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Background

REPORT

SDMS 128115

# *Source Control Work Plan - Upper Reach of Housatonic River (First ½ Mile)*

General Electric Company
Pittsfield, Massachusetts

September 1998

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

TECHNICAL REPORT

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# 1. Introduction

## 1.1 General

In a letter to the General Electric Company (GE) dated August 14, 1998, the United States Environmental Protection Agency (USEPA) provided conditional approval for a document entitled *Conceptual Work Plan - Upper Reach of Housatonic River (First ½ Mile)* (Conceptual Work Plan) ( Blasland, Bouck & Lee, Inc., July 1998). That document described the approach proposed by GE to address certain Housatonic River sediments and bank soils that contain polychlorinated biphenyls (PCBs). The section of the river addressed by the Conceptual Work Plan is located between Newell Street and Lyman Street in Pittsfield, Massachusetts. Figure 1 presents a general location plan.

One of the conditions provided in the USEPA's approval of the Conceptual Work Plan was that GE submit a *Source Control Work Plan*. As discussed further below, GE has over the years conducted numerous detailed investigations of the sites at and adjacent to the first ½ mile of the river, and has installed and continues to operate numerous source control measures in those areas. GE believes that these measures are effectively controlling any significant migration of non-aqueous phase liquid (NAPL) or hazardous constituents into the river. Nevertheless, in response to the condition in the USEPA's August 14, 1998 letter, and in accordance with a commitment that GE made in settlement discussions among the parties involved at this site, this document has been prepared on GE's behalf to present a proposal and schedule for further assessing, evaluating, and addressing NAPL located along the first ½ mile of the river. This *Source Control Work Plan* focuses in particular on several areas where subsurface NAPL is known or suspected to be present. These areas include the areas at the East Street Area 2 and Lyman Street Parking Lot sites where oil seeps were previously observed on the riverbanks and where NAPL has been found, as well as the area at the Newell Street Area II site where dense non-aqueous phase liquid (DNAPL) has been detected. While DNAPL has also been detected in the Building 68 area, GE has separately submitted a proposal to the USEPA to address that DNAPL. That proposal was conditionally approved by the USEPA in a letter of July 17, 1998, and the approved investigations are currently in progress.

This *Source Control Work Plan* proposes a number of additional investigations to further assess subsurface conditions along the first ½ mile reach of the river with respect to the presence of NAPL. It focuses initially on the known or suspected NAPL areas at the East Street Area 2, Lyman Street Parking Lot, and Newell Street Area II sites, but also provides for more general investigations of subsurface conditions in the first ½ mile. Following the initial investigations, GE will evaluate the need for further investigations to address any remaining data needs. In addition, the results of the separate ongoing NAPL-related investigations at the Building 68 area will be incorporated into future evaluations conducted pursuant to this *Source Control Work Plan*.

In addition to proposing additional investigations, this *Source Control Work Plan* describes GE's anticipated plans for evaluation and installation of containment barriers in the former riverbank seep areas at East Street Area 2 and the Lyman Street Parking Lot and for evaluation and installation of an active DNAPL recovery system at Newell Street Area II. It is GE's goal to design and commence installation of the containment barriers at East Street Area 2 and the Lyman Street Parking Lot, as well as such a barrier at the Building 68 area (which has previously been proposed), in 1998. At the present time, however, GE's description of its proposed approach to designing and installing these systems is necessarily preliminary, since the details will depend on the results of the proposed field investigations. Accordingly, the present Work Plan provides for submission of more detailed plans concerning the NAPL containment/recovery systems after completion of the necessary additional subsurface investigations. In addition, the present Work Plan provides that, after completion of the additional investigations, GE will evaluate the need for any further NAPL control and/or recovery activities beyond those described above and beyond the controls that have already been installed (or proposed) pursuant to GE's July 1990 consent order with the

Massachusetts Department of Environmental Protection (MDEP) and the RCRA corrective action permit issued by USEPA to GE effective January 1994 (described in Section 1.2 below).

This *Source Control Work Plan* is submitted pursuant to GE's commitment to do so in settlement discussions among the parties, and should not be regarded as acceptance by GE of the Unilateral Administrative Order issued by USEPA for the upper reach of the Housatonic River on June 3, 1998, or of any requirements imposed by USEPA pursuant to that order, including requirements for the activities proposed herein.

## 1.2 Background

The areas included in this *Source Control Work Plan* (i.e., the first ½ mile of the Housatonic River downstream from Newell Street, and areas immediately adjacent to both sides of the river) have been the subject of extensive investigatory and remedial activities conducted by GE over the last several years. A comprehensive description of these activities as they relate to NAPL assessment, containment, and recovery would result in a significant amount of report narrative, figures, and references to other documentation, and is beyond the scope of this Work Plan. Instead, a summary of the relevant activities is presented below since, in several instances, this information serves as the basis for the activities proposed herein.

Since the 1970s, GE has actively investigated the areas covered by this *Source Control Work Plan*. Most recently, these activities have been performed pursuant to a July 1990 consent order with the MDEP, and a RCRA corrective action permit issued by the USEPA effective January 1994. These activities have been performed within several distinct sites associated with GE's Pittsfield facility, including the following:

- USEPA Area 6 / MCP Housatonic River site;
- USEPA Area 4 / MCP East Street Area 2 site;
- USEPA Area 5A / MCP Lyman Street Parking Lot site;
- USEPA Area 5B / MCP Newell Street Area II site; and
- MCP Newell Street Area I site.

Within each of these sites, GE has performed a significant amount of investigations related to the presence of NAPL, including the sampling and analysis of soils, groundwater, and NAPL (if present). The locations of these various investigations, as they relate to this *Source Control Work Plan*, are presented on Figure 2.

In addition to investigations to assess/characterize NAPL, GE has also conducted remedial actions at a number of these sites to contain and recover subsurface NAPL (where found). These actions, summarized below, were initiated once evidence of NAPL was detected in a given area, and include activities such as regular monitoring, manual NAPL recovery via well bailing, and active groundwater/NAPL recovery systems.

For the East Street Area 2 site, GE currently operates a total of seven active LNAPL recovery systems at various locations within an approximately 15-acre portion of the site. Recovery efforts were initiated in the mid-to late-1970s, and a significant volume of NAPL (over 600,000 gallons) has been recovered over this approximate 20-year period. GE has also constructed and operates a groundwater treatment system for the groundwater recovered with the NAPL; this system treats over 5 million gallons of groundwater per month. In addition to the active NAPL recovery systems, GE also conducts weekly monitoring of several existing monitoring wells for LNAPL near the riverbank and monthly monitoring for DNAPL, and manually recovers any NAPL accumulations. Finally, since 1988, GE has maintained an oil adsorbent boom system along a portion of the riverbank adjacent to the site. The adsorbent booms provide additional containment and passive collection of any oils that may have seeped or been released from the riverbank soils.

For the Lyman Street Parking Lot site, NAPL containment and recovery operations have been performed since 1990, when GE installed oil absorbent booms along the riverbank in the vicinity of the intermittent NAPL seeps. A NAPL/water level monitoring program and a manual NAPL recovery program (via well bailing) was also implemented at that time. At present, in addition to the maintenance of the absorbent booms, GE monitors 22 wells and piezometers on a weekly basis, and removes accumulated LNAPL (thickness greater than 0.25 feet) and DNAPL (thickness greater than 1.0 foot) manually. An additional seven wells are monitored monthly in areas where NAPL has been observed historically. Finally, two active NAPL recovery systems (RW-1 and RW-2) became operational in 1992, while a third recovery system (RW-3) began operations in August 1996. To date, approximately 1,600 gallons of LNAPL and 600 gallons of DNAPL have been extracted from these three recovery wells.

For the Newell Street Area II site, NAPL recovery operations currently include a combination of regular monitoring and manual recovery. Since July 1995, specific monitoring wells have been monitored for LNAPL and DNAPL. If a NAPL thickness of greater than 0.5 feet is measured, it is removed via manual bailing. Originally, in July 1995, only monitoring well NS-15 was monitored for DNAPL, and NS-10 for LNAPL. This monitoring network has since been expanded to include DNAPL monitoring/removal at MW-1D, MW-1S, and NS-30 through NS-37, and LNAPL monitoring/removal at NS-33. Approximately 350 gallons of NAPL have been recovered over the last three years.

For the Building 68 Area, eight monitoring wells are currently being monitored for DNAPL on a weekly basis. Of these, DNAPL has only been detected in two wells (3-6C-EB-25 and 3-6C-EB-28). If a DNAPL thickness greater than one foot is observed in a well, it is removed via manual bailing. To date, only minor amounts of DNAPL have been removed (approximately one gallon from well 3-6C-EB-25). As discussed in Section 2.2.6 of this *Source Control Work Plan*, GE has proposed to implement additional recovery operations following the performance of ongoing investigations and an evaluation of the results.

## 1.3 Objectives and Format of Work Plan

As previously indicated to the USEPA, GE believes that the ongoing NAPL monitoring, control, and recovery activities currently conducted in the areas along the first ½ mile of the river are effective to control any significant migration of NAPL into the river. In addition, several investigation proposals have already been (or will shortly be) submitted to the USEPA and/or the MDEP (the Agencies) to further assess the vertical and horizontal extent of known NAPL areas, evaluate the possible presence of other NAPL areas, and, in some cases, evaluate and implement additional NAPL recovery activities. These ongoing and proposed activities have been developed from the results of the numerous years of investigations and remediations (described above) conducted in accordance with all applicable environmental requirements. The activities proposed herein serve as a supplement to these prior efforts and should provide further assurance that no significant migration of NAPL to the river will occur in the future.

As noted above, GE is submitting this *Source Control Work Plan* in response to the USEPA's August 14, 1998 letter conditionally approving GE's Conceptual Work Plan and in accordance with GE's commitment in settlement discussions among the parties. Section 2 of this Work Plan proposes additional investigations to address the following topics:

- The presence (or potential presence) and extent of lighter-than-water NAPL (LNAPL) in certain areas in the vicinity of the East Street Area 2 riverbank, Lyman Street Parking Lot, and the western end of the former Oxbow H area (where no NAPL has been detected to date);

- The presence and extent of heavier-than-water NAPL (DNAPL) in certain areas in the vicinity of the East Street Area 2 64V oil recovery caisson, Lyman Street Parking Lot, the former Oxbow H area (western end), and the Newell Street Area II site;

- The presence and topography of till and other subsurface confining units within 50 feet of and beneath the river; and

- The need for further delineation of NAPL to determine the extent of a containment barrier along portions of the riverbank (based on the results of the initial investigations proposed in this *Source Control Work Plan*, as well as the ongoing investigations associated with the Building 68 area of the GE facility).

In addition, Section 2 of this document presents a brief summary of the separate investigations associated with the presence of DNAPL detected in the vicinity of Building 68. Although no specific investigation proposals related to that area are presented herein (since they have been previously presented elsewhere), the results will be reviewed in context with the results of the activities proposed herein.

Section 3 of this document describes, in conceptual terms, GE's anticipated plans for implementing the following activities once the NAPL-related investigations are completed:

- The installation of containment barriers in the vicinity of the former East Street Area 2 riverbank seep and 64V oil recovery caisson, as well as the Lyman Street Parking Lot; and

- The installation of an active pumping system and/or containment barrier to enhance DNAPL recovery at the Newell Street Area II site.

As discussed in Section 3, further evaluation of these activities will follow the completion of the proposed investigation activities and will be based on review of pertinent investigation results. As such, Section 3 contains only a general description of these activities and provides for a more detailed plan to be submitted after completion of the additional investigations. Section 4 of this document presents a summary and an anticipated implementation schedule for the activities proposed herein.

# 2. Proposed Subsurface Investigations

## 2.1 General

This section of the *Source Control Work Plan* identifies the field investigations proposed by GE to further evaluate the potential presence and/or extent of NAPL within areas along the first ½ mile of the Housatonic River downstream from the Newell Street. These include advancement of several additional soil borings, installation of monitoring wells, performance of geophysical investigations, and possible collection and analysis of environmental samples. The information obtained from the proposed investigations, in combination with information available from prior investigations, will support subsequent evaluations concerning supplemental containment and possible recovery of subsurface NAPL.

Section 2.2 of this document presents the activities proposed to investigate NAPL in five areas along the first ½ mile of the river, while Section 2.3 summarizes the proposed geophysical investigations to delineate the top of till and other subsurface confining layers (if present) in these and adjacent areas. Section 2.4 discusses how the results of the initial investigations will be evaluated with respect to the need for further NAPL-related investigations. The locations of the proposed investigatory activities are illustrated on Figure 2.

## 2.2 Non-Aqueous Phase Liquids

Comments 1.a, 1.d, and 1.e of the USEPA's August 14, 1998 conditional approval letter states that GE should further evaluate the potential presence and/or extent of NAPL at several locations. The USEPA identified five locations and related NAPL occurrences to be addressed as part of this *Source Control Work Plan*:

- DNAPL within East Street Area 2 (near oil recovery caisson 64V);
- LNAPL within the former riverbank seep area of East Street Area 2 (currently controlled by active oil/groundwater recovery systems and oil adsorbent booms) ;
- LNAPL and DNAPL within the Lyman Street Parking Lot site (currently controlled by active recovery systems and oil adsorbent booms);
- Possible presence of NAPL in the western end of former Oxbow H (no NAPL has been detected to date in this area); and
- DNAPL within the Newell Street Area II site.

For each area identified in the USEPA's August 14, 1998 conditional approval letter, information from prior investigations was reviewed, such as soil boring logs (including descriptions of the subsurface geologic materials and analytical data where present), monitoring well installation logs (including well construction details and subsequent monitoring results), and other information where available (e.g., geophysical surveys). Following review of the available information, GE considered the specific comments presented in the USEPA's conditional approval letter and developed the investigation proposals presented in Sections 2.2.1 through 2.2.5. In addition to the five areas identified above, GE is in the process of implementing several NAPL-related activities associated with the Building 68 area, located within the GE facility and north of the river. A discussion of the Building 68 area and a summary of the separate ongoing investigations is presented in Section 2.2.6 of this document.

The investigations proposed in this section relate to delineating the presence of NAPL within the subsurface soils. For the most part, determinations regarding the presence of NAPL will be performed in the field and will be based on several field-based determinations, including visual observations of the recovered materials during soil boring advancement/monitoring well installation (i.e., observations of sheens, soil staining, discoloration, etc.); relation of visual observations to the presence of groundwater and/or the till layer/confining unit(s); presence of organic vapors as measured using a photoionization detector (PID); water/soil shake tests; and information drawn from

prior investigations. This multi-component assessment has been successful at identifying NAPL in these areas during prior investigations.

If field observations indicate the presence of NAPL, representative soil samples will be collected and submitted for analysis for PCBs, as well as other hazardous constituents listed in Appendix IX of 40 CFR Part 264 excluding herbicides and pesticides, but including three additional constituents -- benzidine, 2-chloroethyvinyl ether, and 1, 2-diphenylhydrazine (Appendix IX+3). In addition, if NAPL is subsequently detected in a newly installed monitoring well, such materials will be collected and analyzed for the same constituents identified above.

### 2.2.1 DNAPL in East Street Area 2

Comment 1.a of the USEPA's August 14, 1998 conditional approval letter states that GE should advance approximately 10 soil borings and install approximately 5 monitoring wells in the vicinity of oil recovery caisson 64V to further delineate the presence of DNAPL previously identified in this area. In response, GE has reviewed the available subsurface information associated with this area (summarized below), and has developed an investigation protocol involving the advancement of 9 soil borings and 3 initial monitoring well installations. Additional discussion regarding the scope of the proposed activities is presented below.

#### 2.2.1.1 Advancement of Soil Borings

Numerous subsurface investigations have been performed in the area currently referred to as the oil recovery caisson 64V since the early 1970s. In total, within this approximately 500 feet by 500 feet area, approximately 60 soil borings have been advanced and at least 40 monitoring wells have been installed. These activities have provided a detailed assessment regarding the subsurface materials in this area, including characterization of LNAPL and DNAPL. Beyond that, GE currently is in the process of preparing a revised *Addendum to MCP Supplemental Phase II Scope of Work and Proposal for RCRA Facility Investigation of East Street Area 2/USEPA Area 4*. That document will be submitted to the Agencies by September 25, 1998, and will incorporate certain of the proposals presented in this *Source Control Work Plan*.

With respect to DNAPL/till delineation in this general area, a total of 6 soil borings/monitoring wells have either been previously installed to the till layer or have encountered DNAPL in this area (ES2-6, 95-28, 64V, 95-6, 95-8, and 28, as shown on Figure 2). Evidence of DNAPL has been observed at three of these locations (ES2-6, 64V and 28). Several soil borings are proposed to characterize more precisely the extent of DNAPL present in this area. To assist in the selection of the proposed soil borings, information regarding the orientation of the confining layer in this area (i.e., located at approximately 30 to 45 feet below ground surface) was considered. The proposed locations are shown on Figure 2; a summary of the rationale involved in the selection of these locations is presented below.

- **Oil Recovery Caisson 64V Area** - DNAPL previously detected at this location was found at the base of this oil recovery caisson, approximately 30 feet below ground surface and approximately 15 feet below the typical groundwater elevation. Immediately downgradient of the 64V oil recovery caisson is a subgrade LNAPL containment barrier and active recovery system consisting of a 2-foot thick, 380-foot long soil-bentonite NAPL containment wall installed to a depth extending approximately 22 to 24 feet below ground surface.

  To further characterize the extent of DNAPL at this location, four soil borings are proposed. These locations (E2SC-1 through E2SC-4, as shown on Figure 2) have been selected based on interpretations regarding the orientation of the underlying confining till layer. It should be noted that these proposed borings negate the need for boring ES2-28A, which has been proposed in the *Addendum to MCP Supplemental Phase II Scope*

*of Work and Proposal for RCRA Facility Investigation for East Street Area 2/USEPA Area 4* (Golder Associates, May 1996). Additional information regarding the installation of these proposed borings, as well as their possible conversion to a monitoring well, is presented below and in Section 2.2.1.2.

- **Monitoring Well 28 Area** - This monitoring well, located approximately 400 feet north of the river, was installed in 1981 as part of GE's initial LNAPL investigations for East Street Area 2. DNAPL at this location was observed at a depth of approximately 22 feet below ground surface (approximately 9 feet below the typical groundwater elevation) and exhibited physical characteristics typically related to coal tar wastes and related coal tar manufacturing by-products (PCBs were also detected in this DNAPL). Based on these observations, one potential source of the detected DNAPL is the former manufactured gas plant structures owned and operated by Berkshire Gas during its ownership of the subject. The approximate location of the former gas plant facilities (Figure 2) is near well 28. In addition, as part of Berkshire Gas's decommissioning of the operations at this property (in the early 1970s), the above-grade portions of a former tar separator located approximately 200 feet north of well 28 were reportedly removed while the subsurface components remained intact. It has also been reported that coal tars remained in the subgrade sections at the time of this closure.

  Several soil borings are proposed to further characterize the extent of DNAPL previously detected at well 28. As shown on Figure 2, three soil borings are proposed (E2SC-5 through E2SC-7). These locations have been selected based on a general understanding regarding the depth and configuration of the underlying till layer. In addition to allowing direct observations to check for DNAPL, these borings will provide a better overall characterization regarding the presence of the confining till layer will result (consistent with the investigation objectives of future MCP Phase II/RFI investigations for East Street Area 2). Additional information regarding the performance of the proposed soil borings, and possible conversions to a monitoring well, is presented below and in Section 2.2.1.2.

- **Monitoring Well ES2-6 Area** - The presence of DNAPL at this location was detected in 1994 during GE's ongoing MCP Phase II/RFI investigations within East Street Area 2. DNAPL was initially observed at this location at a depth of approximately 42 feet below ground surface (approximately 30 feet below the typical groundwater elevation). The characteristics of the DNAPL detected at this location resemble coal tar residuals and laboratory analysis did not indicate the presence of PCBs. In addition, it is suspected that well ES2-6 is located within the eastern limits of the former Oxbow Area H and that the DNAPL detected at this location may originate from materials placed by Berkshire Gas as part of the filling of this oxbow after the river was rechannelized in the 1940s. Information gathered during the installation of monitoring well 95-6, which is located in an area adjacent to and west of the former Oxbow H limits, further supports the presumption that DNAPL presence is confined to the former Oxbow area. Specifically, DNAPL was not detected at this location during the installation of the soil boring, and subsequent monitoring performed by GE monthly since May 1996 has not detected any evidence of DNAPL at this location.

  To further characterize the extent of DNAPL near ES2-6, two soil borings are proposed (E2SC-8 and E2SC-9; Figure 2). Both locations will be positioned within the former oxbow limits: one located in an area between ES2-6 and the existing riverbank, and the other generally north of ES2-6, but south of the existing recharge pond. Additional information regarding the installation of the soil borings, and possible conversion to a monitoring well, is presented below and in Section 2.2.1.2.

All of the proposed soil borings will be installed in accordance with GE's Sampling and Analysis Plan/Data Collections and Analysis Quality Assurance Plan (SAP/DCAQAP), originally dated May 1994, with subsequent revisions since being submitted to the Agencies. (Note that the Agencies have recently provided comments on the

SAP/DCAQAP and that GE is in the process of revising this document with a submittal deadline of October 9, 1998 to the Agencies. Any modifications to the SAP/DCAQAP resulting from this revision process will be incorporated into the investigations proposed in this document.)

#### 2.2.1.2 Monitoring Well Installation

The USEPA's August 14, 1998 conditional approval letter also indicates that GE should install approximately 5 monitoring wells in this area. Consistent with the approach that has been used for various investigations conducted by GE within their Pittsfield facility, the installation of DNAPL monitoring wells will be based on visual observations during advancement of the soil boring, and related observations. For example, several factors are considered when deciding whether a soil boring should be converted into a monitoring well, including presence of visual NAPL in relation to the water table and possible confining layer(s), visual observations of recovered soil samples, and PID measurements. If these data suggest the presence of DNAPL, the soil boring installation will be converted into a suitable DNAPL monitoring well.

GE proposes to maintain this general approach for determining whether soil borings are converted to DNAPL monitoring wells. However, in support of GE's Conceptual Work Plan and forthcoming *Bank Soil/Sediment Removal Work Plan*, three of the proposed soil borings in this area will definitely be converted into DNAPL monitoring wells. The proposed locations (E2SC-3, E2SC-4, and E2SC-9) are positioned along and parallel to the existing riverbank. The proposed installation of these monitoring wells along the riverbank will support subsequent evaluations regarding a containment barrier in this area (e.g., performance of aquifer testing and hydraulic permeability testing). Section 3 further discusses the approach regarding evaluation of a containment barrier. In addition, installation of deep monitoring wells in these locations will, when supplemented by existing monitoring wells in this area (e.g., ES2-6 and 95-6), allow for detection of changes in DNAPL extent and afford the opportunity to implement further response activities in a timely manner.

### 2.2.2 LNAPL Along Riverbank

Comment 1.a of the USEPA's August 14, 1998 conditional approval letter indicates that GE should install 8 to 10 soil borings to a depth of at least 2 feet below the water table to further assess the former LNAPL seeps observed along the riverbank within East Street Area 2. In response to this comment, GE has reviewed the results of investigations that have been conducted in this area since the early 1980s and has identified additional investigations to supplement the existing data set. Since 1980, GE has installed approximately 30 soil borings, 10 LNAPL monitoring wells, 15 piezometers, and four oil recovery wells along a 450-foot length of riverbank associated with the former LNAPL seeps. In addition, GE currently performs semi-annual monitoring of 24 wells in this area and extracts recoverable LNAPL using an active recovery system.

Based on a review the existing information, the presence of LNAPL as it relates to the riverbank area has been adequately characterized. However, in light of the USEPA comment to conduct further investigations in this area, GE has identified certain limited additional data that may be obtained by the advancement of additional borings. Specifically, soil borings E2SC-10 and E2SC-11 (Figure 2) are proposed to provide additional delineation in a westerly (or downriver) direction from the known LNAPL occurrences. These two borings will also be positioned in locations offset from the existing boom installation present along the base of the riverbank. Proposed location E2SC-13 is intended to provide spatial coverage within the eastern portion of the site, while E2SC-14 will replace a temporary well (TMP-1) currently monitored by GE on a weekly basis. At this location, the soil boring will be converted to a permanent monitoring well and TMP-1 will be abandoned. In addition, three of the soil borings proposed in Section 2.2.1.1 to further delineate the presence of DNAPL (i.e., E2SC-3, E2SC-4, and E2SC-9) will also provide information related to possible presence of LNAPL along the riverbank.

At proposed locations E2SC-10, E2SC-11, E2SC-13, and E2SC-14, a soil boring will be advanced to a depth of at least 2 feet below the observed water table at the time of installation. Since it is anticipated that the activities proposed in this *Source Control Work Plan* will commence in the fall of this year (as discussed in Section 4), it is anticipated that seasonally low water table elevations will be present, and that the observed water table will present a conservative criterion for discontinuing advancement of the soil boring. If LNAPL is not detected after advancing the soil boring into the water table, the boring will be discontinued and abandoned in accordance with the SAP/DCAQAP. An exception to this approach is boring E2SC-14, which will be converted into a permanent monitoring well regardless of soil sample observations. However, if LNAPL is observed within the recovered soil samples, or if other visual/qualitative evidence suggests that LNAPL is present, the soil boring will be advanced vertically until evidence of LNAPL is no longer present, and the soil boring will be converted into a shallow monitoring well in accordance with the SAP/DCAQAP.

### 2.2.3 Potential NAPL in Former Oxbow H Area

Comment 1.d of the USEPA's August 14, 1998 letter indicates that GE should advance two borings "in the Oxbow H fill area to determine if NAPL is present in this area." It is assumed that this comment refers to a perceived need for additional investigations in the western limb of the former oxbow area at a location where the former oxbow connects to the current river location (Figure 2). Based on that interpretation, the advancement of a soil boring at location E2SC-12, as shown on Figure 2, should be sufficient to provide the information requested by the USEPA. It should be noted that there are five existing borings/wells in this vicinity which have not detected NAPL. The proposed boring will be advanced to a depth of at least 2 feet below the water table and will continue vertically until the top of till is encountered. However, if DNAPL is detected, the boring will be terminated at the top of the first confining layer encountered.

As part of this soil boring, samples will be collected and visually classified for geology, reviewed with respect to potential presence of LNAPL and DNAPL (e.g., presence of sheens, discoloration, or other visual observations), and screened for the presence of organic vapors using a PID. The results of this soil boring evaluation will be reviewed to determine if the soil boring should be converted into a monitoring well. Specifically, consistent with GE's typical criteria for converting a soil boring into a monitoring well, if there is no evidence of NAPL at this location, the soil boring will be abandoned in accordance with the SAP/DCAQAP. However, if there is evidence that NAPL is present at this location, a suitable monitoring well will be installed. If evidence of both LNAPL and DNAPL exists, the initial soil boring will be converted to a deeper groundwater monitoring well, and an additional shallow soil boring/monitoring well will be installed at a slightly offset location for future LNAPL monitoring.

### 2.2.4 NAPL in Lyman Street Site

Comment 1.a of the USEPA's August 14, 1998 conditional approval letter states that GE should install additional shallow and intermediate wells to determine the extent of LNAPL and DNAPL within the Lyman Street Parking Lot. Investigations conducted by GE in this area since 1986 have provided a general assessment concerning the presence of LNAPL and DNAPL for the majority of the site, and have supported the design and installation of NAPL recovery operations. However, in a document entitled *Addendum to MCP Supplemental Phase II/RCRA Facility Investigation Proposal for Lyman Street/USEPA Area 5A Site*, dated October 1997 (conditionally approved by the Agencies in a letter of July 15, 1998, as modified by agreement of the parties), GE proposed the advancement of two soils borings and subsequent monitoring well installations to further evaluate the extent of NAPL to the east and west of the known NAPL areas. Based on further review of the existing data, as well as consideration of the USEPA's comment, GE proposes to install nine soil borings and six monitoring wells to further delineate the extent of NAPL eastward and westward along the river (Figure 2).

Three shallow wells are proposed to further characterize the extent of LNAPL (LSSC-3, LSSC-5, and LSSC-8). Two of the shallow wells (LSSC-3 and LSSC-5) will be installed in the Lyman Street Parking Lot immediately east and west of the previously detected LNAPL. A third shallow well (LSSC-8) is proposed for the 10 Lyman Street property across the street from existing monitoring well LS-38. To further delineate the extent of DNAPL at the site, GE proposes to install four intermediate wells (LSSC-4, LSSC-6, LSSC-7, and LSSC-9) screened at the top of the silt aquitard (located at approximately 20 to 30 feet below ground surface). Two of the proposed monitoring wells (LSSC-4 and LSSC-6) will be installed in the Lyman Street Parking Lot immediately east and west of the known DNAPL limits, and will be paired with proposed shallow wells LSSC-3 and LSSC-5, respectively. Based on field conditions encountered at the time of installation (i.e., depth of silt aquitard and saturated soil thickness), one or both of these monitoring well pairs may be replaced by a single well screened from the top of the silt layer through the water table. The third well (LSSC-7) will be installed at the 10 Lyman Street property, south of existing monitoring well LS-42; and the fourth well (LSSC-9) will be installed along the southern edge of the center of the Lyman Street Parking Lot. Additionally, to rule out the possible occurrence of DNAPL and more fully define the orientation of the silt layer along the Housatonic River in the northeastern portion of the site, GE proposes to install two soil borings (LSSC-1 and LSSC-2) in the vicinity of existing shallow wells LS-36 and E-4 (Figure 2). The borings will be completed as intermediate monitoring wells if warranted based on field observations.

### 2.2.5 DNAPL at Newell Street Area II

Comment 1.e of the USEPA's August 14, 1998 conditional approval letter states that GE should further delineate the extent of DNAPL previously detected at the Newell Street Area II site, and develop a plan for the installation of an active pumping system to enhance DNAPL recovery. This section describes the field investigations proposed to address this comment, while Section 3 of this *Source Control Work Plan* presents the approach that will be used to assess the newly collected data with reference to installation of an active DNAPL recovery system.

Since detection of DNAPL at the Newell Street Area II site in 1995, several characterization and monitoring activities have been performed to determine the extent, nature, and source of the DNAPL. The results of these investigations indicate DNAPL in several wells (MW-1D, NS-15, NS-30, NS-31, and NS-32). GE currently monitors wells MW-1D, MW-1S, and NS-30 through NS-37 weekly for the presence of DNAPL, and performs removal if the measured thickness is 0.5 feet or greater.

These characterization activities have also included evaluations concerning the presence and orientation of the till unit underlying the site (as well as the overlaying silt layer, where present) through the use of geophysical technologies and the advancement of additional soil borings. The results of these activities were summarized in an April 1998 report entitled *Interim Summary Report and Proposal for Additional Investigations for Newell Street Parking Lot (Newell Street Area II Site)/USEPA Area 5B* dated April 20, 1998. In light of the USEPA's August 14, 1998 letter, as well as the Agencies September 2, 1998 Conditional Approval letter of the April 1998 report, additional investigations (beyond those proposed in April 1998) are proposed with the objectives of further delineating the extent of DNAPL at the Newell Street Area II site and assessing conditions on the north side of the Housatonic River, opposite the known locations of DNAPL at the Newell Street Area II site. Specifically, as shown on Figure 2, seven soil borings (N2SC-1 through N2SC-6 and E2SC-15) are proposed. These borings will be advanced until the till unit is reached and completed as monitoring wells if warranted based on field conditions. In the event that DNAPL is observed in a boring, the boring will be terminated at the top of the first confining layer encountered. These proposed boring locations were designed to accommodate comments set forth in both the USEPA's August 14, 1998 and the Agencies' September 2, 1998 letters. With respect to the recent identification (on September 9, 1998) of DNAPL at well MW-1D, GE is in the process of evaluating this detection in context with other pertinent site information (e.g., other DNAPL occurrences and the till/silt layer orientation within the site). Since this well is located approximately 200 feet from the river edge, and since a deep well (NS-35) without the

presence of DNAPL is located between MW-1D and the river, it is not anticipated that the DNAPL detected at MW-1D extends to the river. However, as part of GE's ongoing investigations of the Newell Street Area II site, GE will prepare and submit revised sampling plans for several areas of the site. These plans, required in accordance with an Agency letter dated September 2, 1998, will be submitted by October 2, 1998 and will include a proposal for additional DNAPL characterization in the area of MW-1D.

### 2.2.6 DNAPL in Building 68 Area

During the Building 68 area sediment and bank soil removal actions, conducted between September 1997 and January 1998, DNAPL was encountered in two areas beneath the river bottom. In response, GE completed additional characterization activities along the northern river bank between October 1997 and April 1998 to define the orientation of the underlying till layer and to evaluate the presence and extent of the DNAPL. DNAPL was encountered in two of the ten monitoring wells installed during these investigations. In May 1998, GE submitted a proposal to the USEPA for the installation of a sheetpile barrier wall and a DNAPL extraction well along the river bank to protect against possible migration of the observed DNAPL to the Housatonic River. The proposal was conditionally approved by the USEPA in a letter dated July 17, 1998. The conditional approval letter requested, among other conditions, that GE install six to eight additional borings along the base of the riverbank to further evaluate the extent of DNAPL in this area. These investigations were initiated August 25, 1998 and are currently in progress. The sheetpile wall and associated DNAPL extraction well will be installed following the completion of these characterization activities. Based on the geographic proximity of the ongoing Building 68 investigations to the first ½ mile of the river (from Newell Street) and the other areas subject to NAPL-related investigations, the results of these separate investigations will be incorporated into future evaluations conducted as part of this *Source Control Work Plan.*

## 2.3 Geophysical Investigations

In accordance with Comment 1.c of the USEPA's August 14, 1998 conditional approval letter, GE will conduct geophysical investigations to further assess the presence and depth of the underlying till layer, as well as other potential subsurface confining layer(s), located within the first ½ mile of the river. Furthermore, that letter indicated that the proposed geophysical survey should include techniques such as Ground Penetrating Radar (GPR) and high frequency seismic reflection. GE has reviewed these and other techniques and proposes to use seismic methods. This proposed approach is based on the results of prior geophysical seismic investigations, subsurface boring logs, and data collected for ongoing investigations performed at East Street Area 2 and the Newell Street Area II site. The seismic survey method will employ the refraction or reflection methodology. A determination of specific technique to be utilized will be made based upon a geophysical evaluation of the site geology and survey objectives.

The geophysical evaluation will be based on a review of several sources of information, including the existing seismic surveys previously performed by GE for portions of the East Street Area 2 and Newell Street Area II sites, and related efforts (i.e., soil borings and classification of the various subsurface materials) to define the top of till/confining layer in those areas (a summary of these activities is provided below). Figure 2 identifies the approximate locations of the prior and proposed survey transects, while additional technical details regarding this component of the *Source Control Work Plan* are presented below.

Prior geophysical surveys conducted in this area have included seismic refraction, GPR, and magnetic surveys within East Street Area 2 in December 1995; GPR, seismic reflection, and refraction performed for Newell Street Area II in April 1996; and electromagnetic and GPR surveys in the Lyman Street Parking Lot in 1991. The locations of the seismic survey lines completed during these investigations are shown on Figure 2. The objective

for both site surveys was to determine the depth to and orientation of the silt confining unit (glacial till) and bedrock. Seismic refraction was generally successful in delineating the silt unit/glacial till at the East Street Area 2 site, although some localized discrepancies between the refraction survey and corresponding stratigraphy (obtained through soil borings) were identified. The silt layer at the Newell Street Area II site was delineated using seismic reflection, and to a lesser degree with GPR, and the depth to bedrock was determined using both seismic refraction and seismic reflection, and to a lesser degree with GPR. Given the limited success of GPR to delineate the subsurface units during the previous geophysical investigations, GPR is not proposed during this phase of the geophysical investigation.

Initially, seismic methods are proposed to define the stratigraphic sequence along transects oriented parallel and perpendicular to the north and south banks of the river. Anticipated transect locations are shown on Figure 2. The proposed seismic transects have been located to augment the previous seismic surveys and to delineate the depth to glacial till and any other confining unit (e.g., silt layers above the till that may act as barriers layers), while limiting technical (e.g., excessive ambient noise from the river) and safety concerns with performing transects across the river. Note that the specific locations for survey lines perpendicular to the river will be identified after the results of the initial survey (performed parallel to the river) is complete. This will allow the perpendicular lines to be placed in potential till trough areas.

Seismic lines will be surveyed and horizontal and vertical control established at shot-points and endpoints of each transect to correct for elevational differences along each transect. Each seismic transect will also be cleared of vegetation (as needed) to allow access of the seismic equipment and to facilitate the location and elevation survey. Where possible, seismic transects have been located near existing or proposed deep boring locations to assist in calibrating the interpreted seismic data. Following completion of the geophysical field work, data processing and evaluation will be performed to produce subsurface profiles of the layers mapped along each transect. These data, along with the existing seismic information from prior surveys, will be used to prepare a contour map depicting the top of till and/or other confining layer(s) along the north and south side of the river. Interpolation of this mapping will also allow depiction of the top of till/confining layer(s) beneath the river.

## 2.4 Additional Field Investigations

Certain of the comments contained in the USEPA's August 14, 1998 letter suggest that the delineation of NAPL may involve an iterative approach. Once the results of the activities proposed in Sections 2.2.1 through 2.2.5 of this *Source Control Work Plan* are available, GE will evaluate the need for any further investigations. The approach by which GE proposes to assess the need for further NAPL-related investigations, and to solicit the USEPA's comments concerning the need for and scope of further assessment activities, is presented below.

The results of the initial investigations previously summarized in this *Source Control Work Plan*, when combined with information obtained from prior investigations, should be sufficient to develop accurate and detailed cross sections of the subsurface conditions beneath and adjacent to the first ½ mile of the Housatonic River. Once developed, it is anticipated that the various cross sections will provide an overall summary of the completed field investigations and will support detailed technical evaluations regarding containment barriers along the river. To illustrate current subsurface conditions, GE anticipates the development of approximately 6 representative subsurface cross sections: two cross sections running parallel to the Housatonic River (along its north and south riverbanks), and four representative cross sections running perpendicular to the river channel and extending from the north side of the river, underneath the river and concluding on the south side of the river. Included on these cross sections will be information concerning surface topography; presence of surface water and/or groundwater; geologic classification of subsurface materials (e.g., sand, gravel, silt, etc.); presence and location of confining layer(s); presence of identified LNAPL and DNAPL areas; and other pertinent information. Once these cross

sections have been generated, they will be provided to the USEPA in draft form for initial review, comment, and discussion. It is also anticipated that, at that time or shortly thereafter, a technical meeting will be held between GE and the USEPA to review the information and interpretations presented on the cross sections, discuss potential data needs, and the scope of any further investigation activities. Section 4 identifies the tentative timetable for preparation of draft geologic cross sections.

# 3. NAPL Containment/Recovery Activities

## 3.1 General

Concurrent with the performance of the field investigations proposed in Section 2 of this *Source Control Work Plan*, GE will initiate and perform several additional evaluations related to the containment and removal of subsurface NAPL. In its August 14, 1998 letter conditionally approving GE's Conceptual Work Plan, the Agencies identified two specific items related to NAPL containment/removal that should be addressed in the *Source Control Work Plan* -- a containment barrier in the East Street Area 2 LNAPL/DNAPL and Lyman Street areas, and an active DNAPL recovery system within GE's Newell Street Area II site. Both of these installations, and the anticipated evaluations, are discussed in this section.

The information presented herein is a preliminary proposal that is subject to further technical and detailed development in the future. The reason for this is that the evaluation of containment barriers and an active DNAPL recovery system will necessarily be dependent upon the results of the investigations proposed in Section 2 of this document. Nevertheless, this section provides a discussion of GE's anticipated approach for the installation of a containment barrier and a plan for an active DNAPL recovery system within the Newell Street Area II site.

As outlined in Section 4 of this *Source Control Work Plan*, it is GE's goal to design and install NAPL containment barriers for three separate areas in 1998. The areas targeted for these installations are:

- East Street Area 2, in the vicinity of the former riverbank seep area;
- Building 68 area (where GE has already proposed installation of a DNAPL containment barrier and recovery system); and
- Lyman Street Parking Lot, in the vicinity of the former riverbank seep area.

To accomplish this goal, it will be necessary to: 1) prioritize certain investigations and evaluations, 2) reduce the number of containment barrier options that are subject to evaluation, 3) gain timely USEPA review and concurrence of relevant GE proposals, including this *Source Control Work Plan*, and 4) attain all necessary local permits and approvals (i.e., Conservation Commission approval). Additional details are presented below.

## 3.2 Containment Barriers

Comment 1.b of the USEPA's August 14, 1998 letter states that GE should identify the approach to be used for the installation of containment barriers in the East Street Area 2 and Lyman Street areas. Furthermore, the Agencies identified three objectives associated with these containment barriers:

- Allow for the excavation of saturated bank soils located between the containment barrier and the river to minimize the material available to recontaminate the bank soils and river sediments;
- Ensure that the dewatering activities associated with the excavation of river sediments do not adversely affect source control activities; and
- Provide additional control of LNAPL/DNAPL in these two areas beyond the completion of the removal actions.

As indicated earlier in this *Source Control Work Plan*, evaluations concerning containment barriers are necessarily dependent upon the results of the investigation activities identified in Section 2 of this document. Hence, it is only possible to provide the general approach that GE anticipates regarding evaluations of containment barriers.

As previously indicated, it is GE's goal to design and install containment barriers in 1998 for the following areas:

- East Street Area 2, in the vicinity of the former riverbank seep area;
- Building 68 area (where GE has already proposed installation of a DNAPL containment barrier and recovery system); and
- Lyman Street Parking Lot, in the vicinity of the former riverbank seep area.

Given the limited time available to achieve this goal, GE has made several preliminary assumptions regarding the type, location, and depth of the proposed containment barriers, and related operations:

- The proposed containment barriers will be constructed of interlocking steel sheetpiling with seals to minimize leakage between the sheetpile joints. This design is consistent with configuration currently proposed (and accepted by the USEPA) for the Building 68 area DNAPL containment system.
- The anticipated location and depth of the proposed sheetpile-based containment barriers will be at the general locations illustrated on Figure 2, unless the field investigation results indicate changes in locations are needed.
- The vertical extent of the containment barriers will be determined based on the results of the investigations proposed herein. At this time, it is anticipated that the containment barrier associated with the Lyman Street Parking Lot will extend into the intermediate silt layer present at approximately 20 to 30 feet below grade. For the East Street Area 2 site, the depth of the containment barrier will depend on whether DNAPL is detected and, the specific circumstances associated with such detection (i.e., depth, thickness, etc...). A maximum depth of 45 feet (corresponding to depth of the till layer) is anticipated.
- With respect to the incorporation of additional active recovery components (e.g., hydraulic controls via drawdown pumping), it is anticipated that the existing measures will be adequate, although this will be confirmed prior to installation.

The above parameters and assumptions are general and subject to modification once the proposed field investigations are initiated and the results are reviewed. In the event that field conditions differ significantly from those anticipated, GE will re-evaluate its proposal and timetable for the installation of containment barriers for the three areas identified above. In addition, should additional NAPL areas be identified based on the investigations proposed in Section 2, GE will conduct a detailed evaluation regarding the need for and scope of a containment barrier(s) and active recovery system(s). A general discussion of the various considerations that would be involved in these evaluations is presented below.

In reviewing the objectives established by the USEPA for the potential containment barrier installations, it is apparent that a wide range of considerations must be evaluated and incorporated into the technical evaluation and design. A prerequisite to such evaluations is an understanding of the presence of NAPL within the area of interest. With this delineation complete, it is possible to identify the specific locations and depth at which a containment barrier may be applicable. Once the relative location of the containment barrier has been identified, subsequent evaluations regarding its installation can be considered. In addition to an understanding regarding the vertical and

horizontal extent of NAPL in close proximity to the riverbanks, it will also be necessary to evaluate potential containment barriers based on hydrogeologic, geotechnical, structural, and constructability considerations.

With respect to hydrogeologic evaluations, it is anticipated that computer modeling will be used to evaluate the potential effectiveness of various containment barrier options. Initially, the computer model will be developed to assess current hydrogeologic conditions within the study area, including parameters such as soil type, depth to water, depth to a confining layer(s), and presence and depth of the surface water within the Housatonic River. In addition to the information gathered as part of the proposed investigations summarized in Section 2, it will be necessary to incorporate data obtained during prior investigations. This includes information related to hydraulic conductivity of the overburden aquifer as well as the results of prior pump tests and groundwater drawdown studies (conducted as part of evaluation efforts associated with the existing oil recovery systems). In addition, it may be necessary to perform additional testing of select well locations (depending on the possible presence of LNAPL and DNAPL), possibly involving in-situ permeability tests (i.e., falling head or rising head slug tests), limited drawdown pumping tests, or other evaluations. Once the model has been calibrated to existing conditions, it will be used to evaluate potential containment barrier options. Parameters that are expected to be obtained through application of the model include estimated groundwater infiltration rates into the anticipated bank soil/sediment excavation areas, the potential zone of influence resulting from the addition of hydraulic controls associated with the containment berm option (i.e., drawdown pumping), and the potential effectiveness in containing/recovering LNAPL present in the subsurface soils.

With respect to the geotechnical considerations related to potential containment barrier options, information available from the proposed and prior investigations will be reviewed to assess the geotechnical properties of the subsurface materials. This would include visual descriptions of the soil type, standard penetration tests, blow counts associated with the sample collection, presence of saturated and unsaturated soils, and surface topography relative to the river bank and river. Until the specific removal depths associated with the bank soils and river sediments are established, it is not possible to accurately perform a detailed geotechnical evaluation. However, preliminary evaluations will be conducted and will incorporate several conservative assumptions.

Finally from a structural and constructability perspective, the evaluation of potential containment barrier options will also require a detailed understanding of the proposed bank soil and sediment removal limits. In addition, it will be necessary to understand the relationship between soil/sediment removal and the presence of NAPLs in the subsurface. For this reason, it is necessary that the design of the containment barrier, at least as it pertains to the first two objectives identified by the USEPA (i.e., excavation of saturated soils along the river bank and dewatering during sediment removal actions), be closely coordinated with the planned removal actions.

### 3.3 DNAPL Recovery from Newell Street Area II

Comment 1.e of the USEPA's August 14, 1998 conditional approval letter states that GE should submit a plan for the installation of an active pumping system to enhance DNAPL recovery within the Newell Street Area II site. In addition, Comment 10 of the Agencies' September 2, 1998 conditional approval letter for that site states that product recovery pumps should be placed in wells NS-15, NS-30, and NS-32, at a minimum, and in any other well which consistently maintains a DNAPL thickness of one foot or greater.

In order to accommodate comments made in each letter, GE proposes to complete further DNAPL delineation as proposed in Section 2 and conduct a DNAPL recovery field testing program within the Newell Street Area II site. The principal objectives of the DNAPL test program are to evaluate DNAPL removal and recovery rates, evaluate methods and equipment to effectively remove DNAPL, and assess the possible need for additional containment measures. The proposed DNAPL removal test program will utilize three existing monitoring wells (NS-15, NS-30,

NS-32) known to contain DNAPL accumulations, as well as any other existing or proposed wells containing recoverable quantities of DNAPL, if observed.

In order to assess potential DNAPL recovery volumes, a five-day evaluation program will initially be performed. This test will involve manual pumping/bailing of DNAPL at frequent intervals, with adjustments to these removal rates and intervals based on the observed recovery. These data will be utilized to select appropriate monitoring wells for automated pump placement, to determine optimum pumping equipment and rates, and to determine requirements in the design of support facilities (i.e., storage tank and building size, piping etc.) for the recovery system. Active pumping of DNAPL will commence following Agency and Pittsfield Conservation Commission approval of the proposed system design.

# 4. Summary and Schedule

## 4.1 Summary

This *Source Control Work Plan* identifies the activities proposed by GE to further assess and evaluate the presence of NAPL at several locations within the first ½ mile of the Housatonic River. In addition to performing field activities to further delineate known areas of NAPL, the investigations proposed in this document will also provide a more regional evaluation of potential NAPL occurrence within the first ½ mile stretch of the river. In total, GE proposes the installation of approximately 25 shallow, intermediate, or deep soil borings (depending on the specific investigation objectives of a given area -- i.e., assessment of LNAPL and/or DNAPL), the installation of several monitoring wells, and the performance of several seismic surveys. The results of these activities, coupled with information from prior investigations, should provide a current and supplemental assessment regarding the presence of subsurface NAPL.

Once the various field activities are complete, GE will perform several evaluations relating to NAPL containment and recovery activities beyond those already in place and operational. As presented in this *Source Control Work Plan*, such evaluations will be performed on an accelerated basis for three specific areas within the first ½ mile of the river: East Street Area 2 (in the vicinity of the riverbank area), the Building 68 Area, and the Lyman Street site. It is GE's goal to perform the necessary evaluation, design, and implementation activities for these three areas this year. However, this schedule (discussed below) is dependent upon the results of the investigations proposed herein.

## 4.2 Anticipated Schedule

GE anticipates that the various field activities proposed in this *Source Control Work Plan* will be initiated within approximately one to two weeks following USEPA review and approval, and that the field investigation can be completed within approximately seven to eight weeks thereafter (dependent upon attainment of all necessary access agreements and permits). Based on this preliminary timetable, and considerations related to GE's goal of installing certain NAPL containment barriers this year, the following tentative schedule has been developed:

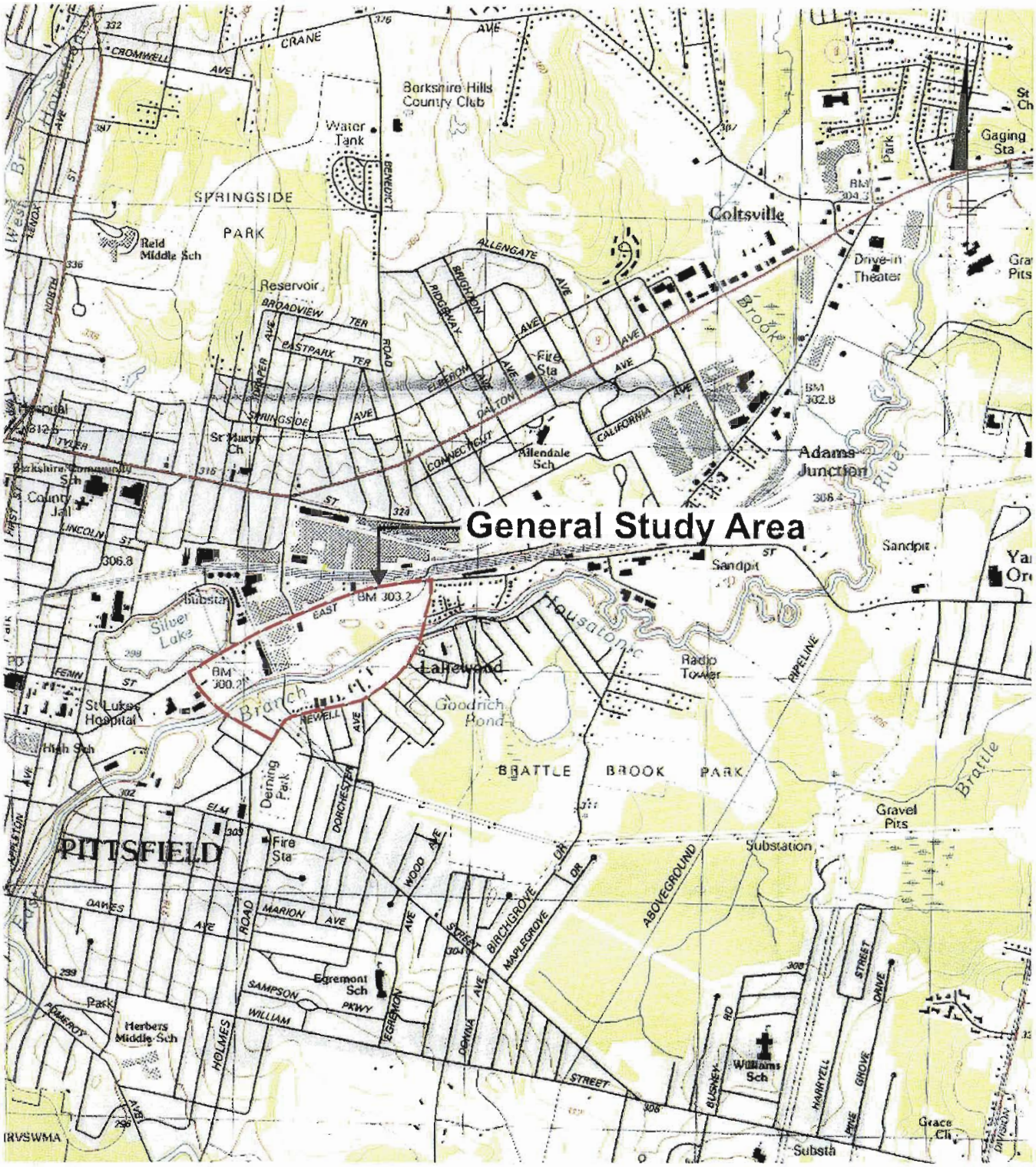
| Tentative Schedule | | Anticipated Activity |
|---|---|---|
| September 21, 1998 | - | Assumed date for USEPA approval of *Source Control Work Plan.* |
| October 1, 1998 | - | Initiation of proposed field activities in accordance with USEPA-approved *Source Control Work Plan.* |
| October 1 - November 25, 1998 | - | Performance of field activities (the sequencing of field activities will be selected in consideration of accelerated containment barrier evaluation and design activities). |
| October 23, 1998 | - | GE submission of detailed proposal for containment barriers at East Street Area 2 and Lyman Street sites (including more detailed schedule). |
| November 6, 1998 | - | Assumed date for USEPA approval of detailed proposal for containment barriers at these locations. |
| November 15, 1998 | - | Anticipated date for initiation of construction work for NAPL containment barriers within the East Street Area 2 and Lyman Street sites (subject to modification in |

accordance with the schedule to be included in the October 23, 1998 detailed proposal).

December 11, 1998 - GE submission of draft subsurface cross sections to the USEPA; technical meeting between GE and USEPA follows.

December 31, 1998 - GE submission of report to USEPA summarizing results of field activities completed to date, assessing the need for further investigations, and establishing a timetable for evaluation of remaining source control topics (i.e., containment barrier evaluations and Newell Street Area II DNAPL recovery).

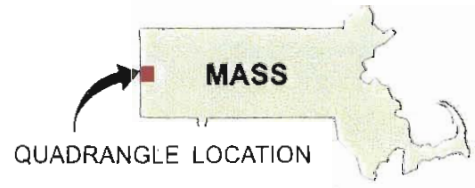
# Figures




REFERENCE: PITTSFIELD EAST, MASS. USGS QUADS., 7.5 MIN. SERIES, 1988

2000' 0 2000'

APPROXIMATE SCALE: 1" = 2000'




QUADRANGLE LOCATION

08/98 SYR-D54-DJH
20146031/20146n01.CDR

GENERAL ELECTRIC COMPANY
PITTSFIELD MASSACHUSETTS

**SOURCE CONTROL WORK PLAN**

# LOCATION PLAN

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

FIGURE
1

## LEGEND:

- APPROXIMATE DELINEATION OF FORMER OXBOW H
- ES2-1 — EXISTING MONITORING WELL
- 64X(W) — EXISTING OIL RECOVERY CAISSON
- RW-1(X) — EXISTING PUMPING WELL
- X-11 — EXISTING SOIL BORING
- SEISMIC TRANSECT LOCATION (PREVIOUSLY COMPLETED)
- PROPOSED SEISMIC TRANSECT LOCATION
- APPROXIMATE LOCATION OF PROPOSED CONTAINMENT BARRIER
- PROPOSED "DEEP" OR "INTERMEDIATE" SOIL BORING/MONITORING WELL
- PROPOSED "SHALLOW" SOIL BORING/MONITORING WELL
- DNAPL OBSERVED (FROM PRIOR INVESTIGATIONS)

0 120' 240'
GRAPHIC SCALE

EAST STREET
NEWELL STREET
PARKSIDE
EASTERN CAISSON
SLURRY WALL
E2SC-1
E2SC-2
E2SC-3
E2SC-4
E2SC-5
E2SC-6
E2SC-7
E2SC-8
E2SC-9
E2SC-10
E2SC-11
E2SC-12
E2SC-13
E2SC-14
E2SC-15
BUILDING 68 DNAPL INVESTIGATIONS
LYMAN STREET LNAPL/DNAPL INVESTIGATIONS
EAST STREET AREA 2 NAPL INVESTIGATIONS
FORMER OXBOW H NAPL INVESTIGATIONS
NEWELL STREET II DNAPL INVESTIGATIONS
Hibbard Playground
Housatonic River
Branch
East
LYMAN
VERMONT
SACKET ST
PILE
LSSC-1
LSSC-2
LSSC-3
LSSC-4
LSSC-5
LSSC-6
LSSC-7
LSSC-8
N2SC-1
N2SC-2
N2SC-3
N2SC-4
N2SC-5
N2SC-6

NOTES:

1. THE BASE MAP FEATURES WERE PHOTOGRAMMETRICALLY MAPPED FROM APRIL 1990 AERIAL PHOTOGRAPHS.
2. ALL EXISTING AND PROPOSED INVESTIGATION LOCATIONS ARE APPROXIMATE.
3. NAPL = NON-AQUEOUS PHASE LIQUID
   LNAPL = LIGHT NON-AQUEOUS PHASE LIQUID
   DNAPL = DENSE NON-AQUEOUS PHASE LIQUID
4. LOCATIONS OF PROPOSED SEISMIC TRANSECTS SUBJECT TO MODIFICATION FOLLOWING ANALYSIS OF INITIAL DATA.
5. LOCATIONS OF PROPOSED CONTAINMENT BARRIERS ARE PRELIMINARY AND SUBJECT TO MODIFICATION BASED ON RESULTS OF PROPOSED INVESTIGATIONS.

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PITTSFIELD, MASSACHUSETTS

# SOURCE CONTROL WORK PLAN

## PROPOSED NAPL-RELATED INVESTIGATIONS

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

FIGURE 2

X 20140X01
L: ON=*; OFF=REF
P: STD-PCP/DL
9/11/98 SYR-54-DMW RLP YCC
20140005\20140G01.DWG