYTICAL DATA
**(Results in mg/L)**

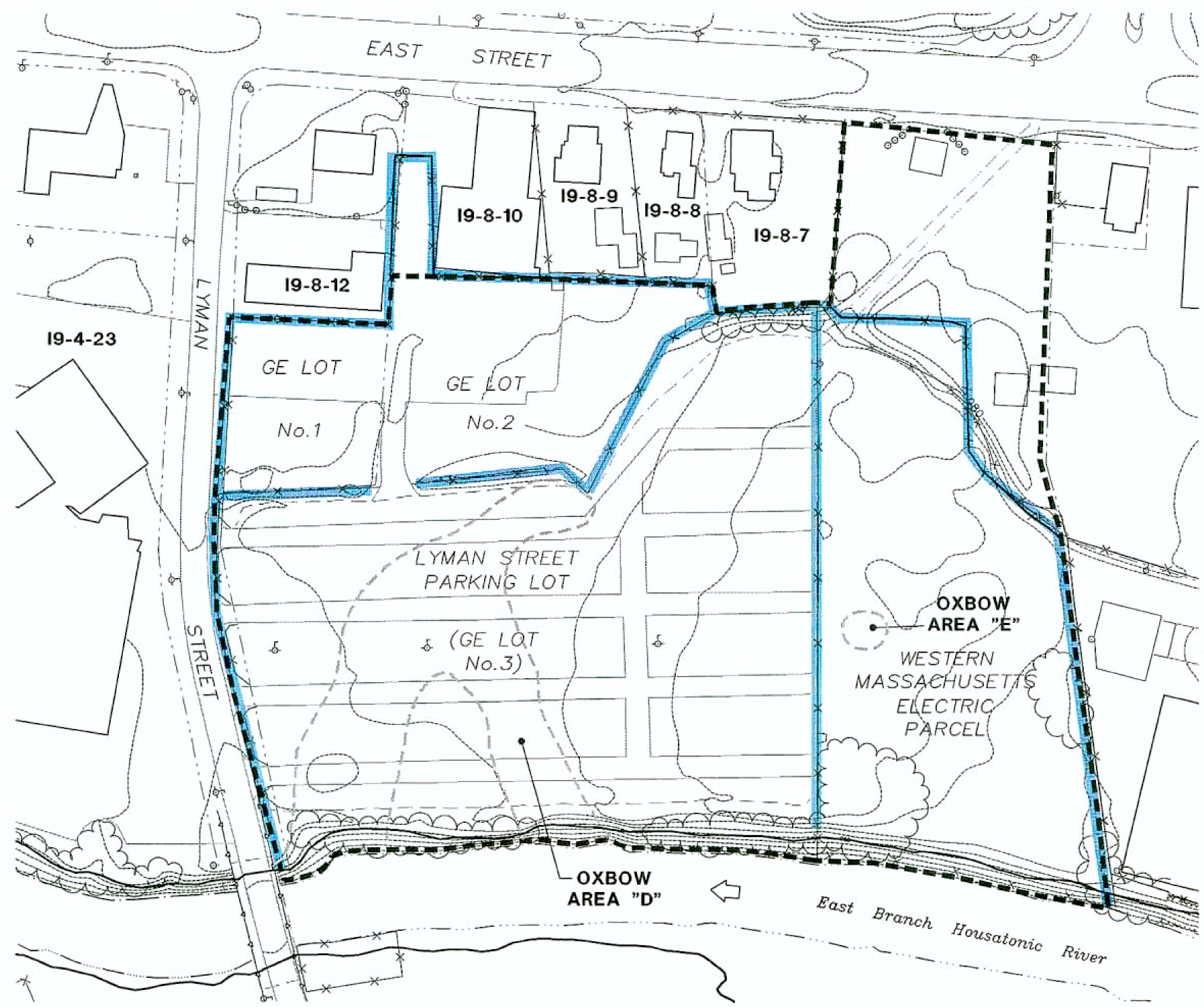
### Notes

1. Samples were collected by Blasland, Bouck & Lee, Inc., and were submitted to Quanterra Environmental Services and CompuChem Environmental Corp. for analysis of Appendix IX+3 constituents (excluding herbicides, semivolatiles and metals). Only those constituents detected in at least one sample are summarized.
2. ND - Analyte was not detected. The number in parentheses is the associated quantitation limit for volatiles and semivolatiles and the associated detection limit for other constituents.
3. J - Indicates an estimated value less than the CLP-required quantitation limit.
4. E - Indicates that the reported concentration exceeded the linear calibration range of the analytical system.
5. B - Analyte was also detected in the associated method blank.
6. Total dioxins/furans determined as the sum of the total homolog concentration; non-detect values considered as zero.
7. Total 2,3,7,8-TCDD toxicity equivalents (TEQs) were calculated using MDEP's and EPA's Toxicity Equivalency Factors (TEFs) for all PCDD/PCDF congeners, although GE does not accept the validity of these TEFs.
8. s - Result detected is below the lower calibration range.
9. P - The percent difference between the primary and confirmatory results exceeded the 25% limit.

(See notes on Page 7)

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

# Figures



DJ-B.PCP
10/16/97 SYR-54-TWD DCC JER AK
20114041/20114G03.DWG

LEGEND:

| | |
|---|---|
| ▬ ▬ ▬ | APPROX. SITE BOUNDARY |
| — · — · — | APPROX. PROPERTY BOUNDARY |
| **19-8-8** | TAX ASSESSOR'S PROPERTY IDENTIFICATION NUMBER |
| ——— | LIMIT OF APPROX. 10-YEAR FLOODPLAIN |
| — · · — · · — | EDGE OF WATER |
| ——— | PAVED ROADWAY |
| — — — | UNPAVED ROADWAY |
| ♂ | LIGHT POLE (NON UTILITY) |
| ⊕ | MANHOLE |
| ---- 970 ---- | INDEX ELEVATION CONTOUR |
| ------------ | INTERMEDIATE ELEVATION CONTOUR |
| ⌒⌒⌒ | VEGETATION |
| —×—×— | APPROXIMATE FENCE LINE |
| ▬ | CURRENT FENCE CONFIGURATION |
| — — — — | APPROXIMATE BOUNDARY OF FORMER OXBOW |

0 80' 160'

GRAPHIC SCALE

NOTES:

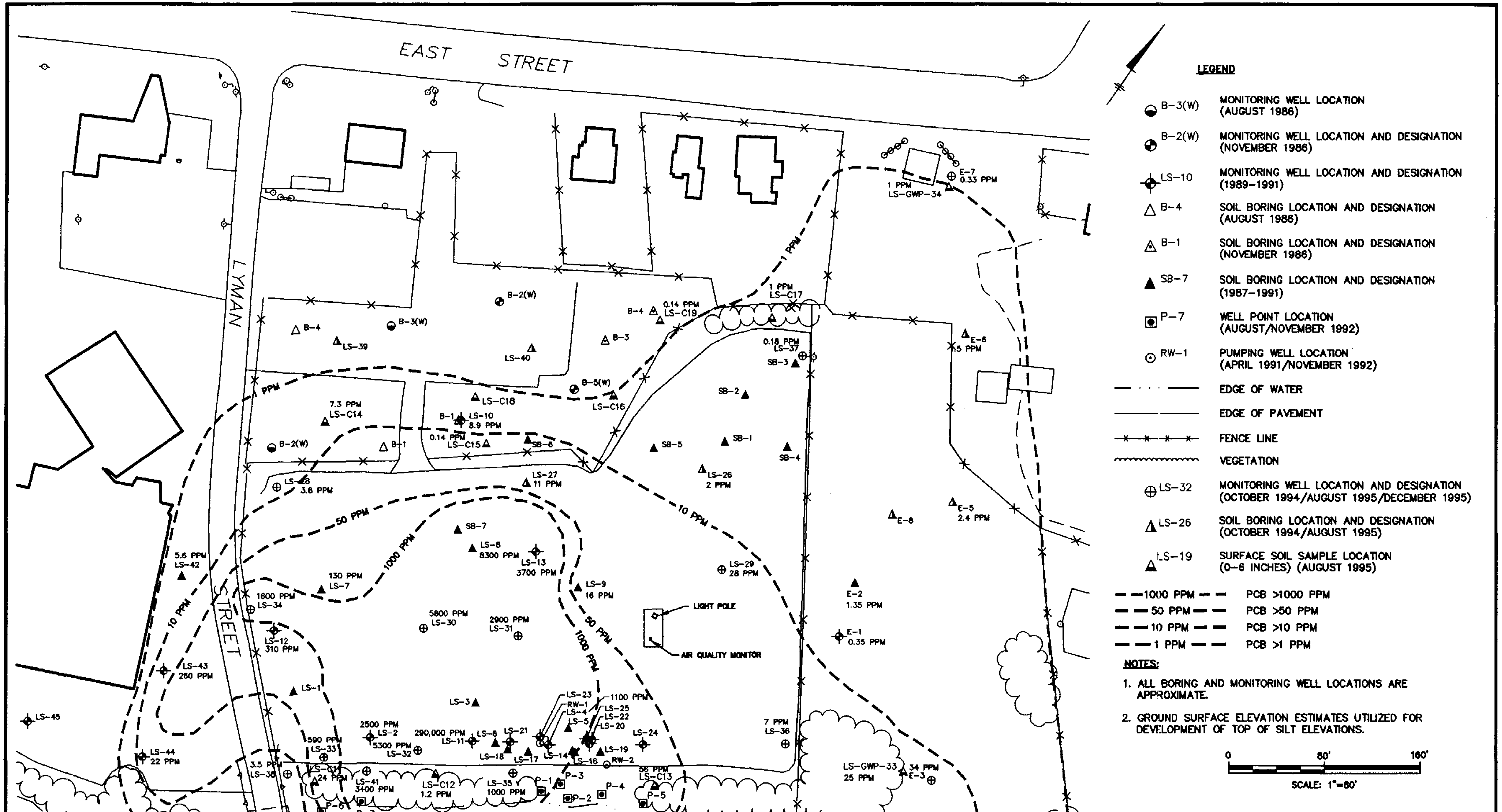
1. THE BASE MAP FEATURES PRESENTED ON THIS FIGURE WERE PHOTOGRAMMETRICALLY MAPPED FROM APRIL 1990 AERIAL PHOTOGRAPHS.
2. DELINEATION OF APPROXIMATE 10-YEAR FLOODPLAIN IS BASED ON HEC-2 HYDRAULIC MODELING PERFORMED BY BLASLAND & BOUCK ENGINEERS, P.C. (1991) AND AVAILABLE TOPOGRAPHIC MAPPING.
3. PROPERTY BOUNDARY INFORMATION OBTAINED FROM CITY OF PITTSFIELD'S TAX ASSESSORS' OFFICE AND IS CURRENT THROUGH DECEMBER 31, 1991.

GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS
LYMAN ST PARKING LOT/ USEPA AREA 5A

## SITE PLAN AND CURRENT FENCE LOCATION

**BBL** BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
1



**NOTES:**

1. ALL BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE.
2. GROUND SURFACE ELEVATION ESTIMATES UTILIZED FOR DEVELOPMENT OF TOP OF SILT ELEVATIONS.

GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS
LYMAN ST PARKING LOT/ USEPA AREA 5A

## PCB DISTRIBUTION IN SOIL

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
2

P: DJC-B.PCP
10/16/97 SYR-54-PGL DMW JER DCC AK
20114041/20114011.DWG

NOTES: 1. ALL BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE.

GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS
LYMAN ST PARKING LOT/ USEPA AREA 5A

## PIPELINE INSTALLATION LOCATION

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
3

**B-2 (Lot 1) 8/19/86**

| | |
|---|---|
| Chloroform | 0.01 J |
| Tetrachloroethene | 0.024 |
| 1,1,1-Trichloroethane | 0.01 J |

**B-3 (Lot 1) 8/19/86**

| | |
|---|---|
| Chloroform | 0.01 J |
| Tetrachloroethene | 0.027 |
| 1,1,1-Trichloroethane | 0.01 J |

**B-2 (LOT 2) 11/86**

| | |
|---|---|
| 1,1,1-Trichloroethane | 0.0023 |
| Tetrachloroethene | 0.023 |

**B-5 (LOT 2) 11/86**

| | |
|---|---|
| 1,1,1-Trichloroethane | 0.0022 |
| Tetrachloroethene | 0.016 |
| Toluene | 0.0027 |

**E-1 4/91**

| | |
|---|---|
| Methylene Chloride | 0.004 BJ |

**E-3 11/30/95**

| | |
|---|---|
| 1,2-Dichloroethane | 0.001 J |

**E-4 12/01/95**

| | |
|---|---|
| 1,2-Dichloroethane | 0.004 J |

**LS-2**

| Date: | 8/89 | 10/90 |
|---|---|---|
| Benzene | 0.34 | 0.27 J |
| Chlorobenzene | 2.5 | 14 |
| Ethylbenzene | ND | 0.89 J |
| Methylene Chloride | ND | 0.31 J |
| Toluene | 0.057 J | ND |
| Xylene | ND | 7.8 |

**LS-4**

| Date: | 8/89 | 10/90 |
|---|---|---|
| Benzene | ND | 0.081 |
| Carbon Disulfide | ND | 0.031 J |
| Carbon Tetrachloride | 4.0 | 1.9 |
| Chlorobenzene | 0.67 | 0.88 |
| Chloroform | 0.17 J | 0.18 |
| Ethylbenzene | ND | 0.11 |
| Methylene Chloride | ND | 0.014 J |
| Toluene | 0.11 J | ND |
| Trichloroethene | 0.49 J | 0.33 |
| Xylene | ND | 1.8 |

**LS-10**

| Date: | 10/90 | 10/20/94 | 11/30/95 |
|---|---|---|---|
| Tetrachloroethene | 0.018 | 0.015 | 0.014 |
| 1,1,1-Trichloroethane | 0.004J | 0.003 J | 0.001J |

**LS-11**

| Date: | 10/90 | 10/20/94 | 11/29/95 |
|---|---|---|---|
| Acetone | ND | ND | 0.13 B |
| Benzene | 0.082 | 0.016 | 0.038J |
| Chlorobenzene | 2.6 D | 0.33 D | 1.5 |
| Ethylbenzene | 0.078 | 0.005 | ND |
| Toluene | 0.003J | ND | ND |
| Trichloroethene | 0.014 | ND | 0.012J |
| Xylene | 0.12 | 0.008 | ND |

**LS-12**

| Date | 9/90 | 10/20/94 | 11/29/95 | 08/28/97 |
|---|---|---|---|---|
| 1,1,1-Trichloroethane | ND(0.01) | ND | ND(0.005) | ND(0.01) |
| 1,4-Dioxane | NA | NA | NA | ND(3.7) |
| Carbon Tetrachloride | 0.15 | 0.07 | 0.077 | 0.006 J |
| Chlorobenzene | 0.035 | 0.005 | 0.014 | 0.009 J |
| Chloroform | 0.038 | 0.037 | 0.057 | 0.011 |
| Ethylbenzene | ND(0.01) | 0.002 J | ND(0.005) | ND(0.01) |
| Methylene Chloride | ND(0.01) | ND | ND(0.005) | ND(0.01) |
| Tetrachloroethene | 0.01 | 0.006 | 0.005 | 0.002 J |
| Toluene | ND(0.01) | ND | ND(0.005) | ND(0.005) |
| Trichloroethene | 0.32 | 0.093 | 0.2 E | 0.027 |
| Xylenes (total) | 0.054 | 0.045 | 0.02 | 0.003 J |

**LS-13 10/90**

| | |
|---|---|
| Benzene | 0.03 |
| Chlorobenzene | 0.4 |
| Ethylbenzene | 0.036 |
| Tetrachloroethene | 0.005 J |
| Xylene | 0.26 |

**LS-20**

| Date: | 10/20/94 | 11/29/95 |
|---|---|---|
| Benzene | 0.19 | 0.094 |
| Chlorobenzene | 0.11 | 0.076 |
| Ethylbenzene | 0.11 | 0.08 |
| Toluene | 0.002 J | ND |
| Xylene | 0.057 | 0.037 |

**LS-22 10/20/94**

| | |
|---|---|
| Acetone | 0.008 J |

**LS-24 10/20/94**

| | |
|---|---|
| 1,1,1-Trichloroethane | 0.002 J |
| Tetrachloroethene | 0.005 J |

**LS-25 10/20/94**

| | |
|---|---|
| Chlorobenzene | 0.001 J |

**LS-28 11/28/95**

| | |
|---|---|
| 1,1,1-Trichloroethane | 0.0020 J |
| Tetrachloroethene | 0.023 |

**LS-29 11/30/95**

| | |
|---|---|
| Tetrachloroethene | 0.0030 J |

**LS-32 10/20/94**

| | |
|---|---|
| Vinyl chloride | 0.27 D [0.24 D] |
| 1,1-Dichloroethene | 0.001 J [0.001 J] |
| 1,2-Dichloroethene | 0.55 D [0.52 D] |
| Chloroform | 0.029 [0.013] |
| Carbon Tetrachloride | 0.004 J [0.002 J] |
| Trichloroethene | 0.035 [0.025] |
| Benzene | 0.2 [0.19 D] |
| Toluene | 0.074 [0.08] |
| Chlorobenzene | 2.5 D [2.7 D] |
| Ethylbenzene | 0.14 [0.15] |
| Xylene | 0.94 D [1.0 D] |
| trans-1,2-Dichloroethene | 0.002 J [0.002 J] |

**LS-33 10/20/94**

| | |
|---|---|
| Benzene | 1.5 |
| Toluene | 0.014 J |
| Chlorobenzene | 6.5 D |
| Ethylbenzene | 0.13 |
| Xylene | 0.64 |

**LS-34 11/28/95**

| | |
|---|---|
| Chloroform | 0.056 |
| Carbon Tetrachloride | 0.42 |
| Trichloroethene | 0.54 |
| Tetrachloroethene | 0.019 J |
| Xylene | 0.066 |

**LS-36 11/29/95**

| | |
|---|---|
| Benzene | 0.0010 J |
| Bromoform | 0.0010 J |
| 1,2-Dichloroethene | 0.0020 J |
| 1,1-Dichloroethane | 0.0010 J |
| Trichloroethene | 0.0030 J |
| Tetrachloroethene | 0.0020 J |
| Vinyl Chloride | 0.0010 J |

**LS-37 11/28/95**

| | |
|---|---|
| Acetone | 0.0020 BJ [ND] |
| Benzene | 0.019 [0.018] |
| Chlorobenzene | 0.001 J [0.0002 J] |

**WP-6 11/88**

| | |
|---|---|
| Benzene | 0.36 |
| Chlorobenzene | 2.4 |
| Ethylbenzene | 0.01 |

**LS-38**

| Date | 08/28/97 |
|---|---|
| 1,1,1-Trichloroethane | ND(0.5) |
| 1,4-Dioxane | ND(180) |
| Carbon Tetrachloride | 0.86 |
| Chlorobenzene | 0.16 J |
| Chloroform | 1.2 |
| Ethylbenzene | ND(0.5) |
| Methylene Chloride | ND(0.5) |
| Tetrachloroethene | ND(0.5) |
| Toluene | 0.06 J |
| Trichloroethene | 5.6 |
| Xylenes (total) | 0.54 J |

**LS-43**

| Date | 08/27/97 |
|---|---|
| 1,1,1-Trichloroethane | 0.001 J |
| 1,4-Dioxane | ND(3.7) |
| Carbon Tetrachloride | 0.036 |
| Chlorobenzene | ND(0.01) |
| Chloroform | 0.001 J |
| Ethylbenzene | ND(0.01) |
| Methylene Chloride | ND(0.01) |
| Tetrachloroethene | 0.013 |
| Toluene | ND(0.005) |
| Trichloroethene | 0.016 |
| Xylenes (total) | ND(0.015) |

**LS-44**

| Date | 08/27/97 |
|---|---|
| 1,1,1-Trichloroethane | 0.001 J [ND(0.01)] |
| 1,4-Dioxane | ND(3.7) [ND(3.7)] |
| Carbon Tetrachloride | 0.12 [0.089] |
| Chlorobenzene | ND(0.01) [ND(0.01)] |
| Chloroform | 0.002 J [0.001 J] |
| Ethylbenzene | ND(0.01) [ND(0.01)] |
| Methylene Chloride | ND(0.01) [ND(0.01)] |
| Tetrachloroethene | 0.016 [0.014] |
| Toluene | ND(0.005) [ND(0.005)] |
| Trichloroethene | 0.14 [0.11] |
| Xylenes (total) | ND(0.015) [ND(0.015)] |

**LS-45**

| Date | 08/27/97 |
|---|---|
| 1,1,1-Trichloroethane | ND(0.01) |
| 1,4-Dioxane | ND(3.7) |
| Carbon Tetrachloride | ND(0.01) |
| Chlorobenzene | ND(0.01) |
| Chloroform | ND(0.005) |
| Ethylbenzene | ND(0.01) |
| Methylene Chloride | ND(0.01) |
| Tetrachloroethene | 0.005 J |
| Toluene | ND(0.005) |
| Trichloroethene | ND(0.005) |
| Xylenes (total) | ND(0.015) |

## LEGEND

| | |
|---|---|
| — · · · — | EDGE OF WATER |
| ——— | EDGE OF PAVEMENT |
| —×—×—×— | FENCE LINE |
| ︵︵︵︵ | VEGETATION |
| ✦ B-3(W) | MONITORING WELL LOCATION |
| ▣ P-7 | WELL POINT LOCATION |

**E-4 12/01/95**

| | |
|---|---|
| 1,2-Dichloroethene | 0.004 J |

SAMPLE LOCATION AND DATE
CONSTITUENT AND DETECTED CONCENTRATION IN PARTS PER MILLION (ppm)

| | |
|---|---|
| 0.003 | BTEX CONCENTRATION (1997) |
| 0.038 | BTEX CONCENTRATION (1995) |
| 0.029 | BTEX CONCENTRATION (1994) |
| 0.283 | BTEX CONCENTRATION (1986; 1989; 1990; 1991) |
| — — — — | BTEX ISO-CONCENTRATION CONTOUR (SEE NOTE 9) |

**NOTES:**

1. ALL BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE.
2. ONLY DETECTED ANALYTES ARE SHOWN.
3. BRACKETS INDICATE DUPLICATE SAMPLE.
4. J = ESTIMATED VALUE LESS THAN THE CLP-REQUIRED QUANTITATION LIMITS.
5. ND = NOT DETECTED.
6. B = COMPOUND ALSO FOUND IN ASSOCIATED BLANK SAMPLE.
7. E = COMPOUND EXCEEDED CALIBRATION RANGE.
8. ONLY WELLS SAMPLED FOR VOC ANALYSIS ARE SHOWN.
9. ISO-CONCENTRATION CONTOURS ARE BASED ON DATA AVAILABLE FOR ALL SAMPLING EVENTS, AND THEREFORE ARE CONCEPTUAL IN NATURE.

0 100' 200'
SCALE: 1"=100'

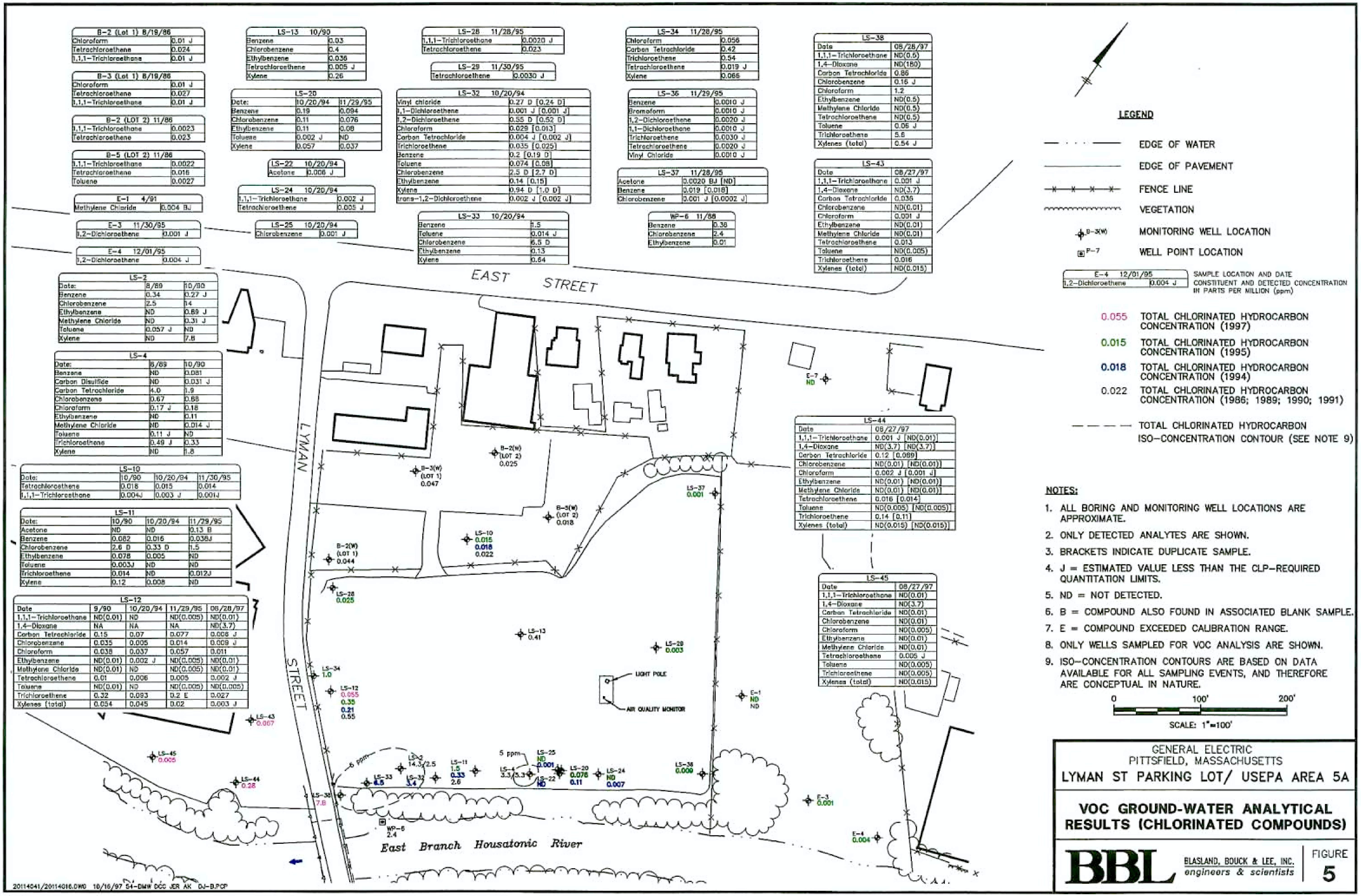
GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS
LYMAN ST PARKING LOT/ USEPA AREA 5A

# VOC GROUND-WATER ANALYTICAL RESULTS (BTEX)

**BBL** BLASLAND, BOUCK & LEE, INC.
*engineers & scientists*

FIGURE
4

20114041/20114G20.DWG 10/16/97 54-DMW DCC JER AK DJ-B.PCP



| B-2 (Lot 1) 8/19/86 | |
|---|---|
| Chloroform | 0.01 J |
| Tetrachloroethene | 0.024 |
| 1,1,1-Trichloroethane | 0.01 J |

| B-3 (Lot 1) 8/19/86 | |
|---|---|
| Chloroform | 0.01 J |
| Tetrachloroethene | 0.027 |
| 1,1,1-Trichloroethane | 0.01 J |

| B-2 (LOT 2) 11/86 | |
|---|---|
| 1,1,1-Trichloroethane | 0.0023 |
| Tetrachloroethene | 0.023 |

| B-5 (LOT 2) 11/86 | |
|---|---|
| 1,1,1-Trichloroethane | 0.0022 |
| Tetrachloroethene | 0.016 |
| Toluene | 0.0027 |

| E-1 4/91 | |
|---|---|
| Methylene Chloride | 0.004 BJ |

| E-3 11/30/95 | |
|---|---|
| 1,2-Dichloroethene | 0.001 J |

| E-4 12/01/95 | |
|---|---|
| 1,2-Dichloroethene | 0.004 J |

| LS-2 | | |
|---|---|---|
| Date: | 8/89 | 10/90 |
| Benzene | 0.34 | 0.27 J |
| Chlorobenzene | 2.5 | 14 |
| Ethylbenzene | ND | 0.89 J |
| Methylene Chloride | ND | 0.31 J |
| Toluene | 0.057 J | ND |
| Xylene | ND | 7.8 |

| LS-4 | | |
|---|---|---|
| Date: | 8/89 | 10/90 |
| Benzene | ND | 0.081 |
| Carbon Disulfide | ND | 0.031 J |
| Carbon Tetrachloride | 4.0 | 1.9 |
| Chlorobenzene | 0.67 | 0.88 |
| Chloroform | 0.17 J | 0.18 |
| Ethylbenzene | ND | 0.11 |
| Methylene Chloride | ND | 0.014 J |
| Toluene | 0.11 J | ND |
| Trichloroethene | 0.49 J | 0.33 |
| Xylene | ND | 1.8 |

| LS-10 | | | |
|---|---|---|---|
| Date: | 10/90 | 10/20/94 | 11/30/95 |
| Tetrachloroethene | 0.018 | 0.015 | 0.014 |
| 1,1,1-Trichloroethane | 0.004J | 0.003 J | 0.001J |

| LS-11 | | | |
|---|---|---|---|
| Date: | 10/90 | 10/20/94 | 11/29/95 |
| Acetone | ND | ND | 0.13 B |
| Benzene | 0.082 | 0.016 | 0.038J |
| Chlorobenzene | 2.6 D | 0.33 D | 1.5 |
| Ethylbenzene | 0.078 | 0.005 | ND |
| Toluene | 0.003J | ND | ND |
| Trichloroethene | 0.014 | ND | 0.012J |
| Xylene | 0.12 | 0.008 | ND |

| LS-12 | | | | |
|---|---|---|---|---|
| Date | 9/90 | 10/20/94 | 11/29/95 | 08/28/97 |
| 1,1,1-Trichloroethane | ND(0.01) | ND | ND(0.005) | ND(0.01) |
| 1,4-Dioxane | NA | NA | NA | ND(3.7) |
| Carbon Tetrachloride | 0.15 | 0.07 | 0.077 | 0.006 J |
| Chlorobenzene | 0.035 | 0.005 | 0.014 | 0.009 J |
| Chloroform | 0.038 | 0.037 | 0.057 | 0.011 |
| Ethylbenzene | ND(0.01) | 0.002 J | ND(0.005) | ND(0.01) |
| Methylene Chloride | ND(0.01) | ND | ND(0.005) | ND(0.01) |
| Tetrachloroethene | 0.01 | 0.006 | 0.005 | 0.002 J |
| Toluene | ND(0.01) | ND | ND(0.005) | ND(0.005) |
| Trichloroethene | 0.32 | 0.093 | 0.2 E | 0.027 |
| Xylenes (total) | 0.054 | 0.045 | 0.02 | 0.003 J |

| LS-13 10/90 | |
|---|---|
| Benzene | 0.03 |
| Chlorobenzene | 0.4 |
| Ethylbenzene | 0.036 |
| Tetrachloroethene | 0.005 J |
| Xylene | 0.26 |

| LS-20 | | |
|---|---|---|
| Date: | 10/20/94 | 11/29/95 |
| Benzene | 0.19 | 0.094 |
| Chlorobenzene | 0.11 | 0.076 |
| Ethylbenzene | 0.11 | 0.08 |
| Toluene | 0.002 J | ND |
| Xylene | 0.057 | 0.037 |

| LS-22 10/20/94 | |
|---|---|
| Acetone | 0.008 J |

| LS-24 10/20/94 | |
|---|---|
| 1,1,1-Trichloroethane | 0.002 J |
| Tetrachloroethene | 0.005 J |

| LS-25 10/20/94 | |
|---|---|
| Chlorobenzene | 0.001 J |

| LS-28 11/28/95 | |
|---|---|
| 1,1,1-Trichloroethane | 0.0020 J |
| Tetrachloroethene | 0.023 |

| LS-29 11/30/95 | |
|---|---|
| Tetrachloroethene | 0.0030 J |

| LS-32 10/20/94 | |
|---|---|
| Vinyl chloride | 0.27 D [0.24 D] |
| 1,1-Dichloroethene | 0.001 J [0.001 J] |
| 1,2-Dichloroethene | 0.55 D [0.52 D] |
| Chloroform | 0.029 [0.013] |
| Carbon Tetrachloride | 0.004 J [0.002 J] |
| Trichloroethene | 0.035 [0.025] |
| Benzene | 0.2 [0.19 D] |
| Toluene | 0.074 [0.08] |
| Chlorobenzene | 2.5 D [2.7 D] |
| Ethylbenzene | 0.14 [0.15] |
| Xylene | 0.94 D [1.0 D] |
| trans-1,2-Dichloroethene | 0.002 J [0.002 J] |

| LS-33 10/20/94 | |
|---|---|
| Benzene | 1.5 |
| Toluene | 0.014 J |
| Chlorobenzene | 6.5 D |
| Ethylbenzene | 0.13 |
| Xylene | 0.64 |

| LS-34 11/28/95 | |
|---|---|
| Chloroform | 0.056 |
| Carbon Tetrachloride | 0.42 |
| Trichloroethene | 0.54 |
| Tetrachloroethene | 0.019 J |
| Xylene | 0.066 |

| LS-36 11/29/95 | |
|---|---|
| Benzene | 0.0010 J |
| Bromoform | 0.0010 J |
| 1,2-Dichloroethene | 0.0020 J |
| 1,1-Dichloroethane | 0.0010 J |
| Trichloroethene | 0.0030 J |
| Tetrachloroethene | 0.0020 J |
| Vinyl Chloride | 0.0010 J |

| LS-37 11/28/95 | |
|---|---|
| Acetone | 0.0020 BJ [ND] |
| Benzene | 0.019 [0.018] |
| Chlorobenzene | 0.001 J [0.0002 J] |

| WP-6 11/88 | |
|---|---|
| Benzene | 0.36 |
| Chlorobenzene | 2.4 |
| Ethylbenzene | 0.01 |

| LS-38 | |
|---|---|
| Date | 08/28/97 |
| 1,1,1-Trichloroethane | ND(0.5) |
| 1,4-Dioxane | ND(180) |
| Carbon Tetrachloride | 0.86 |
| Chlorobenzene | 0.16 J |
| Chloroform | 1.2 |
| Ethylbenzene | ND(0.5) |
| Methylene Chloride | ND(0.5) |
| Tetrachloroethene | ND(0.5) |
| Toluene | 0.06 J |
| Trichloroethene | 5.6 |
| Xylenes (total) | 0.54 J |

| LS-43 | |
|---|---|
| Date | 08/27/97 |
| 1,1,1-Trichloroethane | 0.001 J |
| 1,4-Dioxane | ND(3.7) |
| Carbon Tetrachloride | 0.036 |
| Chlorobenzene | ND(0.01) |
| Chloroform | 0.001 J |
| Ethylbenzene | ND(0.01) |
| Methylene Chloride | ND(0.01) |
| Tetrachloroethene | 0.013 |
| Toluene | ND(0.005) |
| Trichloroethene | 0.016 |
| Xylenes (total) | ND(0.015) |

| LS-44 | |
|---|---|
| Date | 08/27/97 |
| 1,1,1-Trichloroethane | 0.001 J [ND(0.01)] |
| 1,4-Dioxane | ND(3.7) [ND(3.7)] |
| Carbon Tetrachloride | 0.12 [0.089] |
| Chlorobenzene | ND(0.01) [ND(0.01)] |
| Chloroform | 0.002 J [0.001 J] |
| Ethylbenzene | ND(0.01) [ND(0.01)] |
| Methylene Chloride | ND(0.01) [ND(0.01)] |
| Tetrachloroethene | 0.016 [0.014] |
| Toluene | ND(0.005) [ND(0.005)] |
| Trichloroethene | 0.14 [0.11] |
| Xylenes (total) | ND(0.015) [ND(0.015)] |

| LS-45 | |
|---|---|
| Date | 08/27/97 |
| 1,1,1-Trichloroethane | ND(0.01) |
| 1,4-Dioxane | ND(3.7) |
| Carbon Tetrachloride | ND(0.01) |
| Chlorobenzene | ND(0.01) |
| Chloroform | ND(0.005) |
| Ethylbenzene | ND(0.01) |
| Methylene Chloride | ND(0.01) |
| Tetrachloroethene | 0.005 J |
| Toluene | ND(0.005) |
| Trichloroethene | ND(0.005) |
| Xylenes (total) | ND(0.015) |

**LEGEND**

EDGE OF WATER

EDGE OF PAVEMENT

FENCE LINE

VEGETATION

B-3(W) MONITORING WELL LOCATION

P-7 WELL POINT LOCATION

| E-4 12/01/95 | |
|---|---|
| 1,2-Dichloroethene | 0.004 J |

SAMPLE LOCATION AND DATE
CONSTITUENT AND DETECTED CONCENTRATION
IN PARTS PER MILLION (ppm)

0.055 TOTAL CHLORINATED HYDROCARBON CONCENTRATION (1997)

0.015 TOTAL CHLORINATED HYDROCARBON CONCENTRATION (1995)

0.018 TOTAL CHLORINATED HYDROCARBON CONCENTRATION (1994)

0.022 TOTAL CHLORINATED HYDROCARBON CONCENTRATION (1986; 1989; 1990; 1991)

TOTAL CHLORINATED HYDROCARBON ISO-CONCENTRATION CONTOUR (SEE NOTE 9)

**NOTES:**

1. ALL BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE.
2. ONLY DETECTED ANALYTES ARE SHOWN.
3. BRACKETS INDICATE DUPLICATE SAMPLE.
4. J = ESTIMATED VALUE LESS THAN THE CLP-REQUIRED QUANTITATION LIMITS.
5. ND = NOT DETECTED.
6. B = COMPOUND ALSO FOUND IN ASSOCIATED BLANK SAMPLE.
7. E = COMPOUND EXCEEDED CALIBRATION RANGE.
8. ONLY WELLS SAMPLED FOR VOC ANALYSIS ARE SHOWN.
9. ISO-CONCENTRATION CONTOURS ARE BASED ON DATA AVAILABLE FOR ALL SAMPLING EVENTS, AND THEREFORE ARE CONCEPTUAL IN NATURE.

GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS
LYMAN ST PARKING LOT/ USEPA AREA 5A

## VOC GROUND-WATER ANALYTICAL RESULTS (CHLORINATED COMPOUNDS)

BBL BLASLAND, BOUCK & LEE, INC.
*engineers & scientists*

FIGURE
5

20114041/20114G16.DWG 10/16/97 S4-DMW DCC JER AK DJ-B.PCP

**E-1**

| Date: | 4-91 | 12/01/95 |
|---|---|---|
| Phenol | 0.001J | 0.009J |
| Phenols (Total) | 0.013 | NA |
| Phenanthrene | 0.002 J | ND |

**E-4 12/01/95**

| | |
|---|---|
| bis (2-ethylhexyl)phthalate | 0.001 J |

**LS-2**

| Date: | 8/89 | 10/90 |
|---|---|---|
| Acenaphthene | 1.2 D | 0.014 |
| Acenaphthylene | 0.075 | 0.003 J |
| Acetophenone | ND | 0.003 J |
| Anthracene | 0.3 | 0.003 J |
| Benzo(a)anthracene | 0.26 | ND |
| Benzo(b)fluoranthene | 0.14 | ND |
| Benzo(a)pyrene | 0.11 | ND |
| Benzyl alcohol | ND | 0.004 J |
| Benzyl butyl phthalate | 0.48 | ND |
| Bis(2-ethylhexyl)phthalate | 0.021 J | ND |
| Chrysene | 0.12 | ND |
| 1,2-Dichlorobenzene | 0.047 | 0.011 |
| 1,3-Dichlorobenzene | 0.24 | 0.11 |
| 1,4-Dichlorobenzene | 1.5 D | 0.42 D |
| Fluoranthene | 0.19 | 0.003 J |
| Fluorene | 0.84 | 0.011 |
| 2-Methylnaphthalene | ND | 0.04 |
| 4-Methylphenol | ND | 0.004 J |
| Naphthalene | 2.4 D | 0.16 |
| Phenathrene | 2.3 D | 0.015 |
| Phenol | ND | 0.003 J |
| Pyrene | 0.82 D | 0.005 J |
| 1,2,4-Trichlorobenzene | 0.58 | 0.059 |

**LS-4**

| Date: | 8/89 | 10/90 |
|---|---|---|
| Acenaphthene | 0.085 | 0.016 |
| Acenaphthylene | 0.16 | 0.025 |
| Anthracene | 0.27 | 0.017 |
| Benzo(a)anthracene | 0.25 | 0.009 J |
| Benzo(a)pyrene | 0.11 | 0.008 J |
| Benzo(b)fluoranthene | 0.11 | 0.004 J |
| Benzo(k)fluoranthene | 0.11 | 0.006 J |
| Benzo(g,h,i)perylene | 0.085 | 0.004 J |
| Chrysene | 0.15 | 0.009 J |
| Dibenzofuran | ND | 0.006 J |
| 1,2-Dichlorobenzene | 0.009 J | 0.005 J |
| 1,3-Dichlorobenzene | 0.013 J | 0.008 J |
| 1,4-Dichlorobenzene | 0.093 | 0.064 |
| 2,4-Dinitrotoluene | 0.022 J | ND |
| Fluoranthene | 0.42 | 0.018 |
| Fluorene | 0.36 | 0.053 |
| Indeno(1,2,3-cd)pyrene | 0.062 | 0.003 J |
| Naphthalene | 9.5 D | 4.4 D |
| 3-Nitroaniline | ND | 0.002 J |
| 2-Methylnaphthalene | ND | 0.630 |
| Phenathrene | 1.3 D | 0.094 |
| Pyrene | 0.63 | 0.037 |
| 1,2,4-Trichlorobenzene | 0.51 | 0.1 |

**LS-10 11/30/95**

| | |
|---|---|
| bis (2-ethylhexyl)phthalate | 0.008 J |

**LS-11**

| Date: | 10/90 | 10/20/94 | 11/29/95 |
|---|---|---|---|
| bis (2-ethylhexyl)phthalate | ND | ND | 0.002 J |
| Benzyl Alcohol | ND | 0.024 | ND |
| Benzoic Acid | ND | 0.042 J | ND |
| 2-Chlorophenol | ND | ND | 0.011 |
| 1,2-Dichlorobenzene | 0.004J | ND | ND |
| 1,3-Dichlorobenzene | 0.014 | ND | 0.003 J |
| 1,4-Dichlorobenzene | 0.025 | 0.005 J | 0.013 |
| 2-Methylnaphthalene | 0.013 | 0.002 J | ND |
| 2-Methylphenol | ND | 0.002 J | ND |
| Naphthalene | 0.25 | 0.002 J | 0.002 J |
| Phenanthrene | 0.003J | ND | ND |
| Phenol | ND | ND | 0.002 J |
| Pyrene | ND | ND | 0.001 J |
| 1,2,4-Trichlorobenzene | 0.004J | ND | ND |

**LS-12**

| LS-12 | 9/90 | 10/20/94 | 08/28/97 |
|---|---|---|---|
| 1,2,4,5-Tetrachlorobenzene | ND | 0.026 J | 0.003 J |
| 1,2,4-Trichlorobenzene | 0.26 | 1.2 | 0.1 |
| 1,2-Dichlorobenzene | 0.002 J | 0.032 J | 0.002 J |
| 1,3-Dichlorobenzene | NA | NA | ND(0.01) |
| 1,4-Dichlorobenzene | 0.003 J | 0.024 J | 0.003 J |
| 2-Methylnaphthalene | ND(0.01) | ND | ND(0.01) |
| Acetophenone | NA | ND | ND(0.02) |
| Naphthalene | ND(0.01) | ND | ND(0.005) |
| Phenanthrene | ND(0.01) | ND | ND(0.015) |
| Phenol | 0.003 J | 0.024 J | ND(0.015) |

**LS-13 10/90**

| | |
|---|---|
| Acenaphthene | 0.032 |
| Acenaphthylene | 0.005 J |
| Anthracene | 0.015 J |
| Benzo(a)anthracene | 0.01 J |
| Benzo(a)pyrene | 0.007 J |
| Benzo(b)fluoranthene | 0.004 J |
| Benzo(k)fluoranthene | 0.005 J |
| Chrysene | 0.01 J |
| 1,3-Dichlorobenzene | 0.035 |
| 1,4-Dichlorobenzene | 0.053 |
| Fluorene | 0.022 |
| Fluoranthene | 0.02 |
| 2-Methylnaphthalene | 0.059 |
| Naphthalene | 0.21 |
| Phenanthrene | 0.083 |
| Pyrene | 0.033 |

**LS-20**

| Date: | 10/20/94 | 11/29/95 |
|---|---|---|
| Acenaphthene | 0.15 | 0.22 |
| Acenaphthylene | 0.003 J | 0.005J |
| Anthracene | 0.005 J | 0.01 J |
| 1,3-Dichlorobenzene | 0.003 J | ND |
| 1,4-Dichlorobenzene | 0.011 | 0.006 J |
| Dibenzofuran | 0.005 J | 0.007J |
| Di-n-octylphthalate | 0.004 J | ND |
| Fluoranthene | 0.006 J | 0.007J |
| Fluorene | 0.057 | 0.066 |
| 2-Methylnaphthalene | 0.02 | 0.031J |
| Naphthalene | 0.13 | 0.33 |
| p-Dichlorobenzene | ND | 0.006J |
| Pheaanthrene | 0.059 | 0.082 |
| Pyrene | 0.008 J | 0.009J |

**LS-22 10/20/94**

| | |
|---|---|
| Acenaphthene | 0.17 |
| Acenaphthylene | 0.003 J |
| Anthracene | 0.004 J |
| 1,3-Dichlorobenzene | 0.004 J |
| 1,4-Dichlorobenzene | 0.013 |
| Dibenzofuran | 0.005 J |
| Fluoranthene | 0.003 J |
| Fluorene | 0.055 |
| 2-Methylnaphthalene | 0.035 |
| Naphthalene | 0.42 D |
| Phenanthrene | 0.05 |
| Pyrene | 0.005 J |

**LS-24**

| Date: | 10/20/94 | 11/29/95 |
|---|---|---|
| bis (2-ethylhexyl)phthalate | 0.004 J | ND |
| Di-n-octylphthalate | 0.002 J | ND |

**LS-29 11/30/95**

| | |
|---|---|
| bis (2-ethylhexyl)phthalate | 0.001 J |

**LS-32 10/20/94**

| | |
|---|---|
| Acenaphthene | 0.008 J [0.008 J] |
| Acetophenone | ND [0.002 J] |
| Benzoic Acid | 0.021 J [ND] |
| 1,2-Dichlorobenzene | 0.017 [0.017] |
| 1,3-Dichlorobenzene | 0.029 [0.029] |
| 1,4-Dichlorobenzene | 0.19 D [0.19 D] |
| Fluorene | 0.004 J [0.004 J] |
| Naphthalene | 0.15 [0.15] |
| 2-Methylnaphthalene | 0.033 [0.033] |
| Phenol | 0.006 J [0.007 J] |
| 2-Chlorophenol | 0.005 J [0.005 J] |
| Phenanthrene | 0.002 J [0.002 J] |
| 1,2,4-Trichlorobenzene | 0.008 J [0.008 J] |

**LS-33 10/20/94**

| | |
|---|---|
| Acenaphthene | 0.15 J |
| Anthracene | 0.07 J |
| Benzo(a)anthracene | 0.052 J |
| Chrysene | 0.082 J |
| 1,3-Dichlorobenzene | 0.16 J |
| 1,4-Dichlorobenzene | 0.33 |
| Fluoranthene | 0.13 J |
| Fluorene | 0.11 J |
| 2-Methylnaphthalene | 0.23 |
| Phenathrene | 0.37 |
| Pyrene | 0.18 J |

**LS-34 12/28/95**

| | |
|---|---|
| 1,2,4-Trichlorobenzene | 1.2 |
| 1,4-Dichlorobenzene | 0.020 J |
| 1,2,4,5-Tetrachlorobenzene | 0.043 J |

**LS-37 11/28/95**

| | |
|---|---|
| Naphthalene | 0.001 J [0.002 J] |
| 1,2,4-Trichlorobenzene | ND [0.001 J] |

**WP-6 11/88**

| | |
|---|---|
| Acenaphthene | 0.032 |
| 1,3-Dichlorobenzene | 0.013 |
| 1,4-Dichlorobenzene | 0.026 |
| Fluorene | 0.012 |
| Naphthalene | 0.011 |
| Phenanthrene | 0.017 |
| Phenols (Total) | 0.04 |

**LS-38**

| LS-38 | 08/28/97 |
|---|---|
| 1,2,4,5-Tetrachlorobenzene | 0.006 J |
| 1,2,4-Trichlorobenzene | 0.36 D |
| 1,2-Dichlorobenzene | 0.03 |
| 1,3-Dichlorobenzene | 0.008 J |
| 1,4-Dichlorobenzene | 0.12 |
| 2-Methylnaphthalene | 0.005 J |
| Acetophenone | 0.002 J |
| Naphthalene | 0.014 |
| Phenanthrene | 0.001 J |
| Phenol | ND(0.015) |

**LS-43**

| LS-43 | 08/27/97 |
|---|---|
| 1,2,4,5-Tetrachlorobenzene | ND(0.015) |
| 1,2,4-Trichlorobenzene | 0.006 |
| 1,2-Dichlorobenzene | ND(0.01) |
| 1,3-Dichlorobenzene | ND(0.01) |
| 1,4-Dichlorobenzene | ND(0.01) |
| 2-Methylnaphthalene | ND(0.01) |
| Acetophenone | ND(0.02) |
| Naphthalene | ND(0.005) |
| Phenanthrene | ND(0.015) |
| Phenol | ND(0.015) |

**LS-44**

| LS-44 | 08/27/97 | |
|---|---|---|
| 1,2,4,5-Tetrachlorobenzene | ND(0.015) | [ND(0.015)] |
| 1,2,4-Trichlorobenzene | ND(0.005) | [ND(0.005)] |
| 1,2-Dichlorobenzene | ND(0.01) | [ND(0.01)] |
| 1,3-Dichlorobenzene | ND(0.01) | [ND(0.01)] |
| 1,4-Dichlorobenzene | ND(0.01) | [ND(0.01)] |
| 2-Methylnaphthalene | ND(0.01) | [ND(0.01)] |
| Acetophenone | ND(0.02) | [ND(0.02)] |
| Naphthalene | ND(0.005) | [ND(0.005)] |
| Phenanthrene | ND(0.015) | [ND(0.015)] |
| Phenol | ND(0.015) | [ND(0.015)] |

**LS-45**

| LS-45 | 08/27/97 |
|---|---|
| 1,2,4,5-Tetrachlorobenzene | ND(0.015) |
| 1,2,4-Trichlorobenzene | ND(0.005) |
| 1,2-Dichlorobenzene | ND(0.01) |
| 1,3-Dichlorobenzene | ND(0.01) |
| 1,4-Dichlorobenzene | ND(0.01) |
| 2-Methylnaphthalene | ND(0.01) |
| Acetophenone | ND(0.02) |
| Naphthalene | ND(0.005) |
| Phenanthrene | ND(0.015) |
| Phenol | ND(0.015) |

**LEGEND**

| | |
|---|---|
| — · · · — | EDGE OF WATER |
| ——— | EDGE OF PAVEMENT |
| —x—x—x—x— | FENCE LINE |
| ⌒⌒⌒⌒⌒ | VEGETATION |
| ⊕ B-X(W) | MONITORING WELL LOCATION |
| ▣ P-7 | WELL POINT LOCATION |
| E-4 12/01/95 bis (2-ethylhexyl)phthalate 0.001 J | SAMPLE LOCATION AND DATE CONSTITUENT AND DETECTED CONCENTRATION IN PARTS PER MILLION (ppm) |
| 0.11 | TOTAL SVOC CONCENTRATION (1997) |
| 0.034 | TOTAL SVOC CONCENTRATION (1995) |
| 0.077 | TOTAL SVOC CONCENTRATION (1994) |
| 0.31 | TOTAL SVOC CONCENTRATION (1988; 1989; 1990) |
| — — — — | TOTAL SVOC ISO-CONCENTRATION CONTOUR (SEE NOTE 9) |

**NOTES:**

1. ALL BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE.
2. ONLY DETECTED ANALYTES ARE SHOWN.
3. BRACKETS INDICATE DUPLICATE SAMPLE.
4. J = ESTIMATED VALUE LESS THAN THE CLP-REQUIRED QUANTITATION LIMITS.
5. D = ANALYSIS PERFORMED AT A SECONDARY DILUTION FACTOR.
6. ND = NOT DETECTED.
7. NA = NOT ANALYZED.
8. ONLY WELLS SAMPLED FOR SVOC ANALYSIS ARE SHOWN.
9. ISO-CONCENTRATION CONTOURS ARE BASED ON DATA AVAILABLE FOR ALL SAMPLING EVENTS, AND THEREFORE ARE CONCEPTUAL IN NATURE.

0 100' 200'

SCALE: 1"=100'

GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS
LYMAN ST PARKING LOT/ USEPA AREA 5A

## SVOC GROUND-WATER ANALYTICAL RESULTS

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
6

20114041/20114G17.DWG 10/16/97 SYR-54-DMW DCC JER AK DJ-B.PCP

| GROUND-WATER SAMPLES | | | |
|---|---|---|---|
| ID: | Date: | Unfiltered | Filtered |
| E-1 | 12/01/95 | 0.0052 | 0.0034 |
| E-3 | 11/30/95 | 0.0021 | 0.0013 |
| E-4 | 12/01/95 | 0.0028 | 0.00044 |
| E-7 | 12/01/95 | 0.00033 | 0.00042 |
| LS-2 | 08/01/89 | NA | 0.8 |
| LS-2 | 10/01/90 | 0.80 | NA |
| LS-4 | 08/01/89 | 0.018 | NA |
| LS-4 | 10/01/90 | 0.0090 | NA |
| LS-10 | 10/01/90 | 0.0018 | NA |
| LS-10 | 10/20/94 | 0.0065* | NA |
| LS-10 | 11/30/95 | 0.0064 | 0.0019 |
| LS-11 | 10/01/90 | 0.12 D | NA |
| LS-11 | 10/20/94 | 0.146* | NA |
| LS-11 | 11/29/95 | 0.060 | 0.0037 |
| LS-12 | 09/01/90 | 1.2 D | NA |
| LS-12 | 10/20/94 | 51.6* | NA |
| LS-12 | 11/29/95 | 0.42 | 0.42 |
| LS-12 | 08/28/97 | 1.0 | 0.0052 |
| LS-13 | 10/01/90 | 2.1 | NA |
| LS-20 | 10/20/94 | 0.018 | NA |
| LS-20 | 11/29/95 | 0.095 | 0.0023 |
| LS-22 | 10/20/94 | 0.046 | NA |
| LS-24 | 10/20/94 | 0.018 | NA |
| LS-24 | 11/29/95 | 0.0093 | 0.0016 |
| LS-25 | 10/20/94 | 0.0022* | NA |
| LS-25 | 11/30/95 | 0.0056 | 0.0032 |
| LS-28 | 11/28/95 | 0.0013 | 0.00069 |
| LS-29 | 10/30/95 | 0.017 | 0.0081 |
| LS-32 | 10/20/94 | 0.132* [0.098*] | NA |
| LS-33 | 10/20/94 | 24* | NA |
| LS-34 | 12/28/95 | 32 | 0.030 |
| LS-36 | 11/29/95 | 0.018 | 0.00021 |
| LS-37 | 11/28/95 | 0.00011 [0.00040] | ND [ND] |
| LS-38 | 08/28/97 | 0.014 | ND(0.0010) |
| LS-43 | 08/27/97 | 0.017 | 0.0051 P |
| LS-44 | 08/27/97 | 0.0018 P [0.00085 JP] | ND(0.0010) [ND(0.0010)] |
| LS-45 | 08/27/97 | 0.0012 P | ND(0.0010) |
| WP-6 | 11/01/88 | 23 | NA |

**LEGEND**

| | |
|---|---|
| — · · · — | EDGE OF WATER |
| ——— | EDGE OF PAVEMENT |
| —x—x—x— | FENCE LINE |
| ⌒⌒⌒⌒ | VEGETATION |
| ⌖ B-3(M) | MONITORING WELL LOCATION |
| ▣ P-7 | WELL POINT LOCATION |
| 0.017 | PCB CONCENTRATION (FILTERED; 1997) |
| 0.0052 | PCB CONCENTRATION (FILTERED; 1995) |
| 0.018 | PCB CONCENTRATION (FILTERED; 1989) |
| — — — — | PCB ISO-CONCENTRATION CONTOUR (SEE NOTE 10) |

**NOTES:**

1. ALL BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE.
2. ONLY DETECTED ANALYTES ARE SHOWN.
3. BRACKETS INDICATE DUPLICATE SAMPLE.
4. ALL CONCENTRATIONS IN PARTS PER MILLION (ppm).
5. D = ANALYSIS PERFORMED AT A SECONDARY DILUTION FACTOR.
6. ND = NOT DETECTED.
7. NA = NOT ANALYZED.
8. * = SAMPLE EXHIBITS ALTERATION OF STANDARD AROCLOR PATTERN.
9. ONLY WELLS SAMPLED FOR PCB ANALYSIS ARE SHOWN.
10. ISO-CONCENTRATION CONTOURS ARE BASED ON DATA AVAILABLE FOR ALL SAMPLING EVENTS, AND THEREFORE ARE CONCEPTUAL IN NATURE.

0 100' 200'

SCALE: 1"=100'

GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS

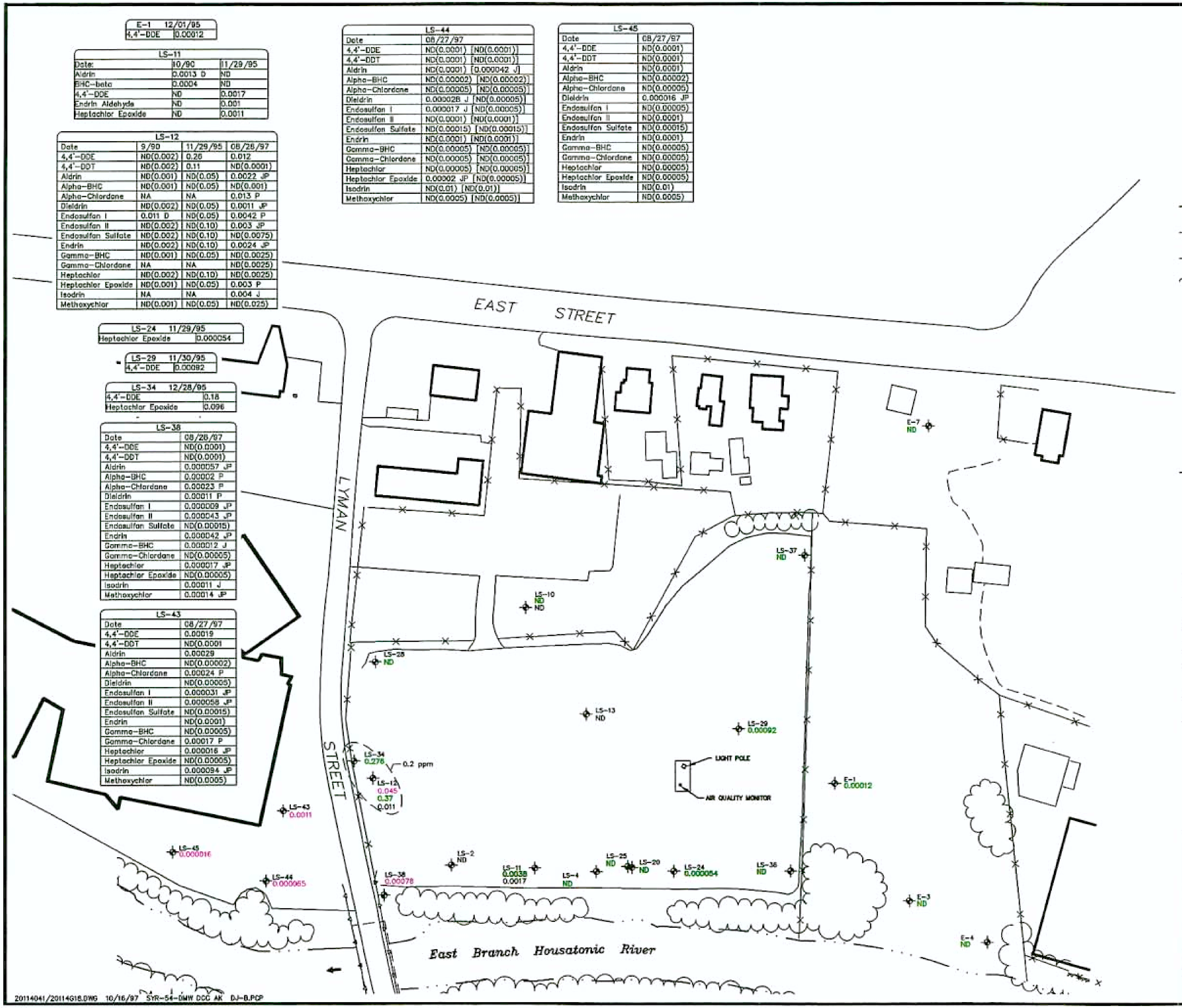
LYMAN ST PARKING LOT/ USEPA AREA 5A

## PCB GROUND-WATER ANALYTICAL RESULTS

**BBL** BLASLAND, BOUCK & LEE, INC.
*engineers & scientists*

FIGURE
7

20114041/20114023.DWG 10/15/97 SYR-54-DMW DCC NES DJ-B.PCP L:ON=* OFF=*SS*,*SB*,*REF*,FENCE-RIV



| E-1 | 12/01/95 |
|---|---|
| 4,4'-DDE | 0.00012 |

| LS-11 | | |
|---|---|---|
| Date: | 10/90 | 11/29/95 |
| Aldrin | 0.0013 D | ND |
| BHC-beta | 0.0004 | ND |
| 4,4'-DDE | ND | 0.0017 |
| Endrin Aldehyde | ND | 0.001 |
| Heptachlor Epoxide | ND | 0.0011 |

| LS-12 | | | |
|---|---|---|---|
| Date | 9/90 | 11/29/95 | 08/28/97 |
| 4,4'-DDE | ND(0.002) | 0.26 | 0.012 |
| 4,4'-DDT | ND(0.002) | 0.11 | ND(0.0001) |
| Aldrin | ND(0.001) | ND(0.05) | 0.0022 JP |
| Alpha-BHC | ND(0.001) | ND(0.05) | ND(0.001) |
| Alpha-Chlordane | NA | NA | 0.013 P |
| Dieldrin | ND(0.002) | ND(0.05) | 0.0011 JP |
| Endosulfan I | 0.011 D | ND(0.05) | 0.0042 P |
| Endosulfan II | ND(0.002) | ND(0.10) | 0.003 JP |
| Endosulfan Sulfate | ND(0.002) | ND(0.10) | ND(0.0075) |
| Endrin | ND(0.002) | ND(0.10) | 0.0024 JP |
| Gamma-BHC | ND(0.001) | ND(0.05) | ND(0.0025) |
| Gamma-Chlordane | NA | NA | ND(0.0025) |
| Heptachlor | ND(0.002) | ND(0.10) | ND(0.0025) |
| Heptachlor Epoxide | ND(0.001) | ND(0.05) | 0.003 P |
| Isodrin | NA | NA | 0.004 J |
| Methoxychlor | ND(0.001) | ND(0.05) | ND(0.025) |

| LS-24 | 11/29/95 |
|---|---|
| Heptachlor Epoxide | 0.000054 |

| LS-29 | 11/30/95 |
|---|---|
| 4,4'-DDE | 0.00092 |

| LS-34 | 12/28/95 |
|---|---|
| 4,4'-DDE | 0.18 |
| Heptachlor Epoxide | 0.096 |

| LS-38 | |
|---|---|
| Date | 08/28/97 |
| 4,4'-DDE | ND(0.0001) |
| 4,4'-DDT | ND(0.0001) |
| Aldrin | 0.000057 JP |
| Alpha-BHC | 0.00002 P |
| Alpha-Chlordane | 0.00023 P |
| Dieldrin | 0.00011 P |
| Endosulfan I | 0.000009 JP |
| Endosulfan II | 0.000043 JP |
| Endosulfan Sulfate | ND(0.00015) |
| Endrin | 0.000042 JP |
| Gamma-BHC | 0.000012 J |
| Gamma-Chlordane | ND(0.00005) |
| Heptachlor | 0.000017 JP |
| Heptachlor Epoxide | ND(0.00005) |
| Isodrin | 0.00011 J |
| Methoxychlor | 0.00014 JP |

| LS-43 | |
|---|---|
| Date | 08/27/97 |
| 4,4'-DDE | 0.00019 |
| 4,4'-DDT | ND(0.0001 |
| Aldrin | 0.00029 |
| Alpha-BHC | ND(0.00002) |
| Alpha-Chlordane | 0.00024 P |
| Dieldrin | ND(0.00005) |
| Endosulfan I | 0.000031 JP |
| Endosulfan II | 0.000058 JP |
| Endosulfan Sulfate | ND(0.00015) |
| Endrin | ND(0.0001) |
| Gamma-BHC | ND(0.00005) |
| Gamma-Chlordane | 0.00017 P |
| Heptachlor | 0.000016 JP |
| Heptachlor Epoxide | ND(0.00005) |
| Isodrin | 0.000094 JP |
| Methoxychlor | ND(0.0005) |

| LS-44 | |
|---|---|
| Date | 08/27/97 |
| 4,4'-DDE | ND(0.0001) [ND(0.0001)] |
| 4,4'-DDT | ND(0.0001) [ND(0.0001)] |
| Aldrin | ND(0.0001) [0.000042 J] |
| Alpha-BHC | ND(0.00002) [ND(0.00002)] |
| Alpha-Chlordane | ND(0.00005) [ND(0.00005)] |
| Dieldrin | 0.000028 J [ND(0.00005)] |
| Endosulfan I | 0.000017 J [ND(0.00005)] |
| Endosulfan II | ND(0.0001) [ND(0.0001)] |
| Endosulfan Sulfate | ND(0.00015) [ND(0.00015)] |
| Endrin | ND(0.0001) [ND(0.0001)] |
| Gamma-BHC | ND(0.00005) [ND(0.00005)] |
| Gamma-Chlordane | ND(0.00005) [ND(0.00005)] |
| Heptachlor | ND(0.00005) [ND(0.00005)] |
| Heptachlor Epoxide | 0.00002 JP [ND(0.00005)] |
| Isodrin | ND(0.01) [ND(0.01)] |
| Methoxychlor | ND(0.0005) [ND(0.0005)] |

| LS-45 | |
|---|---|
| Date | 08/27/97 |
| 4,4'-DDE | ND(0.0001) |
| 4,4'-DDT | ND(0.0001) |
| Aldrin | ND(0.0001) |
| Alpha-BHC | ND(0.00002) |
| Alpha-Chlordane | ND(0.00005) |
| Dieldrin | 0.000016 JP |
| Endosulfan I | ND(0.00005) |
| Endosulfan II | ND(0.0001) |
| Endosulfan Sulfate | ND(0.00015) |
| Endrin | ND(0.0001) |
| Gamma-BHC | ND(0.00005) |
| Gamma-Chlordane | ND(0.00005) |
| Heptachlor | ND(0.00005) |
| Heptachlor Epoxide | ND(0.00005) |
| Isodrin | ND(0.01) |
| Methoxychlor | ND(0.0005) |

**LEGEND**

| | |
|---|---|
| — · · · — | EDGE OF WATER |
| ——— | EDGE OF PAVEMENT |
| —x—x—x— | FENCE LINE |
| ~~~~~~ | VEGETATION |
| ⌖ B-3(W) | MONITORING WELL LOCATION |
| LS-29 11/30/95 4,4'-DDE 0.00092 | SAMPLE LOCATION AND DATE CONSTITUENT AND DETECTED CONCENTRATION IN PARTS PER MILLION (ppm) |
| 0.045 | TOTAL PESTICIDE/HERBICIDE CONCENTRATION (1997) |
| 0.0052 | TOTAL PESTICIDE/HERBICIDE CONCENTRATION (1995) |
| 0.018 | TOTAL PESTICIDE/HERBICIDE CONCENTRATION (1990) |
| — — — — | TOTAL PESTICIDE/HERBICIDE ISO-CONCENTRATION CONTOUR (SEE NOTE 6) |

**NOTES:**

1. ALL BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE.
2. ONLY DETECTED ANALYTES ARE SHOWN.
3. ND = NOT DETECTED
4. D = ANALYSIS PERFORMED AT A SECONDARY DILUTION FACTOR.
5. ONLY WELLS SAMPLED FOR PESTICIDE/HERBICIDE ANALYSIS ARE SHOWN.
6. ISO-CONCENTRATION CONTOURS ARE BASED ON DATA FOR ALL SAMPLING EVENTS, AND THEREFORE ARE CONCEPTUAL IN NATURE.

0 100' 200'

SCALE: 1"=100'

GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS
LYMAN ST PARKING LOT/ USEPA AREA 5A

## PESTICIDE/HERBICIDE GROUND-WATER ANALYTICAL RESULTS

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
8

20114041/20114G18.DWG 10/16/97 SYR-54-DMW DCC AK DJ-B.PCP

| LS-2 | 10/90 |
|---|---|
| Total HxCDD | 0.0000033 |
| Total TCDF | 0.000031 |
| Total PeCDF | 0.000138 |
| Total HxCDF | 0.000503 E |

| LS-4 | 10/90 |
|---|---|
| Total TCDF | 0.00141 (I) |
| Total PeCDF | 0.00167 (I) |
| Total HxCDF | 0.00271 (I) |

| LS-10 | 11/30/95 |
|---|---|
| Total TCDFs | 0.0000000064 |
| 2,3,7,8-TCDF | 0.0000000048 J** |
| Total PeCDFs | 0.000000033 |
| Total HxCDFs | 0.000000055 |
| 1,2,3,4,7,8-HxCDF | 0.000000028 J** |
| Total OCDD | 0.000000054 J** |

| LS-11 | 11/29/95 |
|---|---|
| Total TCDFs | 0.00000088 |
| 2,3,7,8-TCDF | 0.00000008 |
| Total PeCDFs | 0.00000058 |
| 2,3,4,7,8-PeCDF | 0.000000041 J** |
| Total HxCDFs | 0.00000053 |
| 1,2,3,4,7,8-HxCDF | 0.00000016 |
| 1,2,3,6,7,8-HxCDF | 0.000000084 |
| 2,3,4,6,7,8-HxCDF | 0.000000053 |
| Total HpCDFs | 0.00000027 |
| 1,2,3,4,6,7,8-HpCDF | 0.00000011 |
| 1,2,3,4,7,8,9-HpCDF | 0.000000068 |
| Total OCDF | 0.00000016 |
| Total TCDDs | 0.0000000093 |
| Total HpCDDs | 0.000000097 |
| 1,2,3,4,6,7,8-HpCDD | 0.000000036 J** |
| Total OCDD | 0.00000035 |

| LS-12 | | |
|---|---|---|
| Date | 11/29/95 | 08/28/97 |
| TCDFs (total) | 0.000021 | ND(0.00000081) w |
| 2,3,7,8-TCDF | 0.0000034 | ND(0.00000081) w |
| PeCDFs (total) | 0.000051 | 0.000009 |
| 1,2,3,7,8-PeCDF | 0.0000019 | ND(0.0000008) |
| 2,3,4,7,8-PeCDF | 0.000006 | 0.0000023 s |
| HxCDFs (total) | 0.000097 | 0.000029 |
| 1,2,3,4,7,8-HxCDF | 0.000032 | 0.00001 s |
| 1,2,3,6,7,8-HxCDF | 0.000018 | 0.0000039 s |
| 1,2,3,7,8,9-HxCDF | ND(0.0000023) | ND(0.00000088) |
| 2,3,4,6,7,8-HxCDF | 0.0000091 | 0.000002 s |
| HpCDFs (total) | 0.000047 | 0.000012 |
| 1,2,3,4,6,7,8-HpCDF | 0.000016 | 0.0000039 s |
| 1,2,3,4,7,8,9-HpCDF | 0.000016 | 0.0000031 s |
| OCDF | 0.000025 | 0.0000053 s |
| TCDDs (total) | 0.000018 | ND(0.00000043) |
| 2,3,7,8-TCDD | ND(0.000000086) | ND(0.00000043) |
| PeCDDs (total) | ND(0.0000015) | ND(0.0000014) |
| 1,2,3,7,8-PeCDD | ND(0.00000015) | ND(0.0000014) |
| HxCDDs (total) | ND(0.0000012) | ND(0.00000098) |
| 1,2,3,4,7,8-HxCDD | ND(0.00000027) | ND(0.00000098) |
| 1,2,3,6,7,8-HxCDD | ND(0.00000030) | ND(0.0000013) |
| 1,2,3,7,8,9-HxCDD | ND(0.00000020) | ND(0.0000011) |
| HpCDDs (total) | 0.0000078 | 0.0000011 |
| 1,2,3,4,6,7,8-HpCDD | 0.0000046 | 0.0000011 s |
| OCDD | 0.000036 | 0.0000071 s |

| LS-20 | 11/29/95 |
|---|---|
| Total TCDFs | 0.00000015 |
| 2,3,7,8-TCDF | 0.000000012 J** |
| Total PeCDFs | 0.00000015 |
| Total HxCDFs | 0.00000033 |
| 1,2,3,4,7,8-HxCDF | 0.00000011 |
| 1,2,3,6,7,8-HxCDF | 0.00000006 |
| 2,3,4,6,7,8-HxCDF | 0.000000034 J** |
| Total HpCDFs | 0.00000028 |
| 1,2,3,4,6,7,8-HpCDF | 0.00000011 |
| 1,2,3,4,7,8,9-HpCDF | 0.000000067 |
| Total OCDF | 0.00000022 |
| Total TCDDs | 0.0000000061 |
| Total HpCDDs | 0.000000085 |
| 1,2,3,4,6,7,8-HpCDD | 0.000000047 J** |
| Total OCDD | 0.00000074 |

| LS-24 | 11/29/95 |
|---|---|
| Total OCDD | 0.000000084 J** |

| LS-28 | 11/28/95 |
|---|---|
| Total TCDFs | 0.0000000061 |
| Total OCDD | 0.00000013 |

| LS-34 | 11/28/95 |
|---|---|
| Total TCDFs | 0.000017 |
| 2,3,7,8-TCDF | 0.00000055 |
| Total PeCDFs | 0.000043 |
| 1,2,3,7,8-PeCDF | 0.0000018 |
| 2,3,4,7,8-PeCDF | 0.0000051 |
| Total HxCDFs | 0.000087 |
| 1,2,3,4,7,8-HxCDF | 0.000030 E |
| 1,2,3,6,7,8-HxCDF | 0.000014 E |
| 1,2,3,7,8,9-HxCDF | 0.000009 |
| 2,3,4,6,7,8-HxCDF | 0.000008 |
| Total HpCDFs | 0.000069 |
| 1,2,3,4,6,7,8-HpCDF | 0.000020 E |
| 1,2,3,4,7,8,9-HpCDF | 0.000020 E |
| Total OCDF | 0.000060 E |
| Total TCDDs | 0.0000015 B |
| 2,3,7,8-TCDD | 0.000000026 |
| Total PeCDDs | 0.00000073 |
| 1,2,3,7,8-PeCDD | 0.00000025 |
| Total HxCDDs | 0.0000056 |
| 1,2,3,4,7,8-HxCDD | 0.00000083 |
| 1,2,3,6,7,8-HxCDD | 0.00000051 |
| 1,2,3,7,8,9-HxCDD | 0.00000064 |
| Total HpCDDs | 0.000025 |
| 1,2,3,4,6,7,8-HpCDD | 0.000015 E |
| Total OCDD | 0.000140 E |

| LS-37 | 11/28/95 | |
|---|---|---|
| Total TCDFs | 0.000000015 | [ND] |
| Total OCDD | 0.00000040 | [0.00000036] |

| LS-38 | |
|---|---|
| Date | 08/28/97 |
| TCDFs (total) | ND(0.00000092) |
| 2,3,7,8-TCDF | ND(0.00000092) |
| PeCDFs (total) | ND(0.0000019) |
| 1,2,3,7,8-PeCDF | ND(0.000002) |
| 2,3,4,7,8-PeCDF | ND(0.0000019) |
| HxCDFs (total) | ND(0.0000042) w |
| 1,2,3,4,7,8-HxCDF | ND(0.0000015) w |
| 1,2,3,6,7,8-HxCDF | ND(0.00000065) w |
| 1,2,3,7,8,9-HxCDF | ND(0.00000038) w |
| 2,3,4,6,7,8-HxCDF | ND(0.00000038) w |
| HpCDFs (total) | ND(0.0000023) w |
| 1,2,3,4,6,7,8-HpCDF | ND(0.00000081) w |
| 1,2,3,4,7,8,9-HpCDF | ND(0.00000068) w |
| OCDF | ND(0.0000018) w |
| TCDDs (total) | ND(0.00000027) |
| 2,3,7,8-TCDD | ND(0.00000027) |
| PeCDDs (total) | ND(0.0000014) |
| 1,2,3,7,8-PeCDD | ND(0.0000014) |
| HxCDDs (total) | ND(0.0000008) |
| 1,2,3,4,7,8-HxCDD | ND(0.0000008) |
| 1,2,3,6,7,8-HxCDD | ND(0.0000011) |
| 1,2,3,7,8,9-HxCDD | ND(0.00000069) |
| HpCDDs (total) | ND(0.00000092) w |
| 1,2,3,4,6,7,8-HpCDD | ND(0.00000057) w |
| OCDD | 0.0000034 s |

| LS-43 | |
|---|---|
| Date | 08/27/97 |
| TCDFs (total) | ND(0.00000058) |
| 2,3,7,8-TCDF | ND(0.00000058) |
| PeCDFs (total) | ND(0.0000011) |
| 1,2,3,7,8-PeCDF | ND(0.0000011) |
| 2,3,4,7,8-PeCDF | ND(0.0000011) |
| HxCDFs (total) | ND(0.00000077) |
| 1,2,3,4,7,8-HxCDF | ND(0.00000077) |
| 1,2,3,6,7,8-HxCDF | ND(0.00000079) |
| 1,2,3,7,8,9-HxCDF | ND(0.00000094) |
| 2,3,4,6,7,8-HxCDF | ND(0.00000077) |
| HpCDFs (total) | ND(0.00000094) |
| 1,2,3,4,6,7,8-HpCDF | ND(0.00000094) |
| 1,2,3,4,7,8,9-HpCDF | ND(0.0000011) |
| OCDF | ND(0.00000084) |
| TCDDs (total) | ND(0.00000038) |
| 2,3,7,8-TCDD | ND(0.00000038) |
| PeCDDs (total) | ND(0.0000011) |
| 1,2,3,7,8-PeCDD | ND(0.0000011) |
| HxCDDs (total) | ND(0.00000084) |
| 1,2,3,4,7,8-HxCDD | ND(0.00000084) |
| 1,2,3,6,7,8-HxCDD | ND(0.0000011) |
| 1,2,3,7,8,9-HxCDD | ND(0.00000094) |
| HpCDDs (total) | ND(0.00000053) |
| 1,2,3,4,6,7,8-HpCDD | ND(0.00000053) |
| OCDD | ND(0.0000014) |

| LS-44 | | |
|---|---|---|
| Date | 08/27/97 | |
| TCDFs (total) | ND(0.00000062) | [ND(0.00000062)] |
| 2,3,7,8-TCDF | ND(0.00000062) | [ND(0.00000062)] |
| PeCDFs (total) | ND(0.00000092) | [ND(0.00000084)] |
| 1,2,3,7,8-PeCDF | ND(0.00000096) | [ND(0.00000087)] |
| 2,3,4,7,8-PeCDF | ND(0.00000092) | [ND(0.00000084)] |
| HxCDFs (total) | ND(0.00000047) | [ND(0.00000053)] |
| 1,2,3,4,7,8-HxCDF | ND(0.00000047) | [ND(0.00000053)] |
| 1,2,3,6,7,8-HxCDF | ND(0.00000048) | [ND(0.00000054)] |
| 1,2,3,7,8,9-HxCDF | ND(0.00000057) | [ND(0.00000065)] |
| 2,3,4,6,7,8-HxCDF | ND(0.00000047) | [ND(0.00000053)] |
| HpCDFs (total) | ND(0.00000068) | [ND(0.00000093)] |
| 1,2,3,4,6,7,8-HpCDF | ND(0.00000068) | [ND(0.00000093)] |
| 1,2,3,4,7,8,9-HpCDF | ND(0.00000076) | [ND(0.000001)] |
| OCDF | ND(0.00000078) | [ND(0.00000066)] |
| TCDDs (total) | ND(0.00000032) | [ND(0.00000046)] |
| 2,3,7,8-TCDD | ND(0.00000032) | [ND(0.00000046)] |
| PeCDDs (total) | ND(0.0000017) | [ND(0.0000016)] |
| 1,2,3,7,8-PeCDD | ND(0.0000017) | [ND(0.0000016)] |
| HxCDDs (total) | ND(0.00000071) | [ND(0.0000009)] |
| 1,2,3,4,7,8-HxCDD | ND(0.00000071) | [ND(0.0000009)] |
| 1,2,3,6,7,8-HxCDD | ND(0.00000097) | [ND(0.0000012)] |
| 1,2,3,7,8,9-HxCDD | ND(0.0000008) | [ND(0.000001)] |
| HpCDDs (total) | ND(0.00000028) | [ND(0.00000052)] |
| 1,2,3,4,6,7,8-HpCDD | ND(0.00000028) | [ND(0.00000052)] |
| OCDD | ND(0.00000087) | [ND(0.0000008)] |

| LS-45 | |
|---|---|
| Date | 08/27/97 |
| TCDFs (total) | ND(0.00000055) |
| 2,3,7,8-TCDF | ND(0.00000055) |
| PeCDFs (total) | ND(0.00000083) |
| 1,2,3,7,8-PeCDF | ND(0.00000086) |
| 2,3,4,7,8-PeCDF | ND(0.00000083) |
| HxCDFs (total) | ND(0.0000005) |
| 1,2,3,4,7,8-HxCDF | ND(0.0000005) |
| 1,2,3,6,7,8-HxCDF | ND(0.0000005) |
| 1,2,3,7,8,9-HxCDF | ND(0.0000006) |
| 2,3,4,6,7,8-HxCDF | ND(0.0000005) |
| HpCDFs (total) | ND(0.00000091) |
| 1,2,3,4,6,7,8-HpCDF | ND(0.00000076) |
| OCDF | ND(0.00000046) |
| TCDDs (total) | ND(0.00000037) |
| 2,3,7,8-TCDD | ND(0.00000037) |
| PeCDDs (total) | ND(0.0000014) |
| 1,2,3,7,8-PeCDD | ND(0.0000014) |
| HxCDDs (total) | ND(0.00000076) |
| 1,2,3,4,7,8-HxCDD | ND(0.00000091) |
| 1,2,3,6,7,8-HxCDD | ND(0.0000012) |
| 1,2,3,7,8,9-HxCDD | ND(0.000001) |
| HpCDDs (total) | ND(0.00000027) |
| 1,2,3,4,7,8,9-HpCDF | ND(0.00000085) |
| 1,2,3,4,6,7,8-HpCDD | ND(0.00000027) |
| OCDD | ND(0.00000086) |

**LEGEND**

| | |
|---|---|
| — · · · — | EDGE OF WATER |
| ——— | EDGE OF PAVEMENT |
| —x—x—x—x— | FENCE LINE |
| ~~~~~~ | VEGETATION |
| ⌖ B-3(W) | MONITORING WELL LOCATION |
| ⊙ RW-1 | PUMPING WELL LOCATION |
| ▣ P-7 | WELL POINT LOCATION |
| ▲ B-4 | SOIL BORING LOCATION AND DESIGNATION |
| △ LS-19 | SURFACE SOIL SAMPLE LOCATION |

| LS-24 | 11/29/95 |
|---|---|
| Total OCDD | 0.000000084 J** |

SAMPLE LOCATION AND DATE
CONSTITUENT AND DETECTED CONCENTRATION IN PARTS PER MILLION (ppm)

| | |
|---|---|
| 0.0041 | MDEP TOTAL DIOXIN/FURAN TOXICITY EQUIVALENCY FACTOR (PPB) (1997) |
| 0.017 | MDEP TOTAL DIOXIN/FURAN TOXICITY EQUIVALENCY FACTOR (PPB) (1995) |
| 0.017 | MDEP TOTAL DIOXIN/FURAN TOXICITY EQUIVALENCY FACTOR (PPB) (1988; 1989; 1990) |
| — — — — — | TEF ISO-CONCENTRATION CONTOUR (SEE NOTE 10) |

**NOTES:**

1. ALL BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE.
2. ONLY DETECTED ANALYTES ARE SHOWN.
3. BRACKETS INDICATE DUPLICATE SAMPLE.
4. J** = ESTIMATED VALUE BELOW THE LOWER CALIBRATION LIMIT BUT ABOVE THE TARGET DETECTION LIMIT.
5. (I) = POSSIBLE INTERFERENCES NOTED BY LABORATORY.
6. ND = NOT DETECTED.
7. B = COMPOUND ALSO FOUND IN ASSOCIATED BLANK SAMPLE.
8. E = COMPOUND EXCEEDED CALIBRATION RANGE.
9. ONLY WELLS SAMPLED FOR DIOXIN/FURAN ANALYSIS ARE SHOWN.
10. ISO-CONCENTRATION CONTOURS ARE BASED ON DATA FOR ALL SAMPLING EVENTS, AND THEREFORE ARE CONCEPTUAL IN NATURE.

0 100' 200'
SCALE: 1"=100'

GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS
LYMAN ST PARKING LOT/ USEPA AREA 5A

# DIOXIN/FURAN GROUND-WATER ANALYTICAL RESULTS

BBL
BLASLAND, BOUCK & LEE, INC.
*engineers & scientists*

FIGURE
9

20114041/20114G22.DWG 10/16/97 SYR-54-DMW DCC AK DJ-B.PCP

LEGEND

- EDGE OF WATER
- EDGE OF PAVEMENT
- FENCE LINE
- VEGETATION
- B-3(W) MONITORING WELL LOCATION
- RW-1 PUMPING WELL LOCATION
- P-7 WELL POINT LOCATION
- B-4 SOIL BORING LOCATION AND DESIGNATION
- LS-19 SURFACE SOIL SAMPLE LOCATION
- LIGHT NON-AQUEOUS PHASE LIQUID OBSERVED IN MONITORING WELL (DASHED WHERE INFERRED, SOLID WHERE WELL CONTROL PERMITS)
- DENSE NON-AQUEOUS PHASE LIQUID OBSERVED IN MONITORING WELL (DASHED WHERE INFERRED, SOLID WHERE WELL CONTROL PERMITS)

NOTES:

1. ALL BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE.
2. NAPL DISTRIBUTION BASED ON SOIL OBSERVATIONS MADE DURING BORING INSTALLATION AND WEEKLY NAPL MEASUREMENTS IN MONITORING WELLS.

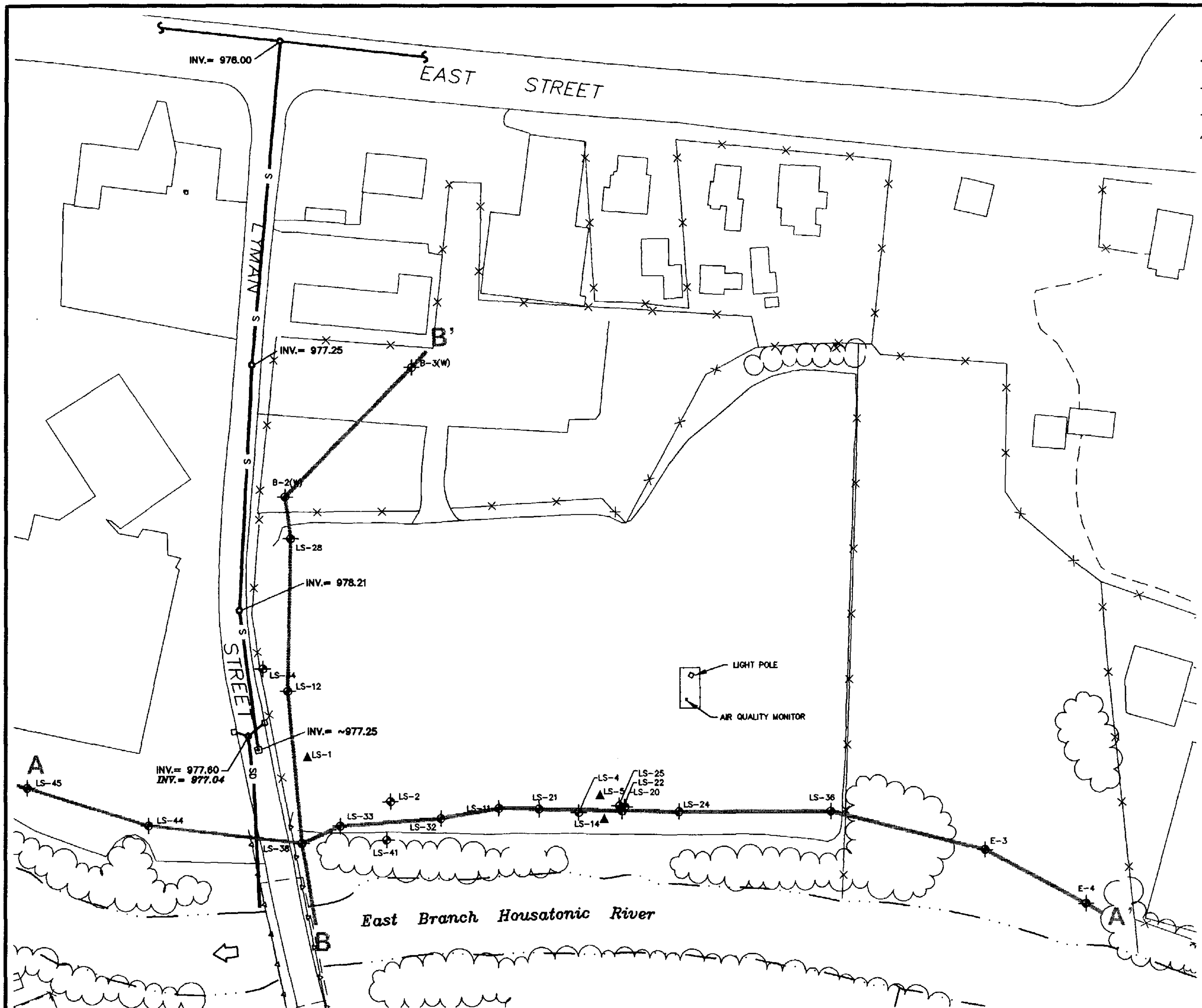
GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS
LYMAN ST PARKING LOT/ USEPA AREA 5A

**DISTRIBUTION OF SUBSURFACE NAPL**

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 10

20114041/20114G10.DWG 10/09/97 SYR-54-DMW DCC JER DJ-B.PCP



L: ON=*, OFF=REF
P: STD/BL
10/16/96 SYR-54-DCC JER AK
20114041/20114G12.DWG

**LEGEND**

| | |
|---|---|
| — · · · — | EDGE OF WATER |
| —— | EDGE OF PAVEMENT |
| —×—×— | FENCE LINE |
| ⌒⌒⌒ | VEGETATION |
| ⌖ B-3(W) | MONITORING WELL LOCATION |
| ⊙ RW-1 | PUMPING WELL LOCATION |
| ⊞ P-7 | WELL POINT LOCATION |
| ▲ B-4 | SOIL BORING LOCATION AND DESIGNATION |
| A —— A' | CROSS SECTION LOCATION |
| INV.= 977.60 ○ *INV.= 977.04* | MANHOLE W/ INVERT ELEVATION(S) * |
| ☐ | CATCH BASIN |
| — S — | SANITARY SEWER (8" – VITREOUS CLAY) |
| — SD — | STORM SEWER |
| ⊡ | SANITARY SEWER STANDPIPE |

**NOTES:**

1. ALL BORING, UTILITY, AND MONITORING WELL LOCATIONS ARE APPROXIMATE.
2. * INVERT ELEVATIONS OBTAINED FROM PLANS PROVIDED BY THE CITY OF PITTSFIELD ENGINEERS, PRESENTED IN APPENDIX A OF THE MCP SUPPLEMENTAL PHASE II/RFI REPORT, BLASLAND, BOUCK, & LEE, INC., JUNE 1996. ITALICIZED ELEVATIONS OBTAINED FROM FIGURE 1 OF THE REVISED MCP SCOPE OF WORK FOR LYMAN STREET PARKING LOT (OXBOW AREA D) AND PROPOSAL FOR RCRA FACILITY INVESTIGATION FOR VSEPA AREA 5A (GOLDER ASSOCIATES, JANUARY 1995).

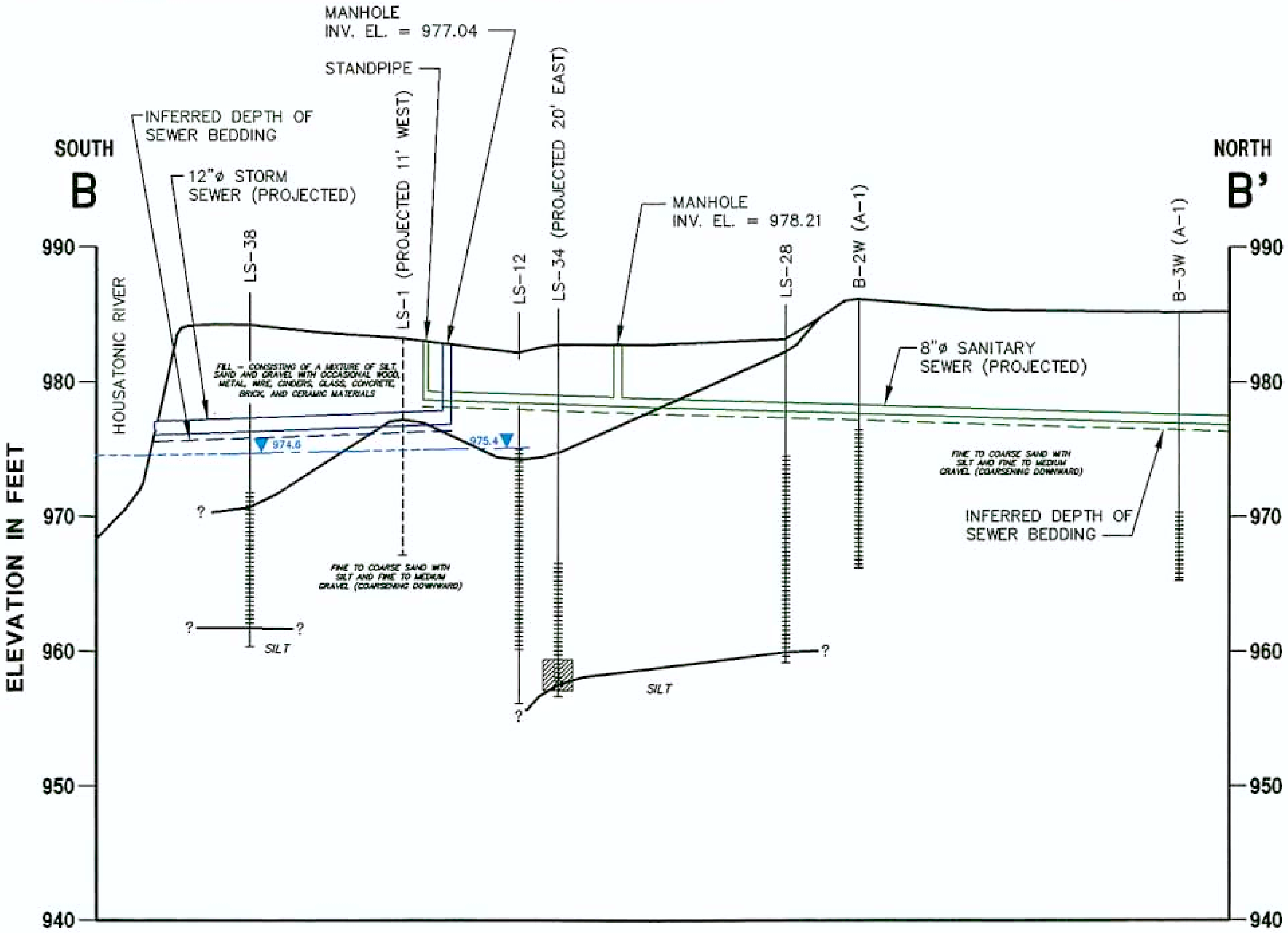
0 80' 160'
SCALE: 1"= 80'

GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS
LYMAN ST PARKING LOT/ USEPA AREA 5A

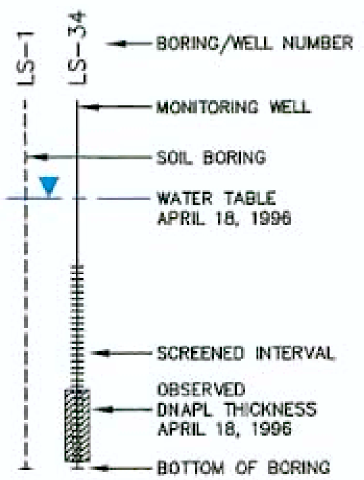
## STORM WATER AND SANITARY SEWER PIPING LOCATIONS

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
11



LEGEND



NOTES:

1. ELEVATIONS ARE APPROXIMATE AND ARE REFERENCED TO NGVD OF 1929.
2. DNAPL = DENSE NON-AQUEOUS PHASE LIQUID.
3. SANITARY SEWER ELEVATIONS BASED ON PLANS OBTAINED FROM THE CITY OF PITTSFIELD ENGINEER, PRESENTED IN APPENDIX A OF THE MCP SUPPLEMENTAL PHASE II/RFI REPORT, BLASLAND, BOUCK & LEE, INC., JUNE 1996.
4. STORM SEWER ELEVATION BASED ON A MANHOLE INVERT ELEVATION OF 977.04 PROVIDED ON FIGURE 1 OF THE REVISED MCP PHASE II SCOPE OF WORK FOR LYMAN STREET PARKING LOT (OXBOW AREA D) AND PROPOSAL FOR RCRA FACILITY INVESTIGATION FOR USEPA AREA 5A, (GOLDER ASSOCIATES, JANUARY 1995), AND A SEWER SLOPE OF 0.5:100 PROVIDED IN APPENDIX A (REFERENCED IN NOTE 3, ABOVE).
5. ALL BORING AND UTILITY LOCATIONS ARE APPROXIMATE.

HORIZONTAL SCALE: 1"=60'

GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS

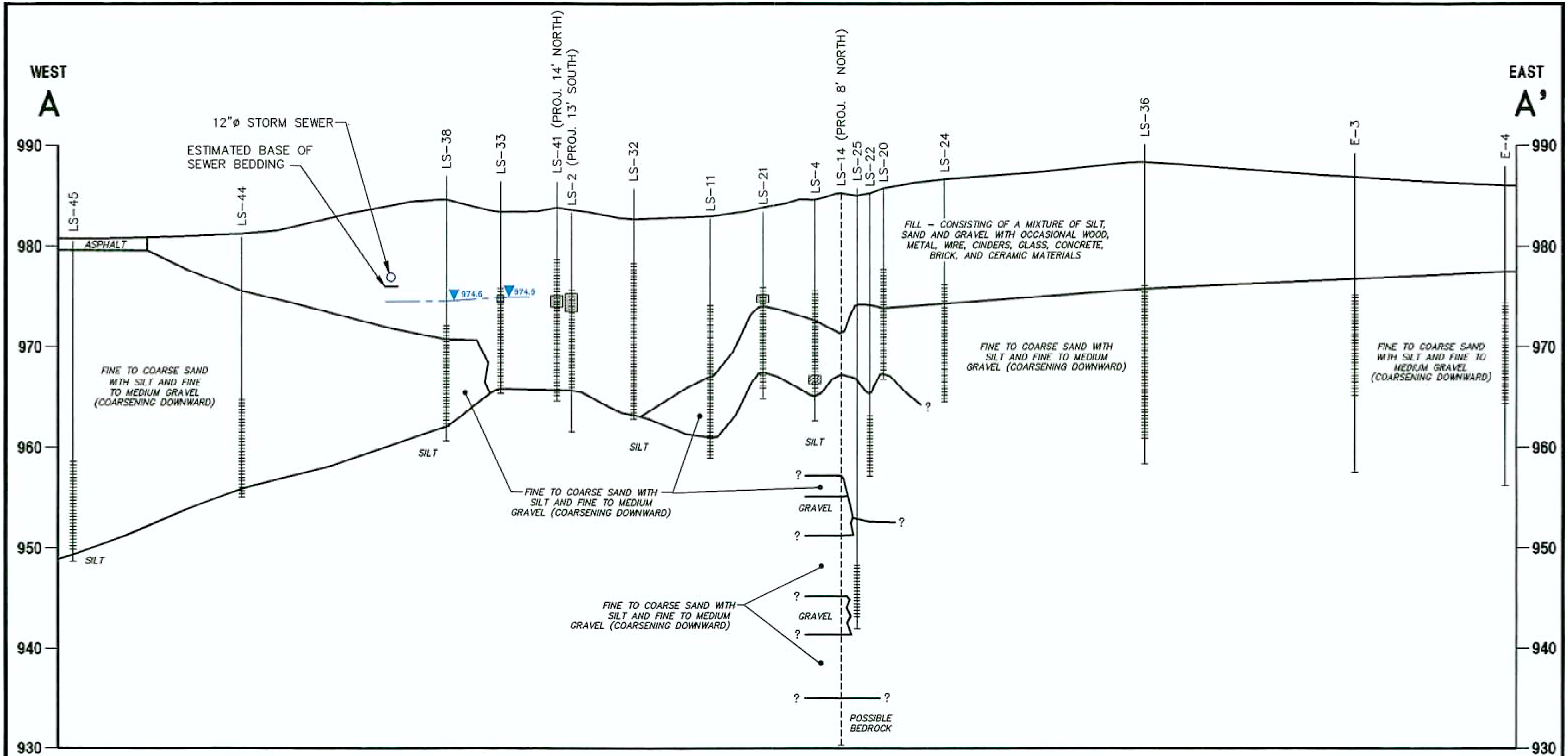
LYMAN ST PARKING LOT/ USEPA AREA 5A

## STORMWATER AND SANITARY SEWER CROSS SECTION

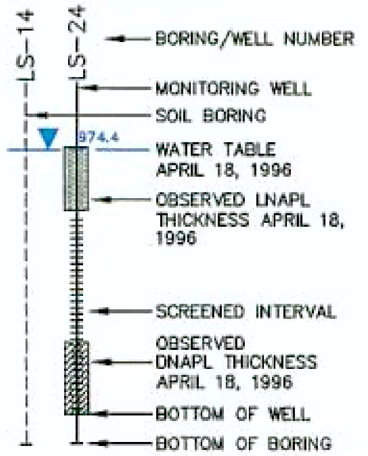
BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
12

P: DL-B
10/16/97 SYR-54-DMW NES DCC AK
20114041/20114G14.DWG



## LEGEND



NOTES:

1. ELEVATIONS ARE APPROXIMATE AND ARE REFERENCED TO NGVD OF 1929.
2. DNAPL = DENSE NON-AQUEOUS PHASE LIQUID.
3. LNAPL = LIGHT NON-AQUEOUS PHASE LIQUID
4. WATER LEVEL ELEVATION IS APPROXIMATE AND IS CORRECTED FOR LNAPL SPECIFIC GRAVITY = 0.93.
5. STORM SEWER LOCATION IS APPROXIMATE AND IS BASED ON PLANS OBTAINED FROM THE CITY OF PITTSFIELD ENGINEER, PRESENTED AS APPENDIX A OF THE MCP SUPPLEMENTAL PHASE II/RFI REPORT, BLASLAND, BOUCK & LEE, INC., JUNE 1996.
6. STORM SEWER ELEVATION BASED ON A MANHOLE INVERT ELEVATION OF 977.04 PROVIDED ON FIGURE 1 OF THE REVISED MCP PHASE II SCOPE OF WORK FOR LYMAN STREET PARKING LOT (OXBOW AREA D) AND PROPOSAL FOR RCRA FACILITY INVESTIGATION FOR USEPA AREA 5A, (GOLDER ASSOCIATES, JANUARY 1995), AND A SEWER SLOPE OF 0.5:100 PROVIDED IN APPENDIX A (REFERENCED IN NOTE 5, ABOVE).

P: DL-B.PCP
9/30/97 SYR-54-DMW NES DCC
20114041/20114G13.DWG

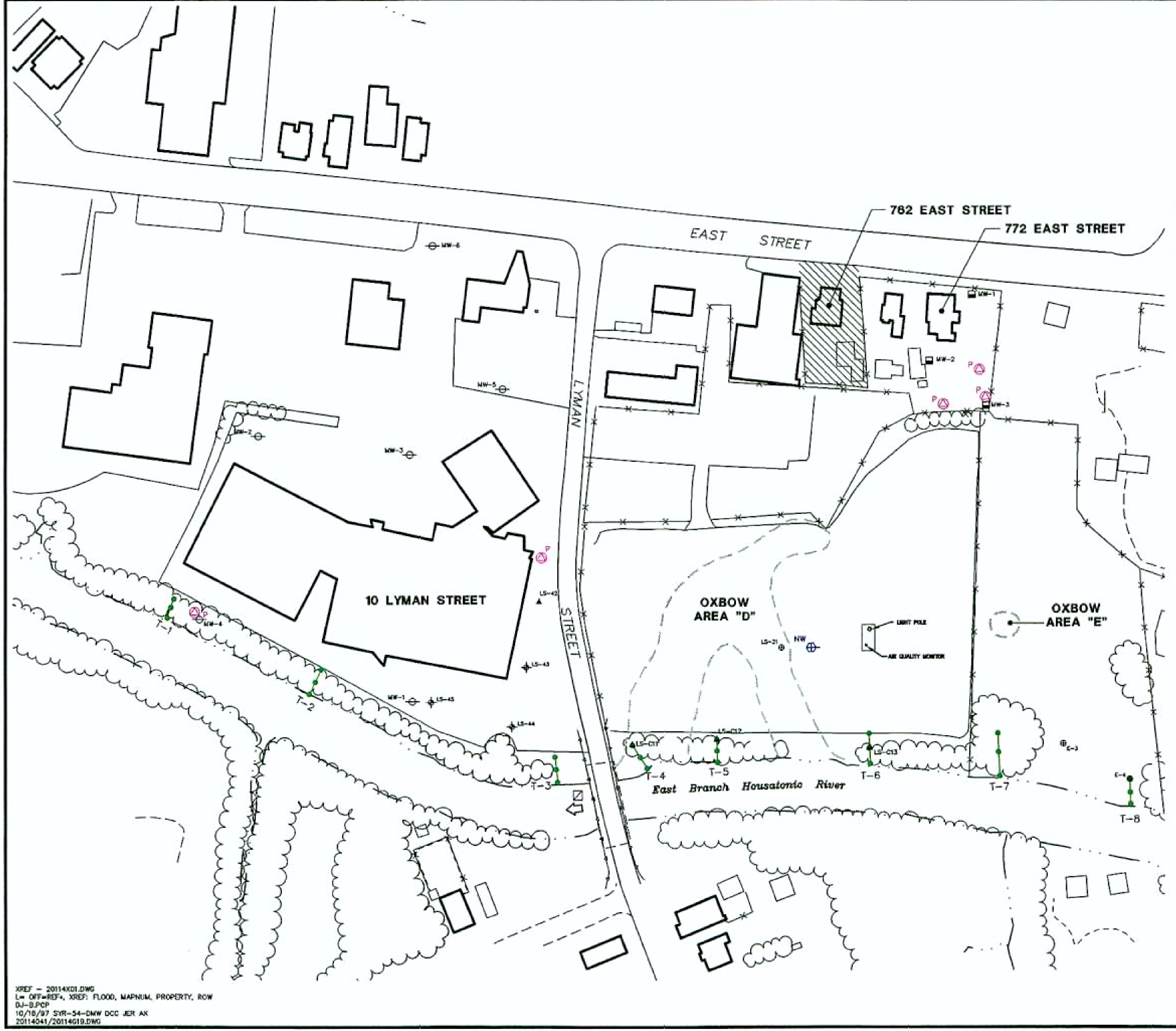
0 60' 120'
HORIZONTAL SCALE: 1"=60'

GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS
LYMAN ST PARKING LOT/ USEPA AREA 5A

**STORM SEWER CROSS SECTION**

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
13



**LEGEND**

| | |
|---|---|
| — · · · — | EDGE OF WATER |
| ——— | EDGE OF PAVEMENT |
| —×—×— | FENCE LINE |
| ⌒⌒⌒⌒ | VEGETATION |
| — — — | APPROXIMATE BOUNDARY OF FORMER OXBOW |
| x ⊕ LS-31 | MONITORING WELL LOCATION |
| ▲ LS-19 | SURFACE SOIL SAMPLE LOCATION (0-6 INCHES) (AUGUST 1995) |
| ⊘ P | PROPOSED SOIL BORING LOCATION |
| ⊕ NW | PROPOSED MONITORING WELL LOCATION |
| ⊠ | PROPOSED SURFACE WATER SAMPLE LOCATION |
| ● | PROPOSED RIVER BANK TRANSECT SAMPLE LOCATIONS |
| ⊕ B-1 | OXBOW B INVESTIGATION BORINGS |
| ⊖ MW-3 | 10 LYMAN ST. INVESTIGATION MONITORING WELLS |
| ▭ MW-3 | 772 EAST ST. MONITORING WELLS |
| ▨ | 762 EAST STREET SURFICIAL SOIL AREA OF INVESTIGATION |

**NOTES:**

1. ALL BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE. A LIMITED NUMBER OF BORING AND MONITORING WELL LOCATIONS ARE SHOWN FOR SPATIAL REFERENCE.
2. EACH TRANSECT CONSISTS OF THREE SAMPLE POINTS: TOP OF BANK, MID-BANK, AND LOWER BANK. ACTUAL SAMPLE LOCATIONS WILL BE DETERMINED IN THE FIELD. AT CERTAIN LOCATIONS TRANSECTS INCORPORATE PREVIOUSLY EXISTING SAMPLE POINTS (e.g. E-4, TRANSECT 8).

0 120' 240'
GRAPHIC SCALE

GENERAL ELECTRIC
PITTSFIELD, MASSACHUSETTS
LYMAN ST PARKING LOT/ USEPA AREA 5A

**PROPOSED SAMPLE/BORING LOCATIONS**

**BBL** BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
14

XREF - 20114X01.DWG
L= OFF=REF*, XREF: FLOOD, MAPNUM, PROPERTY, ROW
DJ-B.PCP
10/16/97 SYR-54-DMW DCC JER AK
20114041/20114G19.DWG

# Appendix A

## LNAPL Sample LS423R1C1 Analytical Data Sheets

LYMAN STREET
LS423R1C1
45

COMPUCHEM
LABORATORIES, INC.
P.O. Box 12652 3308 Chapel Hill/Nelson Highway Research Triangle Park, NC 27709 (919) 549-8263

April 20, 1992

RECEIVED
APR 27 1992
ENVIRONMENTAL PROGRAMS

Mr. Mark Phillips
General Electric Company
Area Env. & Facility Programs
Building 11-250
100 Woodlawn Avenue
Pittsfield, MA 01201

Dear Mr. Phillips:

We at CompuChem® are pleased to provide our report for the analysis you requested: Data for the following sample are enclosed.

| Your ID Number | Our ID Number | Analysis Code | Order Number | Description of Work Requested |
|---|---|---|---|---|
| LS423R1C1 | 485800 | 154 | 24105 | PCBs in Lube Oil (Style 9) |

Thank you for selecting CompuChem® Laboratories for your sample analysis. If you have questions concerning this report or the analytical methods employed please contact your Sales Representative at 919-549-8263.

We hope you will consider CompuChem® Laboratories for your future analytical support and service requirements.

Sincerely,

for Yolanda Lee

Elise L. Cobb
Supervisor, Report Preparation

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## CHRONICLE

| ITEM NO. | SAMPLE IDENTIFIER | COMPUCHEM® NUMBER | DATE SAMPLE RECEIVED | DATE SAMPLE EXTRACTED | DATE PCBs FRACTION ANALYZED |
|---|---|---|---|---|---|
| 1. | LS423R1C1 | 485800 | 03/30/92 | 04/03/92<br>04/11/92* | 04/13/92<br>04/14/92† |

## PCB's

| | |
|---|---|
| (Standard) | R41Q010, R41Q012-R41Q016 |
| (Standard - Conf) | R32G010, R32G012-R32G016 |
| (Blank - PCB) | 488433 |
| (Standard) | R32G010, R32G012-R32G016 |
| (Spike) | 485801 |
| (Standard) | R32G010, R32G012-R34G016 |
| (Spike) | 485802 |
| (Standard) | R32G010, R32G012-R32G016 |
| (Standard - Conf.) | R41Q010, R41Q012-R41Q016 |
| (Spikes Blank) | 488433 |
| (Standard) | R32G010, R32G012-R32G016 |

*The Pesticide fraction was re-extracted because initial endeavors did not meet quality control acceptance criteria.

†Second column confirmation analysis which serves to verify the presence or absence of PCB compounds.

47

COMPUCHEM LABORATORIES, INC. P.O. Box 12652 3308 Chapel Hill/Nelson Highway Research Triangle Park, NC 27709 (919) 549-8263

Style 9 Case Narrative #24105 SDG. 599
Client-GENERAL ELECTRIC COMPANY
Account #500077
CompuChem Laboratories, Inc.

**SAMPLES:** LS423R1C1

The sample was received in good condition, with the proper chain-of-custody (COC) on date March 3rd, 1992. The sample were logged into the Laboratory Management System and stored at 4 degrees Celsius. GC-PCB's In Lub Oil analyses were performed as requested by the client.

**PCBs:**
The sample was initially prepared and analyzed within holding time requirements. The initial analysis, however, did not meet quality control criteria, and a subsequent preparation and analysis were performed. A dilution of 100:1 was performed in order achieve accurate results by GC analysis. The sample contained a concentration of 27000 mg/kg of PCB 1254. There were no other target analytes detected in the sample.

**QC SUMMARY:**
Surrogate recovery requirements were not met for the sample due to the dilution requirements. The matrix spike and duplicate analyses were also outside of control criteria due to the dilution requirements. Notices have been supplied for these occurrences. The method blank and associated standards were within QC specifications.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Toney C. Spruell 4-20-92
**TONEY C. SPRUELL** DATE 04/20/92
**TECHNICAL REVIEWER**

# METHOD REFERENCE

CompuChem® employs the sample preparation procedure from the USEPA Contract WA 83-8064 titled "Organic Analysis in Multi-Media Multi-Concentrations". The analytical protocols for the analysis are taken from the USEPA Method 608 as published in Volume 49, October 26, 1984 Federal Register.

## Method Summary

An approximate 50 gram aliquot of sample is pH adjusted between 5-9 and is then extracted with methylene chloride using a high speed homogenizer (tissuemizer) or sonicator. After extraction, the extract is exchanged into hexane. Pesticide analysis is performed by gas chromatography with an electron capture detector. Positive "hits" are confirmed using dual column confirmation.

## Method Modification

The matrix of this sample precludes routine sample preparation. The existing method is modified to accommodate the high organic content of this sample.

A 250 ul aliquot of sample is diluted to 5 ml with Hexane. Surrogates are added and an aliquot is then taken and analyzed.

5/5

485803
485800

EL92095V

**BLASLAND & BOUCK ENGINEERS, P.C.**
6723 Tow Path Road, Box 66, Syracuse, New York 13214
(315) 446-9120

## CHAIN OF CUSTODY RECORD

MTB 3/30/92

PROJECT NO. 201-08-02
PROJECT NAME PASSIVE OIL RECOVERY PROGRAM

| LAB ID | CUSTODY TAPE NUMBER | DATE | TIME | COMP. | GRAB | SAMPLE TYPE SOLID | WIPE | WATER O/L | NO. OF CONTAINERS | PCB'S / PESTICIDES METHOD 8080 | DIOXANE/DIBENZOFURAN METHOD 8280 | | | | REMARKS<br>I.D. used: LS423R1C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LS-4-23/R | 1/C1 | 3/26/92 | 1410 | | X | | | X | 1 | X | X | | | | TO: GE LAB |
| | | | | | | | | | | | | | | | PITTSFIELD, MA |
| | | | | | | | | | | | | | | | (JEFF NICHOLSON) |
| | | | | | | | | | | | | | | | FOR COURIER PICK-UP |
| | | | | | | | | | | | | | | | FOR COMPUCHEM LABORATORY |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | these samples are for |
| | | | | | | | | | | | | | | | John Ciampa - GE: Tracy |
| | | | | | | | | | | | | | | | Mann of CompChem is |
| | | | | | | | | | | | | | | | aware that they are coming. |
| | | | | | | | | | | | | | | | MTB 3/30/92 |

Send report and invoice to WA Fessler, GE Co., Mail Code C23,
100 Woodlawn Ave., Pittsfield, MA 01201
PO #: PX3023191

RECEIVED IN GOOD CONDITION

SAMPLED BY: (SIGNATURE) A. H. Peart Jr. DATE/TIME 3/26/92 1410
RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE) A. H. Peart Jr. DATE/TIME 3/26/92 1455
RECEIVED BY: (SIGNATURE) J Nicholson

RELINQUISHED BY: (SIGNATURE) J Nicholson DATE/TIME 3/27/92 9:51
RECEIVED BY: (SIGNATURE) John D Ciampa
RELINQUISHED BY: (SIGNATURE) John D Ciampa DATE/TIME 3/27/92 10am
RECEIVED BY: (SIGNATURE)

RELINQUISHED BY: (SIGNATURE) DATE/TIME
RECEIVED FOR LABORATORY BY: (SIGNATURE) DATE/TIME 3/[illegible]/92 9:[illegible]am
REMARKS TO: COMPUCHEM

# COMPOUND LIST -- PCBs

SAMPLE IDENTIFIER: LS423R1C1
COMPUCHEM® SAMPLE NUMBER: 485800

| | | CONCENTRATION (mg/kg) | DETECTION† LIMIT (mg/kg) |
|---|---|---|---|
| 1P. | PCB-1242 | BDL | 2500 |
| 2P. | PCB-1254 | 27000 | 2500 |
| 3P. | PCB-1221 | BDL | 2500 |
| 4P. | PCB-1232 | BDL | 2500 |
| 5P. | PCB-1248 | BDL | 2500 |
| 6P. | PCB-1260 | BDL | 2500 |
| 7P. | PCB-1016 | BDL | 2500 |

Surrogate Recovery - Introduced at the beginning of the extraction, the surrogate standard is a select compound that analytically mimics the response of certain analytes. A known concentration of this surrogate is added to the sample and a percent recovery is calculated. This recovery acts as a barometer of extraction efficiency and analytical response for the individual sample.

| | % Recovery | Control Range % |
|---|---|---|
| Dibutylchlorendate | † | (20-150)* |

BDL = BELOW DETECTION LIMITS

*Advisory surrogate; with the exception of dilutions recovery below 20% requires action step (re-extraction and re-analysis).

†The sample analyzed using a 100 :1 dilution, thus the higher than normal detection limits. See attached Quality Assurance Notice.

DIOXIN/FURAN [illegible]

LS423RIC,

**COMPUCHEM**
WESTERN DIVISION
**(CHEMWEST)**

April 21, 1992

General Electric Company
Area Environmental & Facility
Programs Building 11-250
100 Woodlawn Avenue
Pittsfield, MA 01201

Attention: Mr. Mark Phillips

Subject: Report of Data - Ticket # 9412

Dear Mr. Phillips:

Enclosed are results of analytical work performed by CHEMWEST on one oil sample received on March 31, 1992 in good condition. In addition to the sample results, the results for batch QC and associated method blank(s) are reported.

The submitted sample was analyzed for total tetra through octa dioxin/furan isomers, 2,3,7,8-TCDD and 2,3,7,8-TCDF following the SW846 Method 8280.

Please see Form 1 Quantitation Report for your sample results.

Routine calibration consisted of running a GC window defining mix (first and last eluters) and a shift standard. In addition to the analysis of the GC window defining mixture along with each shift standard, we combined the ions in the descriptors such that any region of congener overlap (i.e. tetradioxin/pentafuran) was simultaneously monitored for both congener groups.

Before any samples were analyzed, standards were run at five different concentrations (200, 500, 1000, 2000, 5000 pg/ul) and mean response factors were obtained. A relative standard deviation of less than 15% was obtained. All sample quantitations follow the formula given in the aforementioned method and are based on an average multipoint response factor. The following table provides a reference for compounds and their appropriate Internal Standard.

600W North Market Boulevard • Sacramento, CA 95834 • Phone (916) 923-0840 • FAX (916) 923-1938

52

| STANDARD | COMPOUND/SURROGATE |
|---|---|
| $^{13}C$-2,3,7,8-TCDD | ALL NATIVE TETRADIOXIN ISOMERS<br>$^{37}Cl_4$-2,3,7,8-TCDD |
| $^{13}C$-1,2,3,7,8-PeCDD | ALL NATIVE PENTADIOXIN ISOMERS |
| $^{13}C_{12}$-1,2,3,7,8-PeCDF | ALL NATIVE PENTAFURAN ISOMERS |
| $^{13}C$-1,2,3,6,7,8-HxCDD | ALL NATIVE HEXADIOXIN ISOMERS<br>ALL NATIVE HEXAFURAN ISOMERS<br>$^{13}C_{12}$-1,2,3,7,8,9-HxCDD |
| $^{13}C$-1,2,3,4,6,7,8-HpCDD | ALL NATIVE HEPTADIOXIN ISOMERS<br>ALL NATIVE HEPTAFURAN ISOMERS<br>$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF |
| $^{13}C$-1,2,3,4,5,6,7,8-OCDD | ALL NATIVE OCTADIOXIN<br>ALL NATIVE OCTAFURAN |
| $^{13}C$-2,3,7,8-TCDF | ALL NATIVE TETRAFURAN ISOMERS |

Interferences were noted from the $^{13}C$-2,3,7,8-TCDF in the tetradioxin regions of the chromatograms as the $^{13}C$ carbon labeled material contains the same ion present in the native dioxin. These interferences were noted on all chromatograms and were not counted as true interferences for use in detection limit calculations.

Extraction procedures were those outlined in the EPA 8280 protocol for soils.

Chemwest welcomes any suggestions or comments regarding our deliverables package. If you have any questions concerning this report, please contact your project manager at (916) 923-0840.

Sincerely,

Vincent Schmidt
Project Manager

and

Elaine Wong

Elaine Wong
GC/MS Manager

EW:ba

cc: File

HEMWEST ANALYTICAL LABORATORIES
00 W. North Market Blvd.
Sacramento, California 95834
916) 923-0840 FAX (916) 923-1938

Order No.:9412
Date Rec'd: 03/31/92 @ 09:15
Compl Date:
Section: VINCE SCHMIDT

CLIENT

LIENT:
OMPUCHEM LABORATORIES
3308 E. CHAPEL HILL/NELSON HWY.
ESEARCH TRIANGLE PARK, NC 27709

Project : COMPUCHEM
Project No.92-38
P.O. NO.
Contact: MARLENE SWIFT
Phone: (800) 833-3984

NE OIL SAMPLE REC'D UNDER CHAIN OF CUSTODY IN 250 ML AMBER GLASS BOTTLE
1) TO BE ANALYZED FOR CL4-CL8 DIOXINS/FURANS (EPA METHOD 8280). OIL MATRIX-
26 DAY TAT. SEE ATTACHED FOR REPORTING REQUIREMENTS.

| W ID. | CC ID. | SAMPLE ID. | DATE/TIME SAMPLED | | ANALYSIS | MATRIX | CONT. |
|---|---|---|---|---|---|---|---|
| 412 | 485803 | LS-4-23/<br>R1/C1 | 3/26/92 | 14:10 | 8280 | OIL | 1BTL |

SAMPLE (S) WILL BE HELD 30 DAYS UNLESS LONGER TIME IS ARRANGED

SUSAN GILBERT

008814905 746
Airborne Exp.

5

**Nº 022888**

COMPUCHEM LABORATORIES

# CHAIN-OF-CUSTODY RECORD

CW

PROJECT NAME: Compuchem

PROJECT NUMBER: CW# 92-38

SAMPLERS (SIGNATURE)
MTB 3/30/92
~~25~~ 24105

PRINTED NAME

| CLIENT ID (9 CHARACTERS) | | | | | | | | | # | GC/MS | | | | | GC | | | | | | | INORGANICS | | | | OTHER | | | | | | | | | | | SAMPLING INFO | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | No. of Bottles/Vials | 624-8240 | 625-8270 | TCL-VOA | TCL-SVOA | Other: | 601-8010 | 602-8020 | 608-8080 | 8140 | TCL PEST/PCB's | Herbicides | Other: | Metals | Cyanide | TAL Metals | Other: | TOC | TOX | Oil & Grease | Pet. Hydro. | Phenols | Dioxin | | | | | MATRIX: Water/Soil | DATE<br>3/30/92 | TIME | |
| L | S | 4 | 2 | 3 | R | 1 | C | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | | 485803 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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SAMPLES REC'D IN GOOD CONDITION
NO LEAKAGE OR BREAKAGE

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| RELINQUISHED BY: Mark E Bagg | Date/Time<br>3/30/92<br>2:30pm | RELINQUISHED BY: | Date/Time | RELINQUISHED BY: | Date/Time | SHIPPING INFORMATION | |
| COMPANY NAME: Compuchem | | COMPANY NAME: | | COMPANY NAME: | | Number of Shipping Containers- 1 | |
| RECEIVED BY: SUSAN GILBERT<br>Susan Gilbert | Date/Time<br>3/31/92<br>09:15 | RECEIVED BY: | Date/Time | RECEIVED BY: | Date/Time | Method of Shipment | |
| COMPANY NAME: CHEMWEST LAB | | COMPANY NAME: | | COMPANY NAME: | | | |
| RELINQUISHED BY: | Date/Time | RELINQUISHED BY: | Date/Time | RELINQUISHED BY: | Date/Time | Special Handling Requirements | |
| COMPANY NAM | | COMPANY NAME: | | OMPANY NAME: | | | |

# SUBCONTRACT ANALYSIS REQUEST FORM

CLIENT ACCOUNT NO. S00077

ORDER NO. 24105 APPLIES TO REQ(S 600

TO BE SUBCONTRACTED TO: [✓ CHEMWEST,CA] WEBB,NC EC JORDAN,ME NAC,NJ
(circle one)
MARZYN,WI OTHER (indicate)

| ID | CCN(1) | ANALYSIS | METHOD(2) | QA/QC(2) | DET.LIMIT(2) | HOLD TIME |
|---|---|---|---|---|---|---|
| LS423RICI | 485803 | Dioxin/Furans | 8280 | Case I.D. | std. | None |

SPECIAL INSTRUCTIONS * Oil Matrix Caution / Handle w/ Care!!

ATT: Vince Schuth ARE SAMPLES INVOLVED IN LITIGATION [✓ YES] NO
(contact at subcontract lab) (circle one)

TURNAROUND REQ'D 26 REPORTING REQUIREMENTS(3) See Attach Copy!!

(1)TO BE FILLED OUT BY RECEIVING
(2)IF PREFERRED OR KNOWN
(3)IF OTHER THAN STYLE "1"

# SECTION 2

# FORM-(n) SUMMARY REPORTS

## FORM 1 - QUANTITATION REPORT

PAGE 1 of 2
DATE: 04/20/92
LABORATORY: ChemWest

Ticket# CW-9412
Project Name: General Electric Company

TOTAL ANALYTE QUANTITY FOUND
(ppb or ng/g)

| CLIENT ID. | CW# | SAMPLE SIZE | GC/MS DATE | GC/MS TIME | INST. ID. | 2378 TCDD | TCDD | PeCDD | HxCDD | HpCDD | OCDD | 2378 TCDF | TCDF | PeCDF | HxCDF | HpCDF | OCD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Method Blank | 9412-MB | 1.0 G | 04/13/92 | 10:03 | CW-2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Detection Limit | | | | | | 0.11 | 0.11 | 0.14 | 0.28 | 0.30 | 0.49 | 0.065 | 0.31 | 0.085 | 0.18 | 0.24 | 0.3 |
| MBS | 9412-MBS | 1.0 G | 04/13/92 | 10:45 | CW-2 | 91.6 | 91.6 | 93.0 | 288 | 88.7 | 92.1 | 90.9 | 90.9 | 183 | 355 | 178 | 10 |
| Detection Limit | | | | | | | | | | | | | | | | | |
| MBSD | 9412-MBSD | 1.0 G | 04/13/92 | 11:28 | CW-2 | 88.5 | 88.5 | 92.4 | 284 | 88.2 | 90.8 | 87.4 | 87.4 | 182 | 346 | 174 | 10 |
| Detection Limit | | | | | | | | | | | | | | | | | |
| LS-4-23/R1/C1 // 485803 | 9412-A | 1.02 G | 04/13/92 | 12:13 | CW-2 | ND | ND | ND | 34.6 | 84.8 | 619 | ND | aND | aND | 72.7 | 88.5 | 120 |
| Detection Limit | | | | | | 43.0 | 43.0 | 9.1 | | | | 34.6 | 41.4 | 27.4 | | | |
| LS-4-23/R1/C1 // 485803 | 9412-B | 0.11 G | 04/13/92 | 13:23 | CW-2 | ND | ND | ND | 40.9 | 103 | 712 | ND | aND | 163 | 466 | 272 | 21 |
| Detection Limit | | | | | | 4.8 | 4.8 | 4.8 | | | | 4.7 | 6.7 | | | | |

a = MAXIMUM POSSIBLE CONCENTRATION

*C-TCDD: Carbon 13 labeled 2,3,7,8-tetrachlorodibenzodioxin (12 carbons)

*C-TCDF: Carbon 13 labeled 2,3,7,8-tetrachlorodibenzofuran (12 carbons)

*C-OCDD: Carbon 13 labeled octachlorodibenzodioxin (12 carbons)

Approved by:____________

FORM 1 - QUANTITATION REPORT

PAGE 2 of 2
DATE: 04/20/92
LABORATORY: ChemWest

Ticket# CW-9412
Project Name: General Electric Company

| CLIENT ID. | CW# | GC/MS DATE | GC/MS TIME | INST. ID. | ABSOLUTE % RECOVERY of INTERNAL STANDARDS | | | | | | | SURROGATE % ACCURACY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *C-TCDD | *C-PeCDD | *C-HxCDD | *C-HpCDD | *C-OCDD | *C-TCDF | *C-PeCDF | *Cl-TCDD | *C-HxCDD | *C-HpCDF |
| Method Blank | 9412-MB | 04/13/92 | 10:03 | CW-2 | 81.9 | 90.6 | 101 | 93.8 | 82.7 | 77.4 | 89.0 | 98.6 | 99.2 | 98.3 |
| Detection Limit | | | | | | | | | | | | | | |
| MBS | 9412-MBS | 04/13/92 | 10:45 | CW-2 | 88.2 | 100 | 109 | 101 | 86.7 | 80.0 | 96.2 | 98.7 | 99.6 | 97.4 |
| Detection Limit | | | | | | | | | | | | | | |
| MBSD | 9412-MBSD | 04/13/92 | 11:28 | CW-2 | 85.0 | 98.8 | 109 | 99.4 | 81.9 | 76.5 | 92.9 | 98.2 | 99.5 | 96.5 |
| Detection Limit | | | | | | | | | | | | | | |
| LS-4-23/R1/C1 // 485803 | 9412-A | 04/13/92 | 12:13 | CW-2 | 0.94 | 5.4 | 26.5 | 59.2 | 65.8 | 1.1 | 5.6 | 213 | 173 | 8.9 |
| Detection Limit | | | | | | | | | | | | | | |
| LS-4-23/R1/C1 // 485803 | 9412-B | 04/13/92 | 13:23 | CW-2 | 26.7 | 73.7 | 104 | 107 | 85.1 | 10.6 | 73.6 | 101 | 107 | 93.0 |
| Detection Limit | | | | | | | | | | | | | | |

INTERNAL STANDARDS
*C-TCDD = 13C12-2378-TCDD
*C-PeCDD = 13C12-12378-PeCDD
*C-HxCDD = 13C12-123678-HxCDD
*C-HpCDD = 13C12-1234678-HpCDD
*C-TCDF = 13C12-2378-TCDF

SURROGATES
*Cl-TCDD = 37CL4-2378-TCDD
*C-HxCDD = 13C12-123789-HxCDD
*C-PeCDF = 13C12-12378-PeCDF
*C-HPCDF = 13C12-1234678-HpCDF

Approved by:____________

FORM 1 - QUANTITATION REPORT

PAGE 1 of 2
DATE: 04/20/92
LABORATORY: ChemWest

Ticket# CW-9412
Project Name: General Electric Company

TOTAL ANALYTE QUANTITY FOUND
(ppb or ng/g)

| CLIENT ID. | CW# | SAMPLE SIZE | GC/MS DATE | GC/MS TIME | INST. ID. | 2378 TCDD | TCDD | PeCDD | HxCDD | HpCDD | OCDD | 2378 TCDF | TCDF | PeCDF | HxCDF | HpCDF | OCDF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LS-4-23/R1/C1 // 485803 MS | 9412-BMS | 0.11 G | 04/13/92 | 14:07 | CW-2 | 787 | 787 | 840 | 2700 | 903 | 1570 | 780 | 862 | 1670 | 3880 | 1930 | 1190 |
| Detection Limit | | | | | | | | | | | | | | | | | |
| LS-4-23/R1/C1 // 485803 MSD | 9412-BMSD | 0.12 G | 04/13/92 | 14:50 | CW-2 | 767 | 767 | 792 | 2490 | 843 | 1350 | 746 | 793 | 1610 | 3440 | 1720 | 1070 |
| Detection Limit | | | | | | | | | | | | | | | | | |

@ = MAXIMUM POSSIBLE CONCENTRATION

*C-TCDD: Carbon 13 labeled 2,3,7,8-tetrachlorodibenzodioxin (12 carbons)

*C-TCDF: Carbon 13 labeled 2,3,7,8-tetrachlorodibenzofuran (12 carbons)

*C-OCDD: Carbon 13 labeled octachlorodibenzodioxin (12 carbons)

Approved by:______________

# FORM 1 - QUANTITATION REPORT

PAGE 2 of 2
DATE: 04/20/92
LABORATORY: ChemWest

Ticket# CW-9412
Project Name: General Electric Company

| | | | | | ABSOLUTE % RECOVERY of INTERNAL STANDARDS | | | | | | | SURROGATE % ACCURACY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLIENT ID. | CW# | GC/MS DATE | GC/MS TIME | INST. ID. | *C-TCDD | *C-PeCDD | *C-HxCDD | *C-HpCDD | *C-OCDD | *C-TCDF | *C-PeCDF | *Cl-TCDD | *C-HxCDD | *C-HpCDF |
| LS-4-23/R1/C1 // | 485809412-BMS | 04/13/92 | 14:07 | CW-2 | 19.2 | 68.8 | 104 | 105 | 86.6 | 7.7 | 65.8 | 101 | 103 | 95.4 |
| Detection Limit | | | | | | | | | | | | | | |
| LS-4-23/R1/C1 // | 485809412-BMSD | 04/13/92 | 14:50 | CW-2 | 27.6 | 85.4 | 110 | 107 | 94.3 | 12.0 | 82.9 | 98.4 | 100 | 97.9 |
| Detection Limit | | | | | | | | | | | | | | |

INTERNAL STANDARDS
*C-TCDD = 13C12-2378-TCDD
*C-PeCDD = 13C12-12378-PeCDD
*C-HxCDD = 13C12-123678-HxCDD
*C-HpCDD = 13C12-1234678-HpCDD
*C-TCDF = 13C12-2378-TCDF

SURROGATES
*Cl-TCDD = 37CL4-2378-TCDD
*C-HxCDD = 13C12-123789-HxCDD
*C-PeCDF = 13C12-12378-PeCDF
*C-HPCDF = 13C12-1234678-HpCDF

Approved by:________________

# FORM 2 - MULTIPOINT CALIBRATION SUMMARY

|  |  |  |  | TARGET COMPOUND RESPONSE FACTORS |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INST. | DATE | TIME | STD. ID. | TCDD | PeCDD | HxCDD | HpCDD | OCDD | TCDF | PeCDF | HxCDF | HpCDF | OCDF |
| CW-2 | 04/03/92 | 15:12 | 200 | 1.188 | 1.161 | 1.039 | 1.159 | 1.440 | 1.232 | 1.239 | 1.804 | 1.702 | 1.535 |
| CW-2 | 04/03/92 | 13:45 | 500 | 1.098 | 1.083 | 0.983 | 1.051 | 1.306 | 1.118 | 1.178 | 1.648 | 1.579 | 1.463 |
| CW-2 | 04/03/92 | 15:53 | 1000 | 1.145 | 1.096 | 1.011 | 1.076 | 1.335 | 1.154 | 1.199 | 1.680 | 1.584 | 1.567 |
| CW-2 | 04/03/92 | 16:33 | 2000 | 1.092 | 1.071 | 1.043 | 1.038 | 1.315 | 1.224 | 1.161 | 1.670 | 1.517 | 1.592 |
| CW-2 | 04/03/92 | 17:14 | 5000 | 1.106 | 1.085 | 1.086 | 1.029 | 1.310 | 1.110 | 1.146 | 1.655 | 1.476 | 1.652 |
| MEAN RESPONSE FACTORS |  |  |  | 1.126 | 1.099 | 1.032 | 1.071 | 1.341 | 1.168 | 1.185 | 1.691 | 1.572 | 1.562 |
| STANDARD DEVIATION |  |  |  | 0.040 | 0.036 | 0.038 | 0.052 | 0.056 | 0.058 | 0.036 | 0.064 | 0.086 | 0.070 |
| RSD |  |  |  | 3.59 | 3.24 | 3.73 | 4.90 | 4.20 | 4.94 | 3.06 | 3.79 | 5.45 | 4.48 |

|  | SHIFT STANDARD COMPOUNDS * | CONCENTRATION (ng/mL) |
|---|---|---|
| SD 200 | 2,3,7,8-TCDD, 2,3,7,8-TCDF . . . . . . . . . . . . . . . . . | 200 |
| SD 500 | 1,2,3,7,8-PeCDD, 1,2,3,7,8-PeCDF . . . . . . . . . . . . . . | 500 |
| SD 1000 | 1,2,3,4,7,8-HxCDD, 1,2,3,4,7,8-HxCDF . . . . . . . . . . . . | 1000 |
| SD 2000 | 1,2,3,4,6,7,8-HpCDD, 1,2,3,4,6,7,8-HpCDF . . . . . . . . . . | 2000 |
| SD 5000 | 1,2,3,4,6,7,8,9-OCDD, 1,2,3,4,6,7,8,9-OCDF . . . . . . . . . | 5000 |

* ALL COMPOUNDS ARE IN EACH STANDARD

Approved by:____________

CHEMWEST ANALYTICAL LABORATORIES INC.

# FORM 2 - MULTIPOINT CALIBRATION SUMMARY

|  |  |  |  | INTERNAL STANDARD RESPONSE FACTORS |  |  |  |  |  |  | SURROGATE RESPONSE FACTORS |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INST. | DATE | TIME | STD. ID. | *C-TCDD | *C-PeCDD | *C-HxCDD | *C-HpCDD | *C-OCDD | *C-TCDF | *C-PeCDF | *Cl-TCDD | *C-HxCDD | *C-HpCDF |
| CW-2 | 04/03/92 | 15:12 | 200 | 1.084 | 0.783 | 0.580 | 0.440 | 0.304 | 1.709 | 1.205 | 1.060 | 1.118 | 1.463 |
| CW-2 | 04/03/92 | 13:45 | 500 | 1.091 | 0.787 | 0.580 | 0.424 | 0.291 | 1.715 | 1.207 | 1.066 | 1.117 | 1.485 |
| CW-2 | 04/03/92 | 15:53 | 1000 | 1.096 | 0.815 | 0.606 | 0.463 | 0.320 | 1.748 | 1.224 | 1.077 | 1.114 | 1.451 |
| CW-2 | 04/03/92 | 16:33 | 2000 | 1.099 | 0.803 | 0.611 | 0.461 | 0.296 | 1.715 | 1.196 | 1.078 | 1.109 | 1.448 |
| CW-2 | 04/03/92 | 17:14 | 5000 | 1.111 | 0.773 | 0.583 | 0.464 | 0.312 | 1.736 | 1.178 | 1.073 | 1.105 | 1.388 |
| MEAN RESPONSE FACTORS |  |  |  | 1.096 | 0.792 | 0.592 | 0.450 | 0.305 | 1.725 | 1.202 | 1.071 | 1.113 | 1.447 |
| STANDARD DEVIATION |  |  |  | 0.010 | 0.017 | 0.015 | 0.018 | 0.012 | 0.017 | 0.017 | 0.008 | 0.006 | 0.036 |
| RSD |  |  |  | 0.92 | 2.11 | 2.57 | 3.94 | 3.85 | 0.96 | 1.40 | 0.72 | 0.49 | 2.49 |

| SD ID | INTERNAL STANDARDS | CONCENTRATION (ng/mL) |
|---|---|---|
| *C-TCDD | *13C12-2,3,7,8-TCDD . . . . . . . . . . . . . . | 500 |
| *C-PeCDD | *13C12-1,2,3,7,8-PeCDD . . . . . . . . . . . . . | 500 |
| *C-HxCDD | *13C12-1,2,3,6,7,8-HxCDD . . . . . . . . . . . . | 500 |
| *C-HpCDD | *13C12-1,2,3,4,6,7,8-HpCDD . . . . . . . . . . . | 500 |
| *C-OCDD | *13C12-1,2,3,4,6,7,8,9-OCDD. . . . . . . . . . . | 2000 |
| *C-TCDF | *13C12-2,3,7,8-TCDF . . . . . . . . . . . . . . | 500 |

| SD ID | SURROGATE |  |
|---|---|---|
| *Cl-TCDD | *37CL4-2,3,7,8-TCDD . . . . . . . . . . . . . . | 500 |
| *C-HxCDD | *13C12-1,2,3,7,8,9-HxCDD . . . . . . . . . . . . | 500 |
| *C-PeCDF | *13C12-1,2,3,7,8-PeCDF . . . . . . . . . . . . . | 500 |
| *C-HPCDF | *13C12-1,2,3,4,6,7,8-HpCDF . . . . . . . . . . . | 500 |

Approved by:

CHEMWEST ANALYTICAL LABORATORIES INC.

# FORM 3 - CONTINUING CALIBRATION SUMMARY

nitial Calibration Curve - Mean RRF's
CW-2

SHIFT STANDARD COMPOUNDS

| DATE | TCDD | PeCDD | HxCDD | HpCDD | OCDD | TCDF | PeCDF | HxCDF | HpCDF | OCDF |
|---|---|---|---|---|---|---|---|---|---|---|
| /03/92 | 1.13 | 1.10 | 1.03 | 1.07 | 1.34 | 1.15 | 1.18 | 1.59 | 1.57 | 1.56 |

| *C-TCDD | *C-PeCDD | *C-HxCDD | *C-HpCDD | *C-OCDD | *C-TCDF | *C-PeCDF | *Cl-TCDD | *C-HxCDD | *C-HpCDF |
|---|---|---|---|---|---|---|---|---|---|
| 1.10 | 0.79 | 0.59 | 0.45 | 0.30 | 1.72 | 1.20 | 1.07 | 1.11 | 1.45 |

ily Calibration - RRF's

SHIFT STANDARD COMPOUNDS

| DATE | TIME | SD 500 | TCDD | PeCDD | HxCDD | HpCDD | OCDD | TCDF | PeCDF | HxCDF | HpCDF | OCDF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| /13/92 | 08:34 | RF | 1.10 | 1.09 | 0.97 | 1.05 | 1.33 | 1.09 | 1.19 | 1.79 | 1.53 | 1.41 |
| | | %DIF. | 1.9 | 0.47 | 6.4 | 2.4 | 0.76 | 4.9 | 0.12 | 5.8 | 2.5 | 10.0 |

| SD 500 | *C-TCDD | *C-PeCDD | *C-HxCDD | *C-HpCDD | *C-OCDD | *C-TCDF | *C-PeCDF | *Cl-TCDD | *C-HxCDD | *C-HpCDF |
|---|---|---|---|---|---|---|---|---|---|---|
| RF | 1.08 | 0.75 | 0.57 | 0.40 | 0.29 | 1.66 | 1.13 | 1.06 | 1.12 | 1.55 |
| %DIF. | 1.2 | 6.0 | 3.7 | 11.4 | 6.1 | 4.0 | 6.2 | 1.5 | 1.0 | 7.3 |

Daily Calibration - RRF's

SHIFT STANDARD COMPOUNDS

| DATE | TIME | SD 500 | TCDD | PeCDD | HxCDD | HpCDD | OCDD | TCDF | PeCDF | HxCDF | HpCDF | OCDF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 04/13/92 | 16:22 | RF | 1.06 | 1.07 | 0.97 | 1.02 | 1.30 | 1.07 | 1.15 | 1.60 | 1.46 | 1.54 |
| | | %DIF. | 5.4 | 2.3 | 5.7 | 4.3 | 2.8 | 6.4 | 2.9 | 5.2 | 7.4 | 1.3 |

| SD 500 | *C-TCDD | *C-PeCDD | *C-HxCDD | *C-HpCDD | *C-OCDD | *C-TCDF | *C-PeCDF | *Cl-TCDD | *C-HxCDD | *C-HpCDF |
|---|---|---|---|---|---|---|---|---|---|---|
| RF | 1.10 | 0.88 | 0.69 | 0.53 | 0.37 | 1.65 | 1.30 | 1.05 | 1.11 | 1.42 |
| %DIF. | 0.24 | 11.1 | 16.6 | 17.2 | 20.8 | 4.4 | 7.9 | 2.1 | 0.11 | 1.9 |

proved by:__________

## FORM 4 - QUALITY CONTROL REPORT

## METHOD BLANK SPIKE/METHOD BLANK SPIKE DUPLICATE

CLIENT ID: MB/MBS/MBSD
CW# : 9412-MB/-MBS/-MBSD

| COMPOUND | SAMPLE AMT ng/g | SAMPLE DL ng/g | AMOUNT MBS ng/g | AMOUNT MBSD ng/g | % REC MBS | % REC MBSD | RPD (%) |
|---|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | ND | 0.11 | 91.6 | 88.5 | 92 | 88 | 4.4 |
| 1,2,3,7,8-PeCDD | ND | 0.14 | 93.0 | 92.4 | 93 | 92 | 1.1 |
| 1,2,3,4,7,8-HxCDD | ND | 0.23 | 92.0 | 94.1 | 92 | 94 | 2.2 |
| 1,2,3,6,7,8-HxCDD | ND | 0.23 | 97.6 | 92.5 | 98 | 92 | 6.3 |
| 1,2,3,7,8,9-HxCDD | ND | 0.23 | 98.2 | 97.1 | 98 | 97 | 1.0 |
| 1,2,3,4,6,7,8-HpCDD | ND | 0.30 | 88.7 | 88.2 | 89 | 88 | 1.1 |
| 1,2,3,4,6,7,8,9-OCDD | ND | 0.49 | 92.1 | 90.8 | 92 | 91 | 1.1 |
| 2,3,7,8-TCDF | ND | 0.065 | 90.9 | 87.4 | 91 | 87 | 4.5 |
| 1,2,3,7,8-PeCDF | ND | 0.084 | 92.9 | 93.1 | 93 | 93 | 0.0 |
| 2,3,4,7,8-PeCDF | ND | 0.085 | 90.4 | 89.4 | 90 | 89 | 1.1 |
| 1,2,3,4,7,8-HxCDF | ND | 0.18 | 90.0 | 90.2 | 90 | 90 | 0.0 |
| 1,2,3,6,7,8-HxCDF | ND | 0.18 | 96.5 | 91.6 | 96 | 92 | 4.3 |
| 2,3,4,6,7,8-HxCDF | ND | 0.18 | 86.0 | 83.3 | 86 | 83 | 3.6 |
| 1,2,3,7,8,9-HxCDF | ND | 0.18 | 83.0 | 81.4 | 83 | 81 | 2.4 |
| 1,2,3,4,6,7,8-HpCDF | ND | 0.19 | 86.9 | 85.6 | 87 | 86 | 1.2 |
| 1,2,3,4,7,8,9-HpCDF | ND | 0.24 | 90.8 | 88.0 | 91 | 88 | 3.4 |
| 1,2,3,4,6,7,8,9-OCDF | ND | 0.39 | 107 | 107 | 107 | 107 | 0.0 |

MBS/MBSD 100% recovery = 1.0 ng/g

Approved By: ______________

ND = Not detected

# FORM 4 - QUALITY CONTROL REPORT

## MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

CLIENT ID: LS-4-23/R1/C1 // 485803
CW# : 9412-B/-BMS/-BMSD

| COMPOUND | SAMPLE<br>AMT<br>ng/g | DL<br>ng/g | AMOUNT<br>MS<br>ng/g | AMOUNT<br>MSD<br>ng/g | % REC<br>MS | % REC<br>MSD | RPD (%) |
|---|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | ND | 4.8 | 787 | 767 | 87 | 93 | 2.3 |
| 1,2,3,7,8-PeCDD | ND | 4.8 | 840 | 783 | 92 | 94 | 2.2 |
| 1,2,3,4,7,8-HxCDD | @ND | 2.6 | 855 | 834 | 94 | 100 | 6.2 |
| 1,2,3,6,7,8-HxCDD | ND | 2.6 | 884 | 789 | 97 | 95 | 2.1 |
| 1,2,3,7,8,9-HxCDD | @ND | 3.9 | 921 | 837 | 101 | 100 | 1.0 |
| 1,2,3,4,6,7,8-HpCDD | 58.8 | --- | 852 | 802 | 87 | 89 | 2.3 |
| 1,2,3,4,6,7,8,9-OCDD | 712 | --- | 1570 | 1350 | 95 | 76 | 22.2 |
| 2,3,7,8-TCDF | ND | 4.7 | 780 | 746 | 86 | 90 | 4.5 |
| 1,2,3,7,8-PeCDF | 4.3 | --- | 858 | 783 | 94 | 93 | 1.1 |
| 2,3,4,7,8-PeCDF | 6.9 | --- | 687 | 674 | 75 | 80 | 6.5 |
| 1,2,3,4,7,8-HxCDF | 162 | --- | 992 | 932 | 91 | 92 | 1.1 |
| 1,2,3,6,7,8-HxCDF | 57.5 | --- | 935 | 848 | 96 | 95 | 1.0 |
| 1,2,3,7,8,9-HxCDF | 33.8 | --- | 820 | 766 | 86 | 88 | 2.3 |
| 2,3,4,6,7,8-HxCDF | 26.7 | --- | 809 | 728 | 86 | 84 | 2.4 |
| 1,2,3,4,6,7,8-HpCDF | 88.9 | --- | 960 | 816 | 97 | 87 | 10.9 |
| 1,2,3,4,7,8,9-HpCDF | 64.6 | --- | 841 | 797 | 85 | 88 | 3.5 |
| 1,2,3,4,6,7,8,9-OCDF | 213 | --- | 1190 | 1070 | 108 | 103 | 4.7 |

MS 100% = 909 ng/g　　MSD 100% = 833 ng/g

Approved By: ____________________

ND = Not detected

@ND = MPC (maximum possible concentration)

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# ALPHA ANALYTICAL LABORATORIES

Eight Walkup Drive
Westborough, Massachusetts 01581-1019
(508) 898-9220

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006

## CERTIFICATE OF ANALYSIS

**Client:** General Electric

**Address:** 100 Woodlawn Avenue
Pittsfield, MA 01201

**Attn:** William Fessler

**Client Designation:** Project# EL92094V

**Laboratory Job Number:** 9202138

**Invoice Number:** 29103

**Date Received:** 03/27/92

**Date Reported:** 04/20/92

**Delivery Method:** Alpha Courier

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| ALPHA SAMPLE NUMBER | CLIENT IDENTIFICATION | SAMPLE LOCATION |
|---|---|---|
| 9202138.1 | LS-4-23/R1/C1 | N/A |
| 9202138.2 | Trip blank | N/A |

Authorized by:
Scott McLean - Laboratory Director

cp

# ALPHA ANALYTICAL LABORATORIES
# CERTIFICATE OF ANALYSIS

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006

**Laboratory Sample Number:** 9202138.1 **Date Received:** 03/27/92

**Sample Matrix:** Oil **Date Reported:** 04/20/92

**Condition of Samples:** Satisfactory **Field Prep:** None

**Number & Type of Containers:** One glass bottle & two VOA vials

**Analysis Requested:** Analysis as listed below

| PARAMETER | RESULT | UNITS | MDL | REF* | METHOD | DATES EXT/PREP | DATES ANALYSIS |
|---|---|---|---|---|---|---|---|
| Total Metals Preperation | -- | --- | -- | 1 | 3005 | 04/09/92 | -------- |
| Antimony | ND | mg/Kg | 2.5 | 1 | 6010 | --- | 04/07/92 |
| Arsenic | 6.9 | mg/Kg | 0.25 | 1 | 7060 | --- | 04/07/92 |
| Barium | 8.9 | mg/Kg | 0.49 | 1 | 6010 | --- | 04/07/92 |
| Beryllium | ND | mg/Kg | 0.10 | 1 | 6010 | --- | 04/07/92 |
| Cadmium | ND | mg/Kg | 0.20 | 1 | 6010 | --- | 04/07/92 |
| Chromium | 9.4 | mg/Kg | 0.49 | 1 | 6010 | --- | 04/07/92 |
| Cobalt | ND | mg/Kg | 0.49 | 1 | 6010 | --- | 04/07/92 |
| Copper | 19.2 | mg/Kg | 0.44 | 1 | 6010 | --- | 04/07/92 |
| Lead | 10.6 | mg/Kg | 0.01 | 1 | 7421 | --- | 04/07/92 |
| Mercury | ND | mg/Kg | 0.10 | 1 | 7470 | --- | 04/07/92 |
| Nickel | ND | mg/Kg | 1.2 | 1 | 6010 | --- | 04/07/92 |
| Selenium | ND | mg/Kg | 2.5 | 1 | 7740 | --- | 04/07/92 |
| Silver | ND | mg/Kg | 0.39 | 1 | 6010 | --- | 04/07/92 |
| Thallium | ND | mg/Kg | 0.25 | 1 | 7840 | --- | 04/07/92 |
| Tin | 36.0 | mg/Kg | 2.4 | 1 | 6010 | --- | 04/07/92 |
| Vanadium | 2.9 | mg/Kg | 0.54 | 1 | 6010 | --- | 04/07/92 |
| Zinc | ND | mg/Kg | 0.30 | 1 | 6010 | --- | 04/07/92 |
| Total Cyanide | ND | mg/Kg | 0.05 | 3 | 4500-CN-CE | --- | 04/08/92 |
| Sulfide | ND | mg/Kg | 0.8 | 3 | 4500-$S^{2}$-E | --- | 04/17/92 |
| Non-Halogenated Volatile Organics | | | | | | | |
| Acrylamide | ND | ug/Kg | 40,000 | 1 | 8015 | --- | 04/04/92 |
| Diethyl ether | ND | ug/Kg | 4,000 | 1 | 8015 | --- | 04/04/92 |
| Ethanol | ND | ug/Kg | 40,000 | 1 | 8015 | --- | 04/04/92 |
| Methyl ethyl ketone | ND | ug/Kg | 2,000 | 1 | 8015 | --- | 04/04/92 |
| Methyl isobutylketone | ND | ug/Kg | 2,000 | 1 | 8015 | --- | 04/04/92 |
| Acetone | ND | ug/Kg | 2,000 | 1 | 8015 | --- | 04/04/92 |
| Paraldehyde | ND | ug/Kg | 2,000 | 1 | 8015 | --- | 04/04/92 |
| 1,4-Dioxane | ND | ug/Kg | 2,000 | 1 | 8015 | --- | 04/04/92 |
| Iso-butanol | ND | ug/Kg | 2,000 | 1 | 8015 | --- | 04/04/92 |

COMMENTS: * Complete list of References found in Addendum I

# ALPHA ANALYTICAL LABORATORIES
# CERTIFICATE OF ANALYSIS

**MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006**

**Laboratory Sample Number:** 9202138.1 **Date Received:** 03/27/92

**Sample Matrix:** Oil **Date Reported:** 04/20/92

**Condition of Samples:** Satisfactory **Field Prep:** None

**Number & Type of Containers:** One glass bottle & two VOA vials

**Analysis Requested:** Analysis as listed below

**CONTINUED**

| PARAMETER | RESULT | UNITS | MDL | REF* | METHOD | DATES | |
|---|---|---|---|---|---|---|---|
| | | | | | | EXT/PREP | ANALYSIS |
| Acrolein | ND | ug/Kg | 2,000 | 1 | 8030 | --- | 04/04/92 |
| Acrylonitrile | ND | ug/Kg | 2,000 | 1 | 8030 | --- | 04/04/92 |
| Acetonitrile | ND | ug/Kg | 2,000 | 1 | 8030 | --- | 04/04/92 |
| Acid/Base/Neutral Extractables *** | | | | | | | |
| Acenaphthene | 1,800,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| 1,2,4-Trichlorobenzene | 1,280,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| 1,4-Dichlorobenzene | 1,200,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| Fluoranthene | 6,200,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| Di-n-butylphthalate | 3,180,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| Benzo(a) anthracene | 1,700,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| Benzo(b) fluoranthene | 1,600,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| Chrysene | 1,600,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| Anthracene | 1,250,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| Fluorene | 2,300,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| Phenanthrene | 6,000,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| Pyrene | 6,600,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| 1-Methyl naphthalene | 3,800,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| Dibenzofuran | 1,000,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| 2-Methyl naphthalene | 2,300,000 | ug/Kg | ** | 1 | 8270 | 04/01/92 | 04/08/92 |
| 1,2-Diphenyl hydrazine | ND | ug/Kg | 1,000,000 | 1 | 8270 | 04/01/92 | 04/08/92 |

COMMENTS:
* Complete list of References found in Addendum I
** A list of acid/base/neutral extractables, pesticides, herbicides & volatile organics analyzed for and their detection limits accompanies this report.
*** All compounds were below the detection limits except those listed above.

# ALPHA ANALYTICAL LABORATORIES
# CERTIFICATE OF ANALYSIS

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006

**Laboratory Sample Number:** 9202138.1 **Date Received:** 03/27/92

**Sample Matrix:** Oil **Date Reported:** 04/20/92

**Condition of Samples:** Satisfactory **Field Prep:** None

**Number & Type of Containers:** One glass bottle & two VOA vials

**Analysis Requested:** Analysis as listed below

**CONTINUED**

| PARAMETER | RESULT | UNITS | MDL | REF* | METHOD | DATES EXT/PREP | DATES ANALYSIS |
|---|---|---|---|---|---|---|---|
| Pesticides *** | ND | mg/Kg | 50,000 | 1 | 8080 | 04/07/92 | 04/14/92 |
| Herbicides *** | ND | mg/Kg | 5.0 | 1 | 8150 | 04/01/92 | 04/08/92 |
| Volatile Organics *** | | | | | | | |
| Carbon tetrachloride | 180,000 | ug/Kg | ** | 1 | 8260 | --- | 04/09/92 |
| Chlorobenzene | 630,000 | ug/Kg | ** | 1 | 8260 | --- | 04/09/92 |
| Ethylbenzene | 11,000 | ug/Kg | ** | 1 | 8260 | --- | 04/09/92 |
| Xylenes | 160,000 | ug/Kg | ** | 1 | 8260 | --- | 04/09/92 |
| Trichloroethene | 15,000 | ug/Kg | ** | 1 | 8260 | --- | 04/09/92 |
| 1,4-Dichlorobenzene | 140,000 | ug/Kg | ** | 1 | 8260 | --- | 04/09/92 |

| Acid/Base/Neutral Extractables | %Surrogate Recovery |
|---|---|
| 2-Fluorophenol | 78% |
| Phenol-d6 | 95% |
| Nitrobenzene-d5 | 113% |
| 2-Fluorobiphenyl | 117% |
| 2,4,6-Tribromophenol | 55% |
| 4-Terphenyl-d14 | 115% |

| Volatile Organics | %Surrogate Recovery |
|---|---|
| 1,2-Dichloroethane-d4 | 103% |
| Toluene-d8 | 101% |
| 4-Bromofluorobenzene | 100% |

COMMENTS: * Complete list of References found in Addendum I

** A list of acid/base/neutral extractables, pesticides, herbicides & volatile organics analyzed for and their detection limits accompanies this report.

*** All compounds were below the detection limits except those listed above.

# ALPHA ANALYTICAL LABORATORIES
## CERTIFICATE OF ANALYSIS

**MA 086  NH 198958-A  CT PH-0574  NY 11148  NC 320  SC 88006**

**Laboratory Sample Number:** 9202138.2    **Date Received:** 03/27/92

**Sample Matrix:** Liquid    **Date Reported:** 04/20/92

**Condition of Samples:** Satisfactory    **Field Prep:** None

**Number & Type of Containers:** One VOA vial

**Analysis Requested:** Analysis as listed below

| PARAMETER | RESULT | UNITS | MDL | REF* | METHOD | DATES EXT/PREP | DATES ANALYSIS |
|---|---|---|---|---|---|---|---|
| Volatile Organics *** | | | | | | | |
| Chloroform | 52 | ug/L | ** | 1 | 8260 | --- | 04/09/92 |
| Bromodichloromethane | 3.2 | ug/L | ** | 1 | 8260 | --- | 04/09/92 |

| Volatile Organics | %Surrogate Recovery |
|---|---|
| 1,2-Dichloroethane-d4 | 96% |
| Toluene-d8 | 101% |
| 4-Bromofluorobenzene | 99% |

COMMENTS: * Complete list of References found in Addendum I

** A list of volatile organics analyzed for and their detection limits accompanies this report.

*** All compounds were below the detection limits except those listed above.

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# ALPHA ANALYTICAL LABS
## ACID EXTRACTABLES ANALYSIS by GC/MS
## METHOD 8270

Alpha Job Number: 9202138 Date Reported: 4/20/92
Alpha Sample Number(s): 9202138.1
Method Detection Limit: 100,000X Higher than stated below in ug/Kg

| COMPOUNDS | |
|---|---|
| 2,4,6-Trichlorophenol | 2.1 ug/L |
| p-Chloro-m-cresol | 3.0 ug/L |
| 2-Chlorophenol | 3.3 ug/L |
| 2,4-Dichlorophenol | 10.0 ug/L |
| 2,4-Dimethylphenol | 2.3 ug/L |
| 2-Nitrophenol | 3.2 ug/L |
| 4-Nitrophenol | 22.0 ug/L |
| 2,4-Dinitrophenol | 12.4 ug/L |
| 4,6-Dinitro-o-cresol | 17.4 ug/L |
| Pentachlorophenol | 9.2 ug/L |
| Phenol | 8.3 ug/L |
| Total cresol | 7.2 ug/L |
| 2,4,5-Trichlorophenol | 2.7 ug/L |
| 2,6-Dichlorophenol | 4.7 ug/L |
| Benzoic acid | 40.0 ug/L |
| Benzyl alcohol | 5.8 ug/L |

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## ALPHA ANALYTICAL LABS
## BASE/NEUTRAL EXTRACTABLES ANALYSIS by GC/MS
## METHOD 8270
## CONTINUED

Alpha Job Number: 9202138 Date Reported: 4/20/92
Alpha Sample Number(s): 9202138.1
Method Detection Limit: 100,000X Higher than stated below in ug/Kg

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| COMPOUNDS | |
|---|---|
| Phenanthrene | 2.6 ug/L |
| Dibenzo(a,h)anthracene | 4.9 ug/L |
| Indeno(1,2,3-cd)pyrene | 4.7 ug/L |
| Pyrene | 2.8 ug/L |
| Aniline | 5.5 ug/L |
| 4-Chloroaniline | 4.5 ug/L |
| 1-Methyl naphthalene | 7.0 ug/L |
| 2-Nitro aniline | 3.2 ug/L |
| 3-Nitro aniline | 6.0 ug/L |
| 4-Nitro aniline | 5.8 ug/L |
| Dibenzofuran | 1.9 ug/L |
| A,A-Dimethylphenethylamine | 45.0 ug/L |
| Hexachloropropene | 20.0 ug/L |
| Nitrosodi-n-butylamine | 4.9 ug/L |
| 2-Methyl naphthalene | 1.8 ug/L |
| Tetrachlorobenzene | 12.4 ug/L |
| Pentachlorobenzene | 12.8 ug/L |
| A-Naphthalamine | 20.0 ug/L |
| B-Naphthalamine | 9.3 ug/L |
| Diphenylamine | 4.1 ug/L |
| Acetophenetitide | 10.0 ug/L |
| Dimethoate | 20.0 ug/L |
| 4-Aminobiphenyl | 10.3 ug/L |
| Pentachloronitrobenzene | 3.9 ug/L |
| Isodrin | 3.8 ug/L |
| P-Dimethylaminoazobenzene | 7.1 ug/L |
| Chlorobenzilate | 16.0 ug/L |
| Bis(2-ethylhexyl)adipate | 3.3 ug/L |
| 3-Methyl cholanthrene | 20.0 ug/L |
| Ethyl methanesulfonate | 14.6 ug/L |
| Acetophenone | 4.7 ug/L |
| Nitrosodipiperidine | 20.0 ug/L |
| 7,12-Dimethylbenzo(a)anthracene | 24.3 ug/L |
| n-Nitrosodimethylamine | 40.0 ug/L |

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# ALPHA ANALYTICAL LABS
## BASE/NEUTRAL EXTRACTABLES ANALYSIS by GC/MS
## METHOD 8270

Alpha Job Number: 9202138 Date Reported: 4/20/92
Alpha Sample Number(s): 9202138.1
Method Detection Limit: 100,000X Higher than stated below in ug/Kg

| COMPOUNDS | |
|---|---|
| Acenaphthene | 2.9 ug/L |
| Benzidine | 24.4 ug/L |
| 1,2,4-Trichlorobenzene | 3.5 ug/L |
| Hexachlorobenzene | 2.9 ug/L |
| Bis(2-chloroethyl)ether | 3.0 ug/L |
| 2-Chloronaphthalene | 3.0 ug/L |
| 1,2-Dichlorobenzene | 2.8 ug/L |
| 1,3-Dichlorobenzene | 3.3 ug/L |
| 1,4-Dichlorobenzene | 2.3 ug/L |
| 3,3-Dichlorobenzidine | 6.5 ug/L |
| 2,4-Dinitrotoluene | 3.7 ug/L |
| 2,6-Dinitrotoluene | 2.8 ug/L |
| Azobenzene | 2.7 ug/L |
| Fluoranthene | 2.9 ug/L |
| 4-Chlorophenyl phenyl ether | 3.0 ug/L |
| 4-Bromophenyl phenyl ether | 2.8 ug/L |
| Bis(2-chloroisopropyl)ether | 2.0 ug/L |
| Bis(2-chloroethoxy)methane | 2.2 ug/L |
| Hexachlorobutadiene | 8.0 ug/L |
| Hexachlorocyclopentadiene | 7.5 ug/L |
| Hexachloroethane | 5.0 ug/L |
| Isophorone | 2.4 ug/L |
| Naphthalene | 2.2 ug/L |
| Nitrobenzene | 1.9 ug/L |
| N-nitrosodiphenylamine/diphenylamine | 2.5 ug/L |
| N-nitrosodi-n-propylamine | 2.6 ug/L |
| Bis(2-ethylhexyl)phthalate | 9.1 ug/L |
| Butyl benzyl phthalate | 3.2 ug/L |
| Di-n-butylphthalate | 2.7 ug/L |
| Di-n-octylphthalate | 2.4 ug/L |
| Diethyl phthalate | 10.0 ug/L |
| Dimethyl phthalate | 9.0 ug/L |
| Benzo(a)anthracene | 3.1 ug/L |
| Benzo(a)pyrene | 3.8 ug/L |
| Benzo(k)fluoranthene | 3.5 ug/L |
| Benzo(b)fluoranthene | 3.5 ug/L |
| Chrysene | 3.1 ug/L |
| Acenaphthylene | 2.6 ug/L |
| Anthracene | 2.5 ug/L |
| Benzo(ghi)perylene | 5.0 ug/L |
| Fluorene | 2.7 ug/L |

## ALPHA ANALYTICAL LABS
## ADDITIONAL APPENDIX 9
## METHOD 8270

Alpha Job Number: 9202138 Date Reported: 4/20/92
Alpha Sample Number(s): 9202138.1
Method Detection Limit: 100,000X Higher than stated below in ug/Kg

COMPOUNDS

| | |
|---|---|
| Pentachloroethane | --- ug/L |
| o-Toluidine | 17.9 ug/L |
| 2-Picoline | 14.2 ug/L |
| Nitrosodiethylamine | 27.8 ug/L |
| Safrole | 2.7 ug/L |
| 1,4-Naphthaquinone | 284.0 ug/L |
| m-Dinitrobenzene | 7.2 ug/L |
| 2-Acetylaminofluorene | 17.2 ug/L |
| 2,3,5,6-Tetrachlorophenol | 4.4 ug/L |
| Phorate | 5.3 ug/L |
| Methyl parathion | 4.2 ug/L |
| Malathion | 172.0 ug/L |
| Parathion | 3.9 ug/L |
| Pronamide | 2.8 ug/L |
| Dinoseb | 8.1 ug/L |
| Pyridine | 24.2 ug/L |
| 3,3' Dimethylbenzidine | 24.0 ug/L |
| Methyl methane sulfonate | 40.0 ug/L |
| n-Nitrosomorpholine | 10.7 ug/L |
| n-Nitrosomethyl ethyl amine | 27.4 ug/L |
| n-Nitrosopyrrolidine | 9.4 ug/L |
| 1,2-Dibromo-3-chloropropane | 7.0 ug/L |
| 0,0,0-Triethyl phosphorothioate | 5.9 ug/L |
| p-Phenylene diamine | 87.0 ug/L |
| Isosafrole | 5.6 ug/L |
| 5-Nitro-o-toluidine | 6.8 ug/L |
| Diallate | 4.1 ug/L |
| 1,3,5-Trinitrobenzene | 7.5 ug/L |
| 4-Nitroquinoline-n-oxide | 4.5 ug/L |
| Disulfoton | 4.2 ug/L |
| Famphur | 2.6 ug/L |
| Kepone | 5.2 ug/L |
| Sulfotepp | 5.1 ug/L |
| Thionazin | 2.5 ug/L |
| Ethyl methacrylate | 9.4 ug/L |
| Aramite | --- ug/L |
| 2,4,5,6-Tetrachlorophenol | --- ug/L |

**ALPHA ANALYTICAL LABS**
VOLATILE ORGANICS ANALYSIS by GC/MS
METHOD 8260

Alpha Job Number: 9202138 Date Reported: 4/20/92
Alpha Sample Number(s): 9202138.1
Method Detection Limit: 5000x higher than stated below

| COMPOUNDS | |
|---|---|
| Methylene chloride | 5 ug/Kg |
| 1,1-Dichloroethane | 2 ug/Kg |
| Chloroform | 2 ug/Kg |
| Carbon tetrachloride | 1 ug/Kg |
| 1,2-Dichloropropane | 4 ug/Kg |
| Dibromochloromethane | 1 ug/Kg |
| 1,1,2-Trichloroethane | 2 ug/Kg |
| 2-Chloroethylvinyl ether | 10 ug/Kg |
| Tetrachloroethene | 2 ug/Kg |
| Chlorobenzene | 4 ug/Kg |
| Trichlorofluoromethane | 5 ug/Kg |
| 1,2-Dichloroethane | 2 ug/Kg |
| 1,1,1-Trichloroethane | 1 ug/Kg |
| Bromodichloromethane | 1 ug/Kg |
| Trans-1,3-Dichloropropene | 2 ug/Kg |
| Cis-1,3-Dichloropropene | 1 ug/Kg |
| Bromoform | 1 ug/Kg |
| 1,1,2,2-Tetrachloroethane | 1 ug/Kg |
| Benzene | 1 ug/Kg |
| Toluene | 2 ug/Kg |
| Ethyl benzene | 1 ug/Kg |
| Xylenes | 1 ug/Kg |
| Chloromethane | 10 ug/Kg |
| Bromomethane | 2 ug/Kg |
| Vinyl chloride | 4 ug/Kg |
| Chloroethane | 2 ug/Kg |
| 1,1-Dichloroethene | 2 ug/Kg |
| Trans-1,2-dichloroethene | 2 ug/Kg |
| Cis-1,2-dichloroethene | 1 ug/Kg |
| Trichloroethene | 1 ug/Kg |
| Dibromomethane | 10 ug/Kg |
| 1,4-Dichloro-2-butane | 10 ug/Kg |
| Ethanol | 25 ug/Kg |
| Iodomethane | 10 ug/Kg |
| 1,2,3-Trichloropropane | 10 ug/Kg |
| Dichlorodifluoromethane | 10 ug/Kg |
| Acetone | 10 ug/Kg |
| Carbon disulfide | 10 ug/Kg |
| 2-Butanone | 5 ug/Kg |
| Vinyl acetate | 10 ug/Kg |
| 4-Methyl-2-pentanone | 10 ug/Kg |
| 2-Hexanone | 10 ug/Kg |

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# ALPHA ANALYTICAL LABS
## VOLATILE ORGANICS ANALYSIS by GC/MS
## METHOD 8260

Alpha Job Number: 9202138 Date Reported: 04/20/92
Alpha Sample Number(s): 9202138.1
Method Detection Limit: 5000x higher than stated below

| COMPOUNDS | |
|---|---|
| Styrene | 1 ug/Kg |
| Ethyl methacrylate | 10 ug/Kg |
| Acrolein | 10 ug/Kg |
| Acrylonitrile | 10 ug/Kg |
| Methyl tert butyl ether | 10 ug/Kg |
| 1,2-Dichlorobenzene | 10 ug/Kg |
| 1,3-Dichlorobenzene | 10 ug/Kg |
| 1,4-Dichlorobenzene | 10 ug/Kg |

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# ALPHA ANALYTICAL LABS
## ADDITIONAL APPENDIX 9
## METHOD 8260

Alpha Job Number: 9202138 Date Reported: 4/20/92
Alpha Sample Number(s): 9202138.1
Method Detection Limit: 5000x higher than stated below in ug/Kg

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| COMPOUNDS | |
|---|---|
| Ethyl ether | 10 ug/L |
| Allylchloride | 10 ug/L |
| Chloropropene | 10 ug/L |
| Propanenitrile | 20 ug/L |
| Methacrylonitrile | 10 ug/L |
| Ethylene dibromide | 10 ug/L |
| 2-Butene, 1,4-Dichloro-(T) | 10 ug/L |
| Pentachloroethane | 10 ug/L |
| Dibromochloropropane | 10 ug/L |
| Methyl methacrylate | 10 ug/L |

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# ALPHA ANALYTICAL LABS
## VOLATILE ORGANICS ANALYSIS by GC/MS
## METHOD 8260

Alpha Job Number: 9202138 Date Reported: 4/20/92
Alpha Sample Number(s): 9202138.2
Method Detection Limit: Stated below

| COMPOUNDS | |
|---|---|
| Methylene chloride | 5.0 ug/L |
| 1,1-Dichloroethane | 1.5 ug/L |
| Chloroform | 1.5 ug/L |
| Carbon tetrachloride | 1.0 ug/L |
| 1,2-Dichloropropane | 3.5 ug/L |
| Dibromochloromethane | 1.0 ug/L |
| 1,1,2-Trichloroethane | 1.5 ug/L |
| 2-Chloroethylvinyl ether | 10.0 ug/L |
| Tetrachloroethene | 1.5 ug/L |
| Chlorobenzene | 3.5 ug/L |
| Trichlorofluoromethane | 5.0 ug/L |
| 1,2-Dichloroethane | 1.5 ug/L |
| 1,1,1-Trichloroethane | 1.0 ug/L |
| Bromodichloromethane | 1.0 ug/L |
| Trans-1,3-Dichloropropene | 1.5 ug/L |
| Cis-1,3-Dichloropropene | 1.0 ug/L |
| Bromoform | 1.0 ug/L |
| 1,1,2,2-Tetrachloroethane | 1.0 ug/L |
| Benzene | 1.0 ug/L |
| Toluene | 1.5 ug/L |
| Ethyl benzene | 1.0 ug/L |
| Xylenes | 1.0 ug/L |
| Chloromethane | 10.0 ug/L |
| Bromomethane | 2.0 ug/L |
| Vinyl chloride | 3.5 ug/L |
| Chloroethane | 2.0 ug/L |
| 1,1-Dichloroethene | 1.5 ug/L |
| Trans-1,2-dichloroethene | 1.5 ug/L |
| Cis-1,2-dichloroethene | 1.0 ug/L |
| Trichloroethene | 1.0 ug/L |
| Dibromomethane | 10.0 ug/L |
| 1,4-Dichloro-2-butane | 10.0 ug/L |
| Ethanol | -- ug/L |
| Iodomethane | -- ug/L |
| 1,2,3-Trichloropropane | 10.0 ug/L |
| Dichlorodifluoromethane | 10.0 ug/L |
| Acetone | 10.0 ug/L |
| Carbon disulfide | 10.0 ug/L |
| 2-Butanone | 4.5 ug/L |
| Vinyl acetate | 10.0 ug/L |
| 4-Methyl-2-pentanone | 10.0 ug/L |
| 2-Hexanone | 10.0 ug/L |

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## ALPHA ANALYTICAL LABS
## VOLATILE ORGANICS ANALYSIS by GC/MS
## METHOD 8260

Alpha Job Number: 9202138 Date Reported: 4/20/92
Alpha Sample Number(s): 9202138.2
Method Detection Limit: Stated below

| COMPOUNDS | |
|---|---|
| Styrene | 1.0 ug/L |
| Ethyl methacrylate | -- ug/L |
| Acrolein | -- ug/L |
| Acrylonitrile | -- ug/L |
| Methyl tert butyl ether | 10.0 ug/L |
| 1,2-Dichlorobenzene | 10.0 ug/L |
| 1,3-Dichlorobenzene | 10.0 ug/L |
| 1,4-Dichlorobenzene | 10.0 ug/L |

**ALPHA ANALYTICAL LABS**
PESTICIDE ANALYSIS by GC
METHOD 608/8080

Alpha Job Number: 9202138 Date Reported: 4/20/92
Alpha Sample Number(s): 9202138.1
Method Detection Limit: 50,000 mg/Kg

---

COMPOUND
--------

Alpha BHC
Lindane (gamma BHC)
Beta BHC
Delta BHC
Heptachlor
Alachlor
Atrazine
Aldrin
Heptachlor epoxide
Endrin
Endrin aldehyde
Endrin ketone
Dieldrin
p,p'-DDE
p,p'-DDD
p,p'-DDT
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Methoxychlor
Chlordane
Toxaphene

# ALPHA ANALYTICAL LABS
## CHLORINATED HERBICIDES ANALYSIS by GC
## METHOD 8150

Alpha Job Number: 9202138 Date Reported: 4/20/92
Alpha Sample Number(s): 9202138.1
Method Detection Limit: 5.0 mg/Kg

---

COMPOUNDS
---------

2,4-D
2,4-DB
2,4,5-T
2,4,5-TP
Dalapon
Diacamba
Dichloroprop
Dinoseb
MCPA
MCPP

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## ALPHA ANALYTICAL LABORATORIES

## ACCEPTABLE SURROGATE SPIKE RECOVERY LIMITS

| FRACTION | SURROGATE COMPOUND | LOW/MEDIUM WATER | LOW/MEDIUM SOIL/SEDIMENT |
|---|---|---|---|
| VOA | Toluene-$d_8$ | 88-110 % | 81-117 % |
| VOA | 4-Bromofluorobenzene | 86-115 % | 74-121 % |
| VOA | 1,2-Dichloroethane-$d_4$ | 76-114 % | 70-121 % |
| BNA | Nitrobenzene-$d_5$ | 35-114 % | 23-120 % |
| BNA | 2-Fluorobiphenyl | 43-116 % | 30-115 % |
| BNA | p-Terphenyl-$d_{14}$ | 33-141 % | 18-137 % |
| BNA | Phenol-$d_5$ | 10-94 % | 24-113 % |
| BNA | 2-Fluorophenol | 10-100 % | 25-121 % |
| BNA | 2,4,6-Tribromophenol | 10-123 % | 19-122 % |
| Pest. | Dibutylchlorendate | 24-154 % | 20-150 % |

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engineers & scientists

# Appendix B

## Monitoring Well Gauging Results

# QUARTERLY WELL MONITORING / OIL RECOVERY DATA SHEET
# LYMAN STREET PARKING LOT / WESTERN MASS PROPERTY
## (201.64.02)

TIME: 1040 HRS
DATE: 6-03-97
METHOD: I.P.

TEMP: 65 o FAHRENHEIT
WEATHER: CLOUDY/OVERCAST

OPERATOR: SETH RYAN
I.P. EQUIPMENT #: B-1096

** BAIL GE WELLS IF LNAPL THICKNESS IS 0.25' OR GREATER **EXCEPT:**
** ALL MEASUREMENTS ARE IN FEET UNLESS OTHERWISE NOTED
** REMOVE DNAPL FROM ANY GE WELL IF DNAPL IS 1.00' OR GREATER

| GE WELL ID | DEPTH TO WATER | DEPTH TO LNAPL | LNAPL THICKNESS | NET VOLUME OF LNAPL REMOVED | LNAPL DISPOSAL LOCATION | DEPTH TO BOTTOM OF WELL | DEPTH TO DNAPL | DNAPL THICKNESS | NET VOLUME OF DNAPL REMOVED | DNAPL DISPOSAL LOCATION |
|---|---|---|---|---|---|---|---|---|---|---|
| LS-10 | 10.57 | — | — | — | — | 11.78 | — | — | — | — |
| LS-18 | 12.96 | 11.02 | 1.94 | 1120 ML | SEE NOTE 2 | 24.15 | — | — | — | — |
| LS-22 | SEE NOTE 3 | — | — | — | — | — | — | — | — | — |
| LS-25 | 9.94 | — | — | — | — | 41.17 | — | — | — | — |
| LS-26 | 11.72 | — | — | — | — | 28.33 | — | — | — | — |
| LS-28 | 17.04 | — | — | — | — | 38.90 | — | — | — | — |
| LS-30 | 18.02 | — | — | — | — | 29.74 | — | — | — | — |
| LS-37 | 12.77 | — | — | — | — | 24.24 | — | — | — | — |
| E-1 | 14.87 | — | — | — | — | 27.33 | — | — | — | — |
| E-5 | 17.32 | — | — | — | — | 24.87 | — | — | — | — |
| E-4 | 16.34 | — | — | — | — | 24.43 | — | — | — | — |
| E-7 | 7.23 | — | — | — | — | 10.10 | — | — | — | — |
| RIVER GAUGE | 0.78 | — | — | — | — | — | — | — | — | — |

NOTE 1: A RIVER GAUGE READING OF 0.00' CORRESPONDS TO AN ELEVATION OF 970.00'.
NOTE 2: THE OIL COLLECTED WAS MANIFESTED BY AND RELINQUISHED TO GENERAL ELECTRIC.
NOTE 3: LS-22 COULD NOT BE LOCATED AND LOCATION WHERE IT SHOULD BE LOOKED AS IF IT WAS FILLED IN AND ABANDONED.

# QUARTERLY WELL MONITORING / OIL RECOVERY DATA SHEET
# LYMAN STREET PARKING LOT / WESTERN MASS PROPERTY
## (201.64.02)

TIME: 1130 HRS
DATE: 7-28-97
METHOD: I.P.

TEMP: 85 o FAHRENHEIT
WEATHER: CLOUDY/OVERCAST

OPERATOR: SETH RYAN
I.P. EQUIPMENT #: B-1098

** BAIL GE WELLS IF LNAPL THICKNESS IS 0.25' OR GREATER **EXCEPT:**
** ALL MEASUREMENTS ARE IN FEET UNLESS OTHERWISE NOTED
** *REMOVE DNAPL FROM ANY GE WELL IF DNAPL IS 1.00' OR GREATER*

| GE WELL ID | DEPTH TO WATER | DEPTH TO LNAPL | LNAPL THICKNESS | EST VOLUME OF LNAPL REMOVED | LNAPL DISPOSAL LOCATION | DEPTH TO BOTTOM OF WELL | DEPTH TO DNAPL | DNAPL THICKNESS | EST VOLUME OF DNAPL REMOVED | DNAPL DISPOSAL LOCATION |
|---|---|---|---|---|---|---|---|---|---|---|
| LS-16 | 11.37 | — | — | — | — | 11.91 | — | — | — | — |
| LS-18 | 11.74 | 11.58 | 0.16 | — | — | 24.16 | — | — | — | — |
| LS-22 | SEE NOTE 3 | — | — | — | — | — | — | — | — | — |
| LS-21 | 10.43 | — | — | — | — | 41.17 | — | — | — | — |
| LS-26 | 12.42 | — | — | — | — | 26.83 | — | — | — | — |
| LS-29 | 17.28 | — | — | — | — | 30.90 | — | — | — | — |
| LS-31 | 17.71 | — | — | — | — | 29.73 | — | — | — | — |
| LS-37 | 12.81 | — | — | — | — | 24.25 | — | — | — | — |
| E-1 | 18.52 | — | — | — | — | 27.33 | — | — | — | — |
| E-3 | 18.97 | — | — | — | — | 24.06 | — | — | — | — |
| E-4 | 15.86 | — | — | — | — | 24.44 | — | — | — | — |
| E-7 | 8.12 | — | — | — | — | 19.19 | — | — | — | — |
| RIVER GAUGE | 1.69 | — | — | — | — | — | — | — | — | — |

NOTE 1: A RIVER GAUGE READING OF 0.00' CORRESPONDS TO AN ELEVATION OF 970.00'
NOTE 2: THE OIL COLLECTED WAS MANIFESTED BY AND RELINQUISHED TO GENERAL ELECTRIC.
NOTE 3: LS-22 COULD NOT BE LOCATED AND LOCATION WHERE IT SHOULD BE LOOKED AS IF IT WAS FILLED IN AND ABANDONED.

# QUARTERLY WELL MONITORING / OIL RECOVERY DATA SHEET
# LYMAN STREET PARKING LOT / WESTERN MASS PROPERTY
## (201.64.02)

TIME: 1300 HRS
DATE: 9-23-97
METHOD: IP

TEMP: 62 ° FAHRENHEIT
WEATHER: CLOUDY/OVERCAST

OPERATOR: TODD BEDNARZ
I.P. EQUIPMENT #: B-1096

** BAIL GE WELLS IF LNAPL THICKNESS IS 0.25' OR GREATER <u>EXCEPT:</u>
** ALL MEASUREMENTS ARE IN FEET UNLESS OTHERWISE NOTED
** REMOVE DNAPL FROM ANY GE WELL IF DNAPL IS 1.00' OR GREATER

| GE WELL ID | DEPTH TO WATER | DEPTH TO LNAPL | LNAPL THICKNESS | EST VOLUME OF LNAPL REMOVED | LNAPL DISPOSAL LOCATION | DEPTH TO BOTTOM OF WELL | DEPTH TO DNAPL | DNAPL THICKNESS | EST VOLUME OF DNAPL REMOVED | DNAPL DISPOSAL LOCATION |
|---|---|---|---|---|---|---|---|---|---|---|
| LS-10 | 11.79 | — | — | — | — | 12.13 | — | — | — | — |
| LS-13 | 12.21 | 12.10 | 0.11 | — | — | 24.14 | — | — | — | — |
| LS-22 | SEE NOTE 2 | — | — | — | — | — | — | — | — | — |
| LS-25 | 11.14 | — | — | — | — | 41.16 | — | — | — | — |
| LS-28 | 12.90 | — | — | — | — | 26.33 | — | — | — | — |
| LS-29 | 18.06 | — | — | — | — | 38.89 | — | — | — | — |
| LS-36 | 18.80 | — | — | — | — | 29.74 | — | — | — | — |
| LS-37 | 14.02 | — | — | — | — | 24.25 | — | — | — | — |
| E-1 | 18.83 | — | — | — | — | 27.32 | — | — | — | — |
| E-3 | 18.09 | — | — | — | — | 24.04 | — | — | — | — |
| E-4 | 17.06 | — | — | — | — | 24.43 | — | — | — | — |
| E-7 | 8.53 | — | — | — | — | 19.19 | — | — | — | — |
| RIVER GAUGE | 0.18 | — | — | — | — | — | — | — | — | — |

NOTE 1: A RIVER GAUGE READING OF 0.00' CORRESPONDS TO AN ELEVATION OF 8/0.00'.
NOTE 2: LS-22 COULD NOT BE LOCATED AND LOCATION WHERE IT SHOULD BE LOOKED AS IF IT WAS FILLED IN AND ABANDONED.

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# Appendix C

## Evaluation of DNAPL Migration Potential

# EVALUATION
# OF
# DNAPL MIGRATION POTENTIAL

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## GENERAL ELECTRIC
## LYMAN STREET PARKING LOT SITE

PREPARED FOR:

GENERAL ELECTRIC COMPANY

PREPARED BY:

HSI GEOTRANS
6 LANCASTER COUNTY ROAD
HARVARD, MASSACHUSETTS 01451

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HSI GEOTRANS PROJECT NO. N654-001 OCTOBER 15, 1997

**HSI GEOTRANS**

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# 1 INTRODUCTION

HSI GeoTrans was retained by General Electric to evaluate the potential for the natural hydrogeologic conditions beneath the Lyman Street Parking Lot Site to be an effective barrier to downward DNAPL migration. Hydrogeologic data were collected during previous site investigations performed by Golder Associates Inc. (1992 and 1993) and Blasland, Bouk, and Lee, Inc. (1993, 1996a, and 1996b). The natural hydrogeologic conditions evaluated were the presence of a silt/clay layer and the vertical hydraulic gradient beneath the site.

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# 2 GENERAL FACTORS AFFECTING DNAPL MIGRATION

DNAPL migration in groundwater is affected by the interaction of three separate and distinct forces. These are a buoyancy force which results from the density difference between the DNAPL and the surrounding groundwater, a capillary pressure force which results from the interfacial tension that exists when DNAPL and groundwater are in contact with each other, and a hydrodynamic force due to the hydraulic gradient of the groundwater. Whether DNAPL migration occurs, and the direction and rate at which it occurs, is a function of the interaction of these three forces. It is rare that the principal direction of each of the three forces would be coincident. Their interaction and their potential effects on DNAPL migration are complicated and have been described in several publications (Schwille, 1988; Wilson et al., 1990; Mercer and Cohen, 1990; Cohen and Mercer, 1993; Huling and Weaver, 1991; USEPA, 1992; Feenstra and Cherry, 1988; and Pankow and Cherry, 1996).

The magnitude of the buoyancy force (B) is directly related to the density difference between the DNAPL and groundwater as well as the height of a continuous DNAPL zone. The greater the density contrast between the DNAPL and the groundwater, the greater the downward acting buoyancy force.

The magnitude of the capillary pressure force (Pc) is directly related to the interfacial tension forces that exist between the DNAPL and groundwater, the contact angle between the DNAPL and the sediment, and inversely related to the size of the apertures or pore spaces through which the DNAPL is migrating. If the DNAPL is a non-wetting fluid, which is a common situation in a DNAPL-groundwater system, then the sediment particles are surrounded by water and the DNAPL is contained within the pore spaces and is not in contact with the sediment. In general, smaller pore spaces result in greater capillary pressure forces than do larger pore spaces. Fine-grained sediments are frequently barriers to DNAPL migration because the resistive capillary pressure forces which result from the small pore spaces of the fine-grained sediment prevent DNAPL entry. The concept of differential capillary pressure forces causing fine-grained sediments to be a barrier to NAPL migration was originally described by M. King Hubbert (1940) in regard to hydrocarbon migration. Other discussions of the effectiveness of fine-grained sediments to create a barrier to NAPL migration are contained in Leverett, (1941), Berg (1975), Schowalter (1979), Guswa (1984), Keuper and McWhorter (1991), and Cohen and Mercer (1993).

The hydrodynamic force (H), which is also referred to as the viscous force, is directly related to the hydraulic gradient in groundwater which exists across the length of the DNAPL zone. The effect of hydraulic gradients on DNAPL migration has been described by Guswa (1994), Kueper and McWhorter (1991), Cohen and Mercer (1993), and Chown et al. (1997).

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# 3 SITE DESCRIPTION

## 3.1 LOCATION

The Site, designated by the MDEP as the Lyman Street Parking Lot Site and by the USEPA as Area 5A, is located along the Housatonic River in Pittsfield, Massachusetts. The Site consists of three former GE parking lots, a strip of land along the riverbank to the south of the Lyman Street parking lot, and a strip of land owned by Western Massachusetts Electric along the east side of the Lyman Street parking lot. The Site is bounded by Lyman Street on the west and the Housatonic River on the south. Commercial/industrial properties border the Site on the east and north. The Site covers an area of approximately seven acres.

## 3.2 AREAL EXTENT AND CONTINUITY OF SILT LAYER

Based on a review of previous reports, the site geology can be summarized as fill overlying a stratified, well sorted, fine to coarse sand of fluvial origin. A portion of the site was previously an oxbow meander of the Housatonic River and is referred to as Oxbow Area D. Underlying the fluvial sediment is an overconsolidated silt layer at a depth of approximately 20 to 30 feet below ground surface. Beneath the silt layer lies a stratified layer of sand and gravel with possible bedrock at a depth of approximately 50 feet.

The areal extent and topography of the silt layer have been documented in the boring logs and the elevation of the top of the silt layer is shown in Figure 3-1. The top of the silt layer is generally observed at its highest elevation in the central portion of the site from where it slopes both towards the northeast and the southwest. Over thirty wells have been drilled partially into the silt layer. The majority of these wells are located across the middle and western portion of the site. Based on the boring logs, the silt layer is believed to be areally extensive across the site. Additional borings may be warranted to refine the elevation of the top of the silt layer on the eastern portion of the site. Two borings/wells, LS-14 and LS-25, have been drilled into the lower sand layer through silt layer thicknesses of 10 feet and 14.7 feet, respectively. Table 3-1 lists the wells and the thickness of silt encountered during drilling.

## 3.3 DNAPL DISTRIBUTION

Historical DNAPL distribution, including maximum NAPL thickness at each well where DNAPL has been observed, is illustrated on Figure 3-2. Inferred DNAPL presence based on sheens observed during drilling and PCB concentrations reported for soil samples collected just above the silt layer are also noted. The maximum DNAPL thickness observed in a monitoring well was 5.9 feet at LS-30.

## 3.4 VERTICAL HYDRAULIC GRADIENTS

Based on historical water level monitoring at well cluster LS-20, LS-22, and LS-25, groundwater flow is consistently upward from the lower sand layer toward the upper sand layer. LS-25 is a well screened in the lower sand and provides a location for evaluating hydraulic gradients across the silt layer. Wells LS-20 and LS-22 are located near LS-25 and are screened in the upper sand and the silt, respectively. A hydrograph of water level data at the LS-20, LS-22, and LS-25 cluster is presented in Figure 3-3. The water elevation in LS-20 is generally slightly higher than the water elevation in LS-22 indicating a gentle downward gradient from the fill/upper sand to the top of the silt, although there are periods when water level data indicate that the gradient is reversed and upward flow from the silt to the fill/upper sand occurs. The water level elevation in LS-25, however, is always higher than in LS-22 and LS 20 indicating consistently upward gradients from the lower sand unit toward the silt layer.

Tables 3-2 and 3-3 list historically measured head differences between LS-25 and LS-20 and between LS-25 and LS-22, respectively. The average head difference between LS-25 and LS-22 is 3.55 feet. The vertical distance between the mid-point of the screened intervals of LS-25 and LS-22 is 14.6 feet yielding an average upward hydraulic gradient of 0.243. The minimum upward gradient from LS-25 to LS-22 is 0.071 feet (measured on

September 23, 1992). This upward gradient was observed once in 49 measurements. Ninety four percent of the time the vertical gradient exceeded 0.160 and ninety percent of the time exceeded 0.165.

Table 3-1. Silt thickness

| WELL/BORING ID | SILT THICKNESS (FEET) |
|---|---|
| LS-2 | >4.20 |
| LS-3 | >2.17 |
| LS-4 | >2.50 |
| LS-8 | >1.98 |
| LS-10 | >5.98 |
| LS-13 | >5.96 |
| LS-14 | 10.00 |
| LS-16 | >0.97 |
| LS-17 | >2.00 |
| LS-18 | >2.99 |
| LS-20 | >0.50 |
| LS-21 | >2.54 |
| LS-22 | >8.00 |
| LS-25 | 14.70 |
| LS-26 | >3.00 |
| LS-27 | >1.05 |
| LS-28 | >0.70 |
| LS-29 | >1.02 |
| LS-30 | >1.37 |
| LS-31 | >1.96 |
| LS-32 | >0.26 |
| LS-33 | >0.40 |
| LS-34 | >1.00 |
| LS-35 | >2.00 |
| LS-38 | >1.40 |
| LS-41 | >1.20 |
| LS-42 | >0.42 |
| LS-43 | >0.50 |
| LS-44 | >0.60 |
| LS-45 | >0.60 |
| RW-1 | >3.00 |
| RW-2 | >1.50 |
| SB-7 | >3.80 |

Table 3-2. Upward head difference between LS-25 and LS-20

| DATE | WATER LEVEL ELEVATION (FEET MSL) | | HEAD DIFFERENCE (FEET) |
|---|---|---|---|
| | LS-25 (LOWER SAND) | LS-20 (UPPER SAND) | |
| 11/21/91 | 975.29 | 972.15 | 3.14 |
| 1/2/92 | 975.75 | 972.25 | 3.50 |
| 1/9/92 | 975.62 | 972.17 | 3.45 |
| 1/16/92 | 975.75 | 972.65 | 3.10 |
| 1/23/92 | 975.25 | 972.03 | 3.22 |
| 1/30/92 | 975.33 | 971.99 | 3.34 |
| 2/7/92 | 975.25 | 971.75 | 3.50 |
| 2/13/92 | 975.17 | 971.78 | 3.39 |
| 2/20/92 | 975.21 | 972.01 | 3.20 |
| 2/28/92 | 975.21 | 971.91 | 3.30 |
| 3/5/92 | 975.07 | 971.89 | 3.18 |
| 3/13/92 | 976.00 | 973.28 | 2.72 |
| 3/19/92 | 974.50 | 972.40 | 2.10 |
| 3/26/92 | 975.30 | 972.07 | 3.23 |
| 4/2/92 | 974.75 | 972.55 | 2.20 |
| 4/9/92 | 975.48 | 972.39 | 3.09 |
| 4/16/92 | 975.25 | 972.33 | 2.92 |
| 4/23/92 | 976.22 | 973.29 | 2.93 |
| 4/30/92 | 976.04 | 972.79 | 3.25 |
| 5/7/92 | 976.02 | 972.86 | 3.16 |
| 5/14/92 | 975.83 | 972.29 | 3.54 |
| 5/21/92 | 976.00 | 972.15 | 3.85 |
| 5/28/92 | 975.54 | 971.98 | 3.56 |
| 6/4/92 | 975.46 | 972.29 | 3.17 |
| 6/11/92 | 976.08 | 972.52 | 3.56 |
| 6/19/92 | 975.29 | 971.84 | 3.45 |
| 6/25/92 | 975.15 | 971.85 | 3.30 |
| 7/2/92 | 975.12 | 971.75 | 3.37 |
| 7/10/92 | 974.08 | 971.99 | 2.09 |
| 7/16/92 | 974.75 | 972.21 | 2.54 |
| 7/23/92 | 975.08 | 971.77 | 3.31 |
| 7/31/92 | 974.83 | 971.69 | 3.14 |
| 9/23/92 | 972.75 | 972.34 | 0.41 |
| 10/2/92 | 974.58 | 971.64 | 2.94 |
| 10/8/92 | 974.17 | 971.44 | 2.73 |
| 10/16/92 | 974.83 | 971.67 | 3.16 |

Table 3-2 (continued).

| **DATE** | **WATER LEVEL ELEVATION (FEET MSL)** | | **HEAD DIFFERENCE (FEET)** |
|---|---|---|---|
| | **LS-25 (LOWER SAND)** | **LS-20 (UPPER SAND)** | |
| 10/23/92 | 974.67 | 971.86 | 2.81 |
| 10/30/92 | 974.25 | 971.82 | 2.43 |
| 11/5/92 | 975.25 | 972.29 | 2.96 |
| 11/12/92 | 974.75 | 972.24 | 2.51 |
| 11/19/92 | 974.75 | 972.03 | 2.72 |
| 11/25/92 | 974.75 | 973.1 | 1.65 |
| 12/3/92 | 975.50 | 972.32 | 3.18 |
| 12/10/92 | 975.00 | 971.95 | 3.05 |
| 12/17/92 | 974.83 | 972.24 | 2.59 |
| 12/31/92 | 975.50 | 973.37 | 2.13 |
| 1/7/93 | 975.75 | 974.19 | 1.56 |
| 1/15/93 | 976.42 | 972.43 | 3.99 |
| 1/21/93 | 974.67 | 972.09 | 2.58 |
| 1/28/93 | 975.25 | 972.62 | 2.63 |
| 2/5/93 | 975.25 | 971.93 | 3.32 |
| 3/4/93 | 974.58 | 971.55 | 3.03 |
| 4/8/93 | 976.83 | 973.88 | 2.95 |
| 5/6/93 | 976.83 | 972.68 | 4.15 |
| 6/3/93 | 975.85 | 971.84 | 4.01 |
| 7/8/93 | 975.00 | 971.42 | 3.58 |
| 1/7/94 | 974.25 | 971.76 | 2.49 |
| 3/3/94 | 975.33 | 971.95 | 3.38 |
| 4/7/94 | 978.35 | 975.14 | 3.21 |
| 5/5/94 | 976.96 | 972.80 | 4.16 |
| 6/2/94 | 976.29 | 971.99 | 4.30 |
| 7/7/94 | 975.17 | 971.54 | 3.63 |
| 8/4/94 | 975.50 | 971.51 | 3.99 |
| 9/1/94 | 975.27 | 971.63 | 3.64 |
| 10/4/94 | 975.15 | 971.98 | 3.17 |
| 11/7/94 | 974.83 | 971.58 | 3.25 |
| 12/1/94 | 975.29 | 972.07 | 3.22 |
| 1/5/95 | 975.33 | 972.14 | 3.19 |
| 2/2/95 | 974.79 | 972.17 | 2.62 |
| 3/2/95 | 975.67 | 972.27 | 3.40 |
| 4/6/95 | 975.83 | 972.16 | 3.67 |
| 5/4/95 | 975.54 | 4/6/95 | 975.83 |

Table 3-2 (continued).

| DATE | WATER LEVEL ELEVATION (FEET MSL) | | HEAD DIFFERENCE (FEET) |
|---|---|---|---|
| | LS-25 (LOWER SAND) | LS-20 (UPPER SAND) | |
| 6/1/95 | 975.17 | 971.65 | 3.52 |
| 7/7/95 | 974.42 | 971.39 | 3.03 |
| 8/3/95 | 974.42 | 971.29 | 3.13 |
| 9/7/95 | 974.08 | 971.24 | 2.84 |
| 10/5/95 | 972.87 | 971.74 | 1.13 |
| 11/30/95 | 973.85 | 972.45 | 1.40 |
| Average | | | 3.05 |

Note:

Total number of measurements = 78

Table 3-3. Upward head difference between LS-25 and LS-22

| DATE | WATER TABLE ELEVATION (FEET MSL) | | HEAD DIFFERENCE (FEET) |
|---|---|---|---|
| | LS-25 (LOWER SAND) | LS-22 (SILT) | |
| 11/21/91 | 975.29 | 972.63 | 2.66 |
| 1/2/92 | 975.75 | 972.93 | 2.82 |
| 1/9/92 | 975.62 | 972.35 | 3.27 |
| 1/16/92 | 975.75 | 972.65 | 3.10 |
| 1/23/92 | 975.25 | 972.20 | 3.05 |
| 1/30/92 | 975.33 | 971.59 | 3.74 |
| 2/7/92 | 975.25 | 971.98 | 3.27 |
| 2/13/92 | 975.17 | 971.98 | 3.19 |
| 2/20/92 | 975.21 | 971.82 | 3.39 |
| 2/28/92 | 975.21 | 972.85 | 2.36 |
| 3/5/92 | 975.07 | 971.35 | 3.72 |
| 3/13/92 | 976.00 | 972.85 | 3.15 |
| 3/19/92 | 974.50 | 972.11 | 2.39 |
| 4/9/92 | 975.48 | 972.03 | 3.45 |
| 5/7/92 | 976.02 | 972.25 | 3.77 |
| 6/4/92 | 975.46 | 971.72 | 3.74 |
| 7/10/92 | 974.08 | 971.41 | 2.67 |
| 9/23/92 | 972.75 | 971.72 | 1.03 |
| 10/8/92 | 974.17 | 971.00 | 3.17 |
| 11/5/92 | 975.25 | 971.77 | 3.48 |
| 12/3/92 | 975.50 | 971.72 | 3.78 |
| 1/7/93 | 975.75 | 973.86 | 1.89 |
| 2/5/93 | 975.25 | 971.23 | 4.02 |
| 3/4/93 | 974.58 | 971.52 | 3.06 |
| 4/8/93 | 976.83 | 973.12 | 3.71 |
| 5/6/93 | 976.83 | 971.93 | 4.90 |
| 6/3/93 | 975.85 | 971.10 | 4.75 |
| 7/8/93 | 975.00 | 970.65 | 4.35 |
| 1/7/94 | 974.25 | 971.00 | 3.25 |
| 2/3/94 | 975.42 | 971.38 | 4.04 |
| 4/7/94 | 978.35 | 974.36 | 3.99 |
| 5/5/94 | 976.96 | 972.06 | 4.90 |
| 6/2/94 | 976.29 | 971.22 | 5.07 |
| 7/7/94 | 975.17 | 970.77 | 4.40 |
| 8/4/94 | 975.50 | 970.74 | 4.76 |
| 9/1/94 | 975.27 | 970.86 | 4.41 |

Table 3-3 (continued).

| DATE | WATER TABLE ELEVATION (FEET MSL) | | HEAD DIFFERENCE (FEET) |
|---|---|---|---|
| | LS-25 (LOWER SAND) | LS-22 (SILT) | |
| 10/4/94 | 975.15 | 971.21 | 3.94 |
| 11/7/94 | 974.83 | 971.63 | 3.20 |
| 12/1/94 | 975.29 | 971.89 | 3.40 |
| 1/5/95 | 975.33 | 971.49 | 3.84 |
| 2/2/95 | 974.79 | 971.48 | 3.31 |
| 3/2/95 | 975.67 | 972.01 | 3.66 |
| 4/6/95 | 975.83 | 971.46 | 4.37 |
| 5/4/95 | 975.54 | 971.29 | 4.25 |
| 6/1/95 | 975.17 | 970.92 | 4.25 |
| 7/7/95 | 974.42 | 970.63 | 3.79 |
| 8/3/95 | 974.42 | 970.54 | 3.88 |
| 9/7/95 | 974.08 | 970.46 | 3.62 |
| 10/5/95 | 972.87 | 970.95 | 1.92 |
| Average | | | 3.55 |

Note:

Total number of measurements = 49

Figure 3-1 Areal Extent and Topography of the Silt Layer

EXPLANATION

| | |
|---|---|
| — · · — | EDGE OF WATER |
| ——— | EDGE OF PAVEMENT |
| —x—x—x—x— | FENCE LINE |
| ⌒⌒⌒⌒⌒ | VEGETATION |
| ⌖ B-3(W) | MONITORING WELL LOCATION |
| ⊙ RW-1 | PUMPING WELL LOCATION |
| ▣ P-7 | WELL POINT LOCATION |
| ▲ B-4 | SOIL BORING LOCATION AND DESIGNATION |
| (964.9) | TOP OF SILT ELEVATION (FEET) |
| B-4 ▲ ⌖ B-3(W) | WELLS OR SOIL BORINGS THAT ENCOUNTERED THE SILT LAYER |
| 966 ——— | TOP OF SILT ELEVATION CONTOUR (FEET), DASHED WHERE INFERRED |
| - - - - - - | APPROXIMATE BOUNDARY OF FORMER OXBOW "D" |

NOTES:

1. ALL BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE.
2. NA = SILT ELEVATION NOT AVAILABLE.
3. E = ELEVATION IS BASED ON AN ESTIMATED GROUND SURFACE.
4. MAP PREPARED FROM FIGURE 5-2 BLASLAND, BOUCK AND LEE, 1996.

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SILT-L.DWG

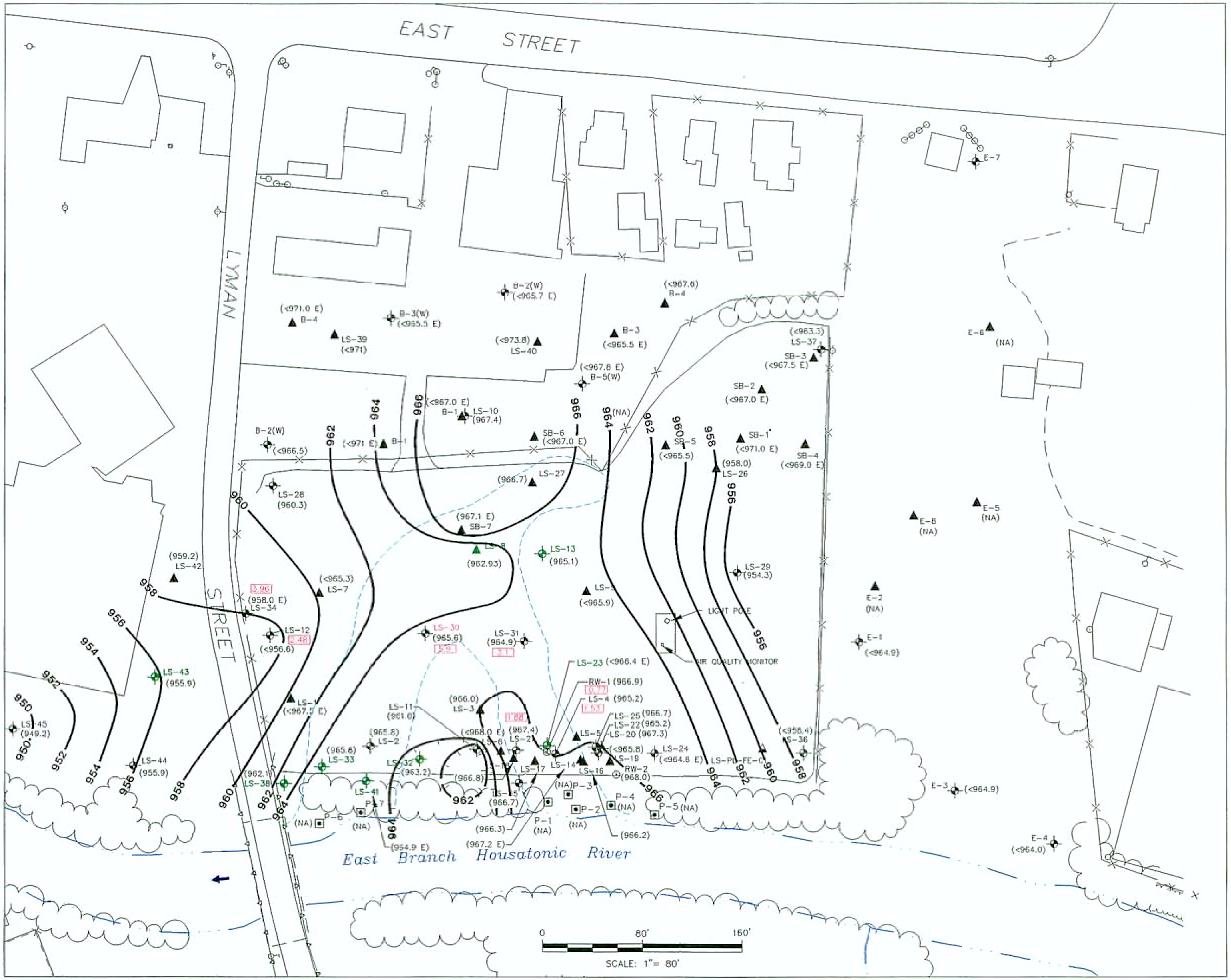

Figure 3-2 DNAPL Disribution

EXPLANATION

- LS-31 3.1 — WELL SHOWING MAXIMUM MEASURED DNAPL THICKNESS (FEET)
- LS-23, B-4 — WELLS OR SOIL BORINGS WITH INFERRED DNAPL BASED ON SHEEN OBSERVED DURING DRILLING AND PCB SOIL CONCENTRATIONS
- EDGE OF WATER
- EDGE OF PAVEMENT
- FENCE LINE
- VEGETATION
- B-3(W) — MONITORING WELL LOCATION
- RW-1 — PUMPING WELL LOCATION
- P-7 — WELL POINT LOCATION
- B-4 — SOIL BORING LOCATION AND DESIGNATION
- (964.9) — TOP OF SILT ELEVATION (FEET)
- 966 — TOP OF SILT ELEVATION CONTOUR (FEET), DASHED WHERE INFERRED
- APPROXIMATE BOUNDARY OF FORMER OXBOW "D"

NOTES:

1. ALL BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE.
2. NA = SILT ELEVATION NOT AVAILABLE.
3. E = ELEVATION IS BASED ON AN ESTIMATED GROUND SURFACE.
4. MAP PREPARED FROM FIGURE 5-2 BLASLAND BOUK AND LEE, 1996.

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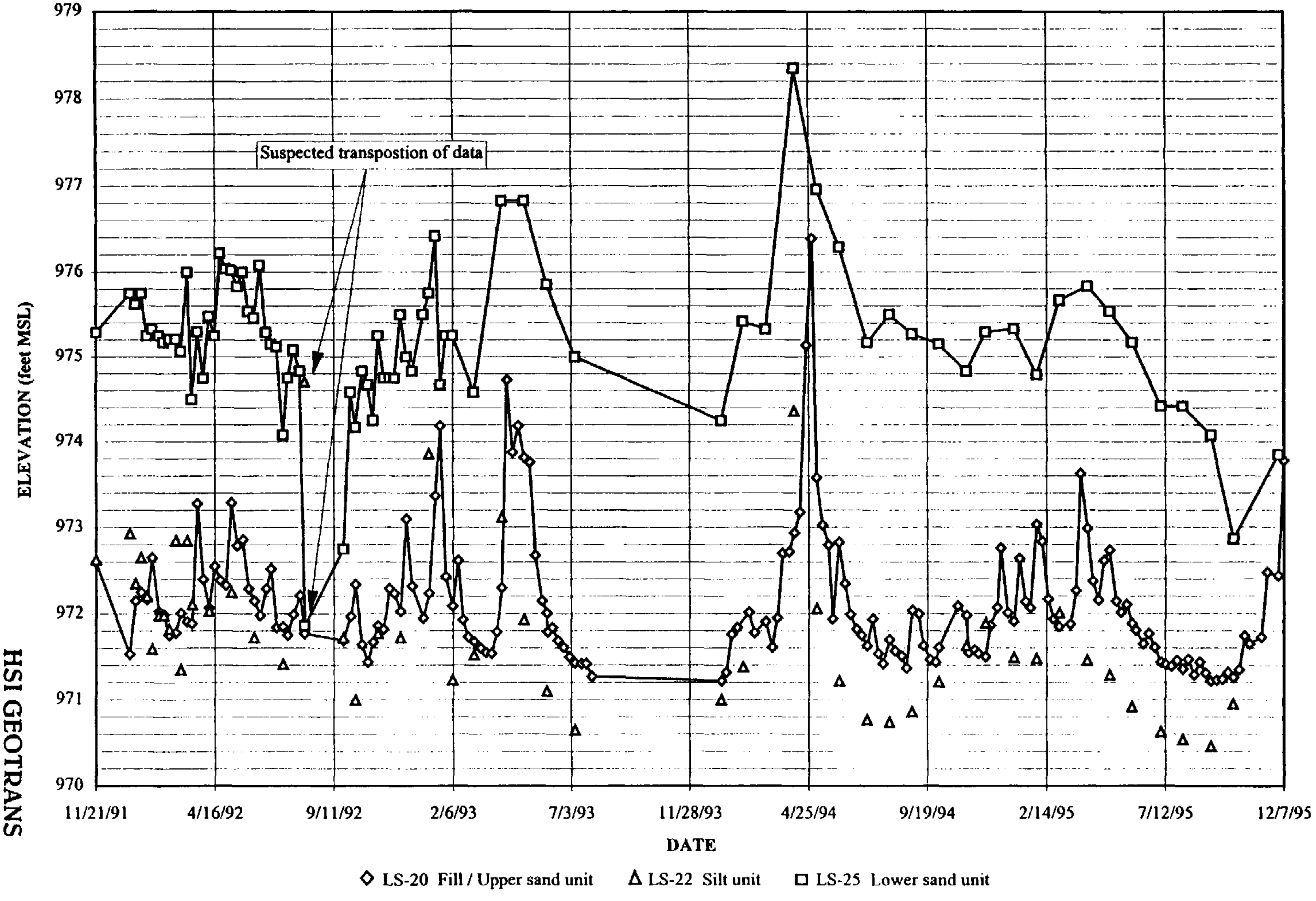
## Figure 3.3 Hydrograph of LS-20, LS-22 and LS-25



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# 4 SITE-SPECIFIC EVALUATION OF RESISTIVE FORCES

As it relates to the Lyman Street Parking Lot Site, the critical factors affecting the potential for the natural hydrogeologic conditions to be an effective barrier for downward DNAPL migration are capillary pressure effects of the underlying silt layer and vertical hydraulic gradients. These topics will be discussed separately.

## 4.1 CAPILLARY PRESSURE FORCE

Before DNAPL can penetrate a fine grained layer, such as a silt, the DNAPL pressure head must exceed the resisting capillary pressure forces. The height of a DNAPL column required to develop sufficient DNAPL pressure head to exceed the capillary pressure resistance is referred to as the critical DNAPL thickness or height, $Z_n$. The pore size distribution of the silt layer generally has a more significant effect on DNAPL migration than the thickness of the layer. Equations have been derived to calculate the critical height of DNAPL in two cases (Cohen and Mercer, 1993). The first, where residual DNAPL overlies a continuous DNAPL body and the second, where there is no residual DNAPL above the continuous DNAPL body. A continuous DNAPL body with no overlying residual DNAPL has greater potential for downward migration and the equation for the critical DNAPL height that can be supported by the underlying fine-grained layer is:

$$Z_n = [(2\sigma\cos\phi)(\frac{1}{r_{finer}} - \frac{1}{r_{host}})]/[g(\rho_n - \rho_w)] \quad (1)$$

where $\sigma$ = interfacial tension

$\phi$ = wetting contact angle

$r_{finer}$ = pore radius of the underlying finer grained layer

$r_{host}$ = pore radius of the overlying host layer

$\rho_n$ = density of the DNAPL

$\rho_w$ = density of water, 1g/ml

$g$ = acceleration due to gravity, 9.807 m/s$^2$

If the contact angle is zero, than cos ϕ equals one, and equation (1) can be rewritten as:

$$Z_n = [(2\sigma)(\frac{1}{r_{finer}} - \frac{1}{r_{host}})]/[g(\rho_n - \rho_w)] \qquad (2)$$

To evaluate the critical height of the DNAPL required to develop sufficient pressure head to exceed capillary pressure resistance, equation (2) was applied using input values specific to the Lyman Street Parking Lot Site. Laboratory measurements were reported for interfacial tension and NAPL density (General Electric, 1991; 1992). The measured interfacial tension was reported to be 12.8 dyne/cm. NAPL density measurements were made on three DNAPL samples. The reported values were 1.076, 1.091, and 1.165 g/ml. The greater density value reported, 1.165 g/ml, was used in the calculations. The pore sizes for the upper sand and silt layers were estimated based on a relationship developed by Hubbert (1953) where the pore radius can be estimated as the mean grain diameter divided by eight. A range of typical grain size values for silt and for fine to coarse gravel were evaluated (Lamb and Whitman, 1969).

Critical DNAPL height as a function of pore radius is plotted in Figure 4-1. As shown, the resistive capillary pressure forces of a fine-grained sediment, such as silt, can cause substantial DNAPL thicknesses to accumulation on top of the silt layer. Assuming a mid-range value of $4.0 \times 10^{-3}$ mm for the silt layer pore size, the estimated DNAPL height that could accumulate on top of the silt layer is 7.5 feet for an overlying host layer of fine sand. If the overlying host layer is a coarse sand, then the critical DNAPL height is about 13 feet. This calculation assumed that the DNAPL was not in contact with the sediment. That is, the contact angle was zero. In some instances, a non-wetting DNAPL may be in contact with the sediment. To evaluate the sensitivity of critical DNAPL height to the contact angle a contact angle of 30 degrees was used in equation (1). The sensitivity of critical DNAPL height, $Z_n$, to the contact angle and the pore size of both the resisting silt layer and the overlying sand layer is illustrated in Figure 4-2. Assuming a contact angle of 30 degrees and silt pore size of 4 x $10^{-3}$ mm, the estimated critical DNAPL thicknesses are 6.4 feet and 11 feet for an overlying host layer of fine and coarse sand, respectively.

## 4.2 HYDRAULIC GRADIENT

Groundwater flow driven by upward hydraulic gradients can prevent the downward migration of DNAPL. The minimum hydraulic gradient, $i_h$, sufficient to prevent DNAPL from sinking vertically downward due to gravity is related to the density contrast between the DNAPL and water, and can be obtained with the following equation (Cohen and Mercer, 1993):

$$i_n=(\rho_n-\rho_w)/\rho_w \qquad (3)$$

where:

$i_n$= The critical hydraulic gradient necessary to prevent downward DNAPL migration

$P_n$= DNAPL density

$P_w$= Water density

The minimum hydraulic gradient needed to prevent DNAPL from sinking vertically downward through the silt layer is calculated using Equation 3 and the maximum measured DNAPL density, 1.165 g/ml. The resulting minimum upward hydraulic gradient sufficient to halt downward migration of the DNAPL is 0.165.

Based on water level data from LS-25 and LS-22, the average upward hydraulic gradient measured across the silt layer is 0.243. This average gradient is sufficient to prevent downward migration of PCB DNAPL through the silt layer of the Lyman Street Site. Ninety percent of the water level data from LS-22 and LS-25 indicate upward vertical gradients greater than 0.165.

### 4.3 COMBINED EFFECTS OF CAPILLARY PRESSURE AND HYDRAULIC GRADIENT FORCES

The previous sections considered the independent effects of resistive capillary pressure forces related to the underlying silt layer and the upward hydraulic gradient across the silt layer to prevent downward DNAPL migration through the silt layer to the underlying sand. In reality, these two forces would operate together and complement each other to resist the downward migration of DNAPL.

**Figure 4-1** Critical DNAPL Height

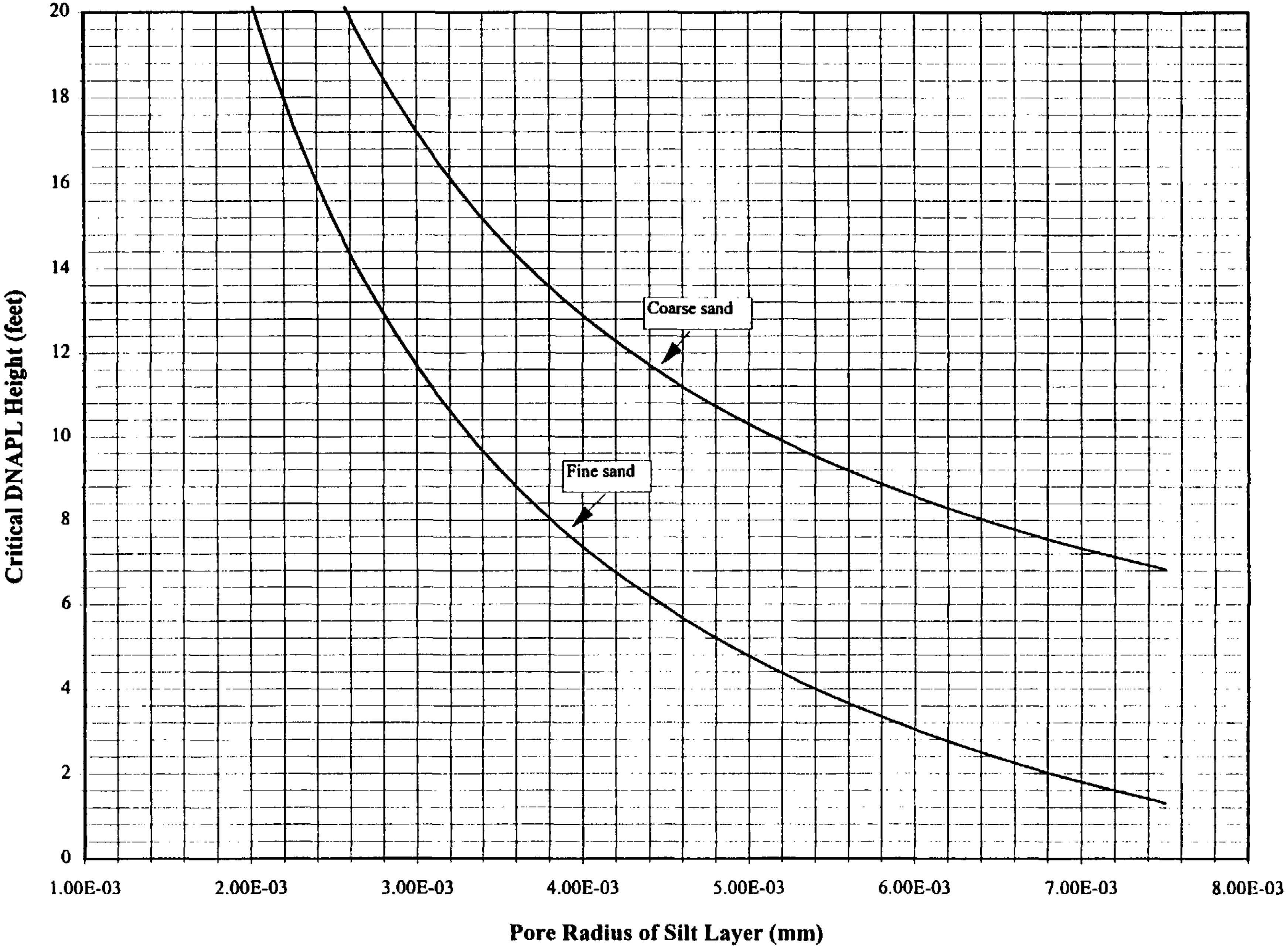
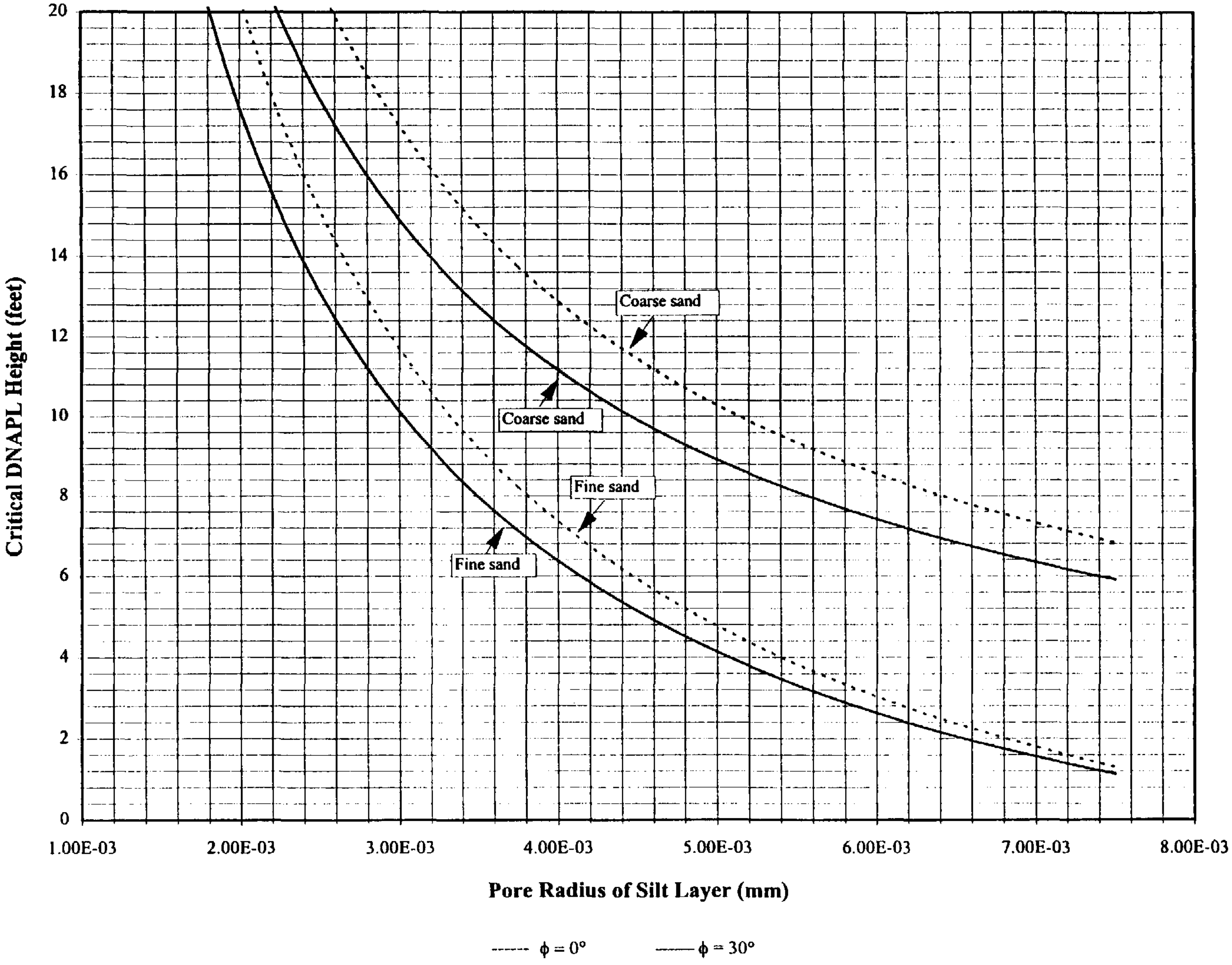


**Figure 4-2** Sensitivity of Critical DNAPL Height to Contact Angle



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# 5 CONCLUSIONS/RECOMMENDATIONS

Based on the calculations presented in Section 4 and the vertical gradients and DNAPL thickness measurements taken at the site, it is likely that the natural conditions beneath the site are an effective barrier to downward DNAPL migration. The upward vertical gradients observed at the site are sufficient to prevent the DNAPL from migrating downward through the silt layer. The resistance to downward vertical DNAPL migration provided by the capillary pressure effects of the silt layer increases the likelihood that DNAPL has not migrated downward through the silt layer.

Water quality data of samples collected from LS-25, however, indicated the presence of Aroclor 1254 at concentrations of 0.0022 to 0.0056 ppm (0.0032 ppm, filtered). It is possible that these data reflect cross contamination as a result of drilling and installing or sampling monitoring well LS-25. Alternatively, they may indicate that some PCB constituents are present in the lower sand groundwater. This condition needs to be further evaluated. The first action to be taken should be redevelopment and resampling of LS-25 using the low-flow protocols accepted by EPA Region 1. If resampling indicates the likely presence of PCB constituents in the lower sand or groundwater, then additional investigations should be planned to identify the likely source. Such investigations should include drilling and sampling to further evaluate the upgradient potentiometric levels and water quality in the lower sand.

# 6 REFERENCES

Berg, R.R., 1975, *Capillary Pressure in Stratigraphic Traps*: AAPG Bull., v. 59, p. 939-956.

Blasland, Bouck & Lee, Inc., 1993. *Silver Lake data summary, General Electric Company, Pittsfield, Massachusetts site,* November.

Blasland, Bouck & Lee, Inc., 1996. *Supplemental Phase II/RCRA facility investigation report for Housatonic River and Silver Lake, General Electric Company, Pittsfield, Massachusetts,* January. Volume I of II.

Blasland, Bouck & Lee, Inc., 1996. *MCP Supplemental Phase II/RCRA facility investigation report for Lyman Street site/USEPA Area 5A site,* June.

Chown, J.C., B.H. Kueper, and D.B. McWhorter, 1997. *The use of upward hydraulic gradients to arrest downward DNAPL migration in rock fractures.* Ground Water, Volume 35, Number 3, May-June.

Cohen, Robert M., J.W. Mercer, and J. Matthews, 1993. *DNAPL site evaluation,* C.K. Smoley.

Feenstra, S. and J.A. Cherry, 1988. *Subsurface contamination by dense non-aqueous phase liquids (DNAPL) chemicals.* Paper presented at International Groundwater Symposium, International Association of Hydrogeologists, Halifax, Nova Scotia, May 1-4.

General Electric, 1991. *Environmental laboratory test report - interfacial tension between water and oils recovered from monitoring wells,* December 31.

General Electric, 1992. *Environmental laboratory test report - viscosity of oils from groundwater monitoring wells,* April 13.

Golder Associates, Inc., 1992. *Additional hydrogeologic assessment and short-term measure evaluation and proposal, Lyman Street Parking Lot (Oxbow Area D), Pittsfield, Massachusetts,* January.

Golder Associates, Inc., 1993. *Effectiveness evaluation of short term measures, Lyman Street site (Oxbow Area D), Pittsfield, Massachusetts,* August.

Guswa, J.H., 1984. *Application of multi-phase flow theory at a chemical waste landfill, Niagara Falls, New York.* Proceedings, Second International Conference on Ground Water Quality Research, edited by N.H. Durham and A.E. Redelfs, University Center for Water Research, Oklahoma State University, Stillwater, Oklahoma, pp. 108-111.

5

Hubbert, M.K., 1940. *The theory of ground-water motion.* The Journal of Geology, Volume XLVIII, Number 8, Part 1, November-December, pp 785-944.

Hubbert, M.K., 1953. *Entrapment of petroleum under hydrostatic conditions,* the Bulletin of the American Association of Petroleum Geologists, 37(8); 1954-2026.

Hulong, S.G. and J.W. Weaver, 1991. *Dense nonaqueous phase liquids,* USEPA Groundwater Issue Paper, EPA/540/4-91, 21 pp.

Kueper, B.H. and D.B. McWhorter, 1991. *The behavior of dense nonaqueous phase liquids in fractured clay and rock,* Groundwater, 19(5), 716-728 pp.

Lambe, T.W. and R.V. Whitman, 1969. *Soil Mechanics,* John Wiley and Sons.

Leverett, M.C., 1941, *Capillary Behavior in Porous Solids:* AIME trans., v. 142, p. 152-169.

Mercer, J.W. and R.M. Cohen, 1990. *a review of immiscible fluids in the subsurface: Properties, models, characterization and remediation,* Journal of Contaminant Hydrology, 6:107-163.

Pankow, J.F. and J.A. Cherry, 1996. *Dense Chlorinated Solvents and Other DNAPLs in Groundwater,* Waterloo Press.

Schowalter, T.T., 1979, *Mechanics of Secondary Hydrocarbon Migration and Entrapment:* AAPG Bulletin v. 63, no. 5, p. 723-760..

Schwille, F., 1988. *Dense Chlorinated Solvents in Porous and Fractured Media, Model Experiments,* Lewis Publishers.

Wilson, J.L., S.H. Conrad, W.R. Mason, W. Peplinski, and E. Hagen, 1990. *Laboratory investigation of residual liquid organics,* USEPA/600/6-90/004, Robert S. Kerr Environmental Research Laboratory, Ada, Oklahoma, 267 pp.

USEPA, 1992. *Dense nonaqueous phase liquids -- a workshop summary, Dallas, Texas, April 17-18, 1991.* EPA/600/R-92/030, Robert S. Kerr Environmental Research Laboratory, Ada, Oklahoma.

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