08-0184

SDMS 158589

Corporate Environmental Programs
General Electric Company
100 Woodlawn Ave., Pittsfield, MA 01201

Transmitted Via Facsimile & Federal Express

March 3, 2000

Dean Tagliaferro
On Scene Coordinator
Site Evaluation and Response Section (HBR)
U.S. Environmental Protection Agency
One Congress Street, Suite 1100
Boston, MA 02203-2211

Bryan Olson
Project Coordinator
Office of Site Remediation and Restoration
U.S. Environmental Protection Agency
One Congress Street, Suite 1100
Boston, MA 02114-2023

Re: GE-Pittsfield/Housatonic Site
Upper ½-Mile Reach Removal Action: Results of DNAPL Investigation and Proposal to Address Presence of DNAPL

Dear Mr. Tagliaferro and Mr. Olson:

Enclosed as an attachment to this letter are the results of the recent investigation for further delineation of dense non-aqueous phase liquid (DNAPL), encountered during sediment removal activities in Cell C as part of the Upper ½-Mile Reach Removal Action. Additionally included in the attachment, is a proposal to address the presence of DNAPL that was delineated by the investigation. The proposal involves additional excavation of the DNAPL-impacted materials and potential modification to the restoration system in this area. The proposal will be implemented following the United States Environmental Protection Agency (USEPA) approval of this plan.

Very truly yours,

Andrew T. Silfer /dmm

Andrew T. Silfer, P.E.
GE Project Coordinator

SDM/plh

F:\USERS\SMR\SMR00\19201938.WPD

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M. Carroll, GE
A. Thomas, GE
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Public Information Repositories ECL I-P-IV(A) (1)
GE Internal Repositories

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS
UPPER ½-MILE REMOVAL ACTION OF HOUSATONIC RIVER

RESULTS OF DNAPL INVESTIGATION AND PROPOSAL TO ADDRESS PRESENCE OF DNAPL

I. INTRODUCTION

On February 7, 2000, GE submitted an *Investigation Work Plan - Occurrence of Dense Non-Aqueous Phase Liquid (DNAPL)* (the Work Plan) to the United States Environmental Protection Agency (USEPA), with a copy to the Massachusetts Department of Environmental Protection (MDEP). The Work Plan included a proposal for the implementation of a DNAPL investigation in response to the observation of a coal-tar-based DNAPL within the Cell C sediment removal area for the Upper ½-Mile Reach Removal Action within the Housatonic River (Figure 1). The proposed investigation included a phased soil boring program within Cells C and D to delineate the horizontal and vertical extent of DNAPL present in this area as well as the initiation of groundwater pumping of two existing wells [RW-3(X) and E2SC-9] located on the north bank. The USEPA issued a conditional approval letter on February 11, 2000 and the investigation program was initiated on February 14, 2000. Installation of groundwater pumping equipment at the two wells has been performed and groundwater pumping began in well E2SC-9 on February 29, 2000. Following the initiation of groundwater pumping, GE verbally proposed (to the USEPA on February 29, 2000) to not pump groundwater at well RW-3(X) since sediment excavation/restoration activities were nearly completed in the upstream portion of Cell C. GE received verbal approval from the USEPA and pumping at well RW-3(X) has not been initiated.

This document, which has been prepared by Blasland, Bouck & Lee, Inc. (BBL) on behalf of GE, presents the results of the investigation program and provides a proposal for excavation of the DNAPL-containing materials and a potential modification of the restoration system in this area. The results of the investigation and the proposal to address the presence of DNAPL are presented in Sections II and III, respectively; the proposed schedule is presented in Section IV.

II. SUMMARY OF DNAPL INVESTIGATION AND RESULTS

The phased investigation program was performed between February 14, 2000 and February 21, 2000 by GE with oversight from USEPA representatives. Implementation of the program resulted in the installation of 15 soil borings in a grid-like pattern at approximately 15-foot spacing, using manual AMS probe sampling techniques. The surveyed soil boring locations are shown on Figure 1. During advancement of the core barrel, the recovered soils were continuously logged and boring logs were developed and are included as Attachment A to this document. The soil samples were characterized with regard to the potential presence of DNAPL based on visual descriptions, photoionization detector (PID) readings, and soil-water shake tests. Following completion of the borings, each borehole was filled with bentonite grout and/or bentonite chips. Separate-phase DNAPL was only observed in the soil cores at three borings (HRSC-3, HRSC-5, and HRSC-6), representing an area of approximately 400 square feet. The approximate horizontal and vertical extent of DNAPL is depicted on Figures 1 through 4 (attached). The data from the borings indicate the vertical extent of DNAPL is limited to a 1 to 3 foot thick lens of sediment extending to a maximum depth of elevation 962 feet. Below this elevation a finer sand layer was consistently encountered. The estimated volume of impacted material within this area is 40 cubic yards.

Following completion of several of the boring locations, an intermediate cut-off sheetpile wall was installed within Cell C (see Figure 1) to further isolate the DNAPL area.

Following completion of the soil boring investigation, five of the soil boring locations (HRSC-3, HRSC-5, HRSC-6, HRSC-8, and HRSC-9, were selected for installation of well points (piezometers). Table 1 summarizes the well point construction details. The well points were installed on February 21, 2000, and monitored on February 24 and 25, 2000 for the presence of DNAPL. The results are presented in Table 2.

As indicated in Table 2 DNAPL was only found in one well point (PZ-4-HRSC-3) at a thickness ranging from approximately 1.5 to 1.7 feet.

III. PROPOSED EXCAVATION AND RESTORATION ACTIVITIES

As determined during the boring program, the horizontal and vertical limits of the DNAPL are confined to an isolated "pocket" of granular sediment present within the western portion of Cell C above a fine sand layer. Based on a review of options for DNAPL removal and/or containment, GE proposes to excavate the sediment containing DNAPL to the boundaries defined by the borings, as depicted in Figures 1 through 4. Maxymillian Technologies, Inc. (MTI) has performed a structural evaluation of the current sheetpile configuration with the proposed removal depth (i.e., to approximately elevation 962 feet) and has determined that it will be necessary to install deeper sheeting (i.e., to approximately elevation 952 feet) along the southern and western boundaries in order to reach the identified removal limits. As a result, additional sheeting will be installed at the locations shown on Figure 1.

Prior to initiation of excavation activities, the well points will be decommissioned by removing the well point and filling the borehole with grout. Following completion of the excavation, a determination will be made as to whether additional DNAPL-impacted materials are present (based on visual observations) and whether it is possible to excavate additional materials based on the location and extent of DNAPL-impacted materials and excavation stability concerns. If it is determined that additional excavation can safely and reasonably be performed, additional excavation will be performed until it is determined, based on visual observations, that the DNAPL-impacted materials have been removed or until the maximum excavation limits have been reached.

Following completion of the excavation, the area will be immediately restored. GE has developed two restoration scenarios for the DNAPL excavation area. The restoration option used will depend on whether DNAPL is observed following completion of excavation activities. Each scenario is further described below.

Scenario 1 - No DNAPL Observed Following Excavation

If the DNAPL-impacted materials have been completely removed, then the area will be restored consistent with the requirements for the remainder of the Upper ½-Mile Reach (i.e., geotextile in the base of the excavation, followed by a variable depth of isolation layer material, geotextile, geogrid, and a 12-inch thick layer of 9-inch armor stone).

Scenario 2 - DNAPL Observed Following Excavation

If DNAPL-impacted materials remain following completion of excavation activities, then an impermeable 20 mil high density polyethylene (HDPE) liner will initially be placed over the area to provide physical separation so that the area may be restored consistent with the requirements for the remainder of the Upper ½-Mile Reach. The intent of the HDPE liner is to minimize contact with the remainder of the restoration layers during construction (i.e., to prevent mixing). Modification to the restoration system above the HDPE liner would not be necessary (even if some DNAPL-impacted materials remain at depth) since, to a large extent, the DNAPL zone will have been removed. In addition, BBL on behalf of GE, performed calculations which indicate that the average observed vertical hydraulic gradient of well pair E2SC-3S/E2SC-3I (which are located on the river bank in the vicinity of the DNAPL area) is 0.0173 (with maximum value of 0.021). This hydraulic gradient is well below the critical vertical hydraulic gradient of 0.059 theoretically required to cause upward movement of DNAPL (based on the specific gravity of 1.059 measured for the DNAPL). Further, any remaining DNAPL would be present at a much deeper elevation than existed previously, and the potential for upward movement caused by dewatering of the excavation will be eliminated following restoration. It should also be noted that as discussed in the investigation Work Plan submitted to USEPA, under previously existing conditions (i.e., prior to any sediment and DNAPL removal) Appendix IX+3 sediment data in this vicinity did not contain elevated levels of the constituents reported in the DNAPL sample. Also, the surface water data showed no

statistical difference between constituent concentrations collected from surface water upstream and downstream of the DNAPL area.

IV. SCHEDULE AND ADDITIONAL ACTIVITIES

The proposed excavation and restoration activities outlined herein will be implemented following USEPA's approval of this proposal. It is anticipated that following USEPA approval of this proposal, excavation and restoration activities will be completed within a 2 week time frame. Until such time, GE will continue to conduct the following activities:

- Monitor the well points three times per week until the additional excavation activities are initiated;
- Pump groundwater from well E2SC-9 until the DNAPL excavation area is restored and excavation dewatering activities are discontinued (at that time GE will re-assess the need for continued groundwater pumping of this well);
- Recover DNAPL from the excavation area on a daily basis, as practicable; and
- Maintain oil absorbent booms and pads as needed.

Finally, following completion of restoration activities in the upstream portion of Cell C, GE will begin installation of the automated DNAPL collection system in well RW-3(X).

Tables

TABLE 1

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS
UPPER ½-MILE REMOVAL ACTION OF HOUSATONIC RIVER

WELL POINT CONSTRUCTION DETAILS

ID	GROUND ELEVATION (Feet AMSL)	HEIGHT OF RISER ABOVE GRADE (Feet)	RISER LENGTH (Feet)	SCREEN LENGTH (Feet)	SUMP LENGTH (Feet)	BASE OF SCREEN ELEVATION (Feet AMSL)	DEPTH TO BOTTOM (Feet)
PZ-1-HRSC-5	966.40	4.10	5.63	2.00	0.00	962.87	7.63
PZ-2-HRSC-6	966.09	4.38	5.63	2.00	0.00	962.84	7.63
PZ-3-HRSC-9	968.44	2.77	5.63	3.97	0.56	961.61	10.16
PZ-4-HRSC-3	965.71	4.39	5.63	2.00	0.00	962.47	7.63
PZ-5-HRSC-8	969.92	3.05	5.63	3.97	0.56	963.37	10.16

Notes:

1. Materials used for well installation consisted of PVC screens and solid PVC risers.

TABLE 2

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS
UPPER ½-MILE REMOVAL ACTION OF HOUSATONIC RIVER

WELL POINT MONITORING PROGRAM

DATE: 2/24/00
TIME: 0905
TEMP: 35°F
WEATHER: Sunny
METHOD: I.P.
OPERATOR: Steve Lewitt

** ALL MEASUREMENTS ARE IN FEET

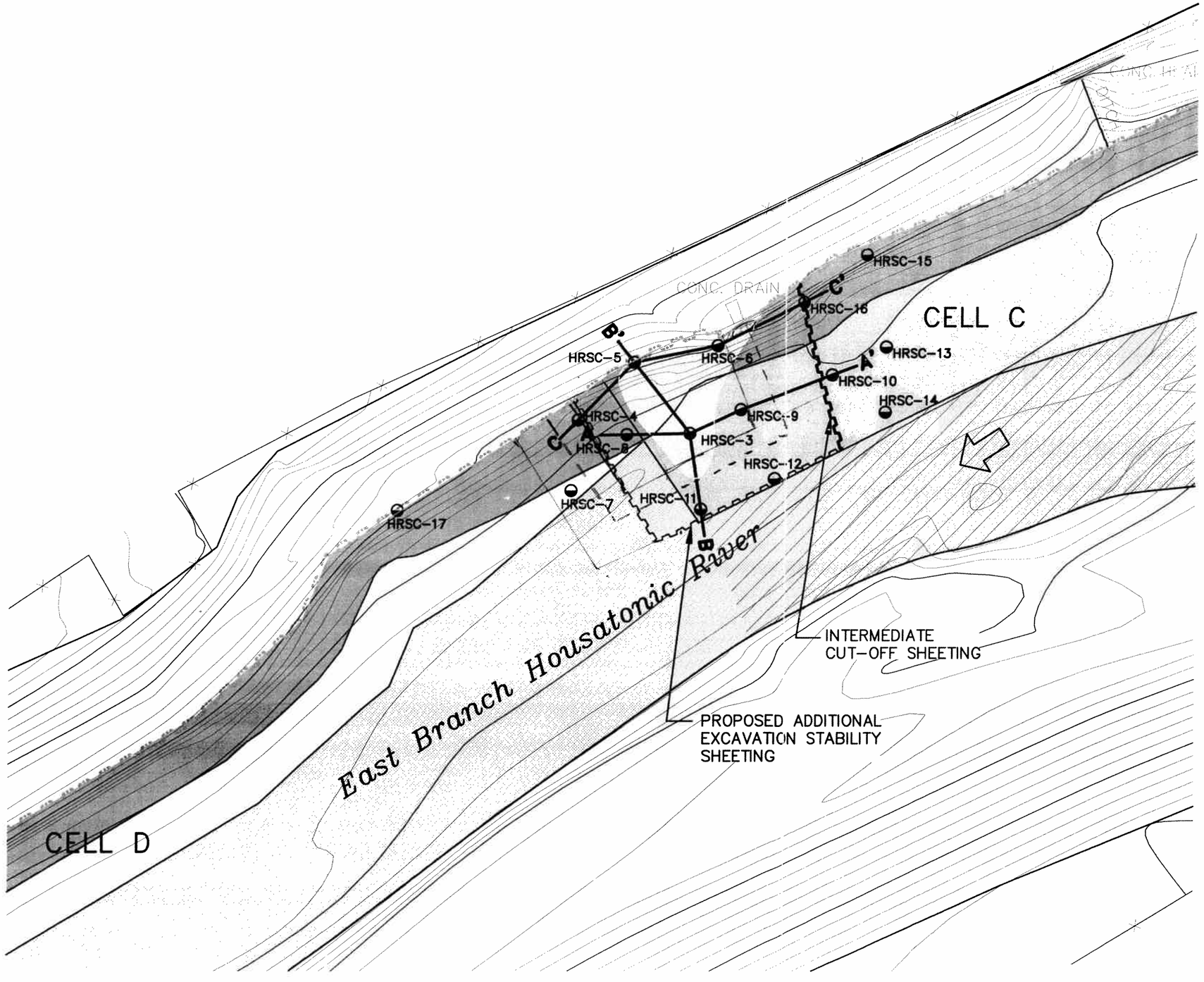
ID	DEPTH TO WATER	DEPTH TO LNAPL	LNAPL THICKNESS	DEPTH TO BOTTOM	DEPTH TO DNAPL	DNAPL THICKNESS	HEIGHT OF RISER ABOVE GRADE
PZ-1-HRSC-5	2.70	-----	-----	7.30	-----	-----	4.10
PZ-2-HRSC-6	3.22	-----	-----	7.54	-----	-----	4.38
PZ-3-HRSC-9	4.05	-----	-----	8.31	-----	-----	2.77
PZ-4-HRSC-3	2.81	-----	-----	7.55	6.09	1.46	4.39
PZ-5-HRSC-8	3.80	-----	-----	9.47	-----	-----	3.05

DATE: 2/25/00
TIME: 1430
TEMP: 45°F
WEATHER: Overcast
METHOD: I.P.
OPERATOR: Steve Lewitt

** ALL MEASUREMENTS ARE IN FEET

ID	DEPTH TO WATER	DEPTH TO LNAPL	LNAPL THICKNESS	DEPTH TO BOTTOM	DEPTH TO DNAPL	DNAPL THICKNESS	HEIGHT OF RISER ABOVE GRADE
PZ-1-HRSC-5	2.35	-----	-----	7.32	-----	-----	4.10
PZ-2-HRSC-6	2.57	-----	-----	7.54	-----	-----	4.38
PZ-3-HRSC-9	3.41	-----	-----	8.24	-----	-----	2.77
PZ-4-HRSC-3	2.60	-----	-----	7.55	5.84	1.71	4.39
PZ-5-HRSC-8	3.02	-----	-----	9.45	-----	-----	3.05

Figures



LEGEND:

- BORING LOCATION FOR DNAPL INVESTIGATION
- ADDITIONAL EXCAVATION TO OCCUR IN CONJUNCTION WITH EAST STREET AREA 2 SOURCE CONTROL ACTIVITIES
- EXCAVATION SHEETPILE
- SOURCE CONTROL SHEETPILE
- TOP OF BANK
- SEDIMENT REMOVAL AREA
- SEDIMENT REMOVAL AND REPLACEMENT COMPLETED
- APPROXIMATE EXTENT OF DNAPL OBSERVED

NOTES:

1. BASE MAP PROVIDED BY LOCKWOOD MAPPING, INC. PREPARED FROM 1990 AERIAL PHOTOGRAPHY. RIVERBANK AND RIVER BED TOPOGRAPHIC INFORMATION PROVIDED BY BBL FROM OCTOBER 12–23, 1998 FIELD SURVEY.
2. COORDINATE GRID BASED ON 1927 STATE PLANE COORDINATES.
3. ELEVATION DATUM REFERENCED TO NGVD 1929.

0 20' 40'

GRAPHIC SCALE

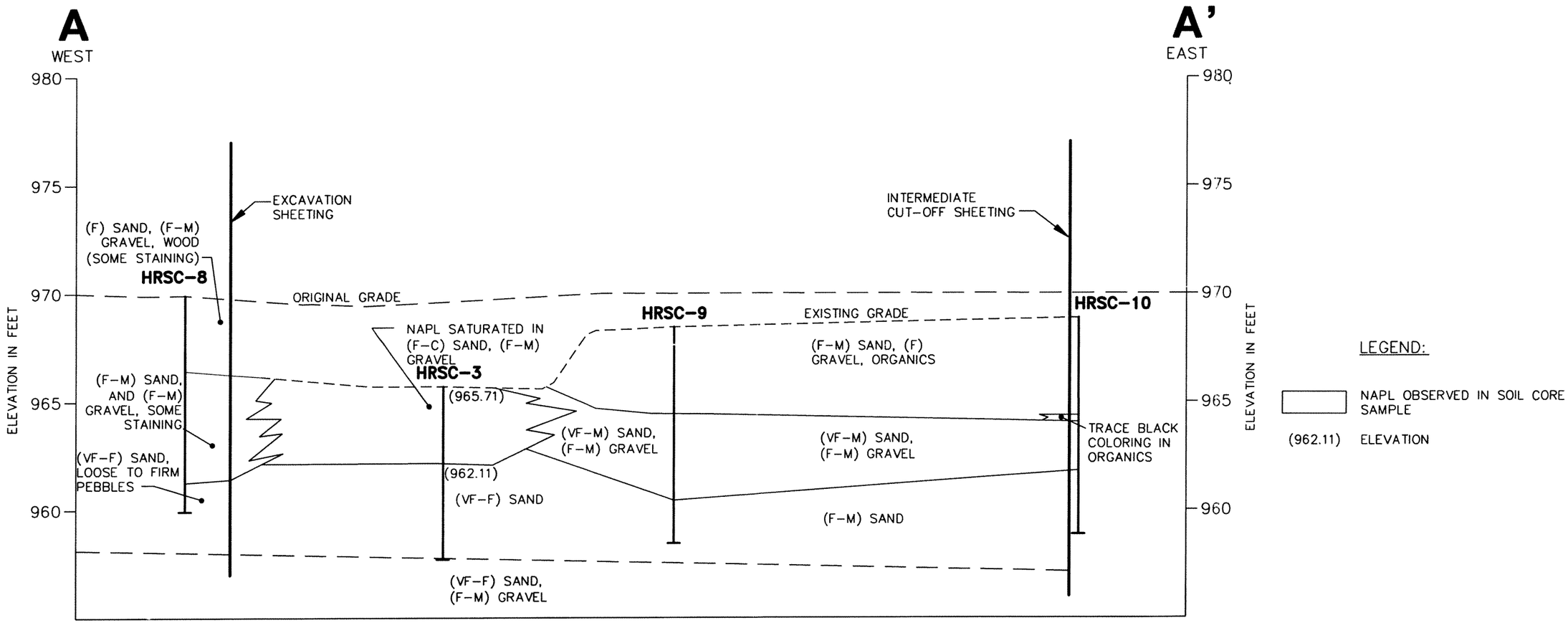
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
REMOVAL ACTION
UPPER 1/2-MILE REACH OF HOUSATONIC RIVER

DNAPL INVESTIGATION RESULTS

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

FIGURE **1**

L: ON =* OFF=*REF*,SURV*,*SED-* ON=*SED-POLY
P: STD-PCP/BL
2/24/00 SYR-54-NES AK NES RCB
20197070/20197B04.DWG



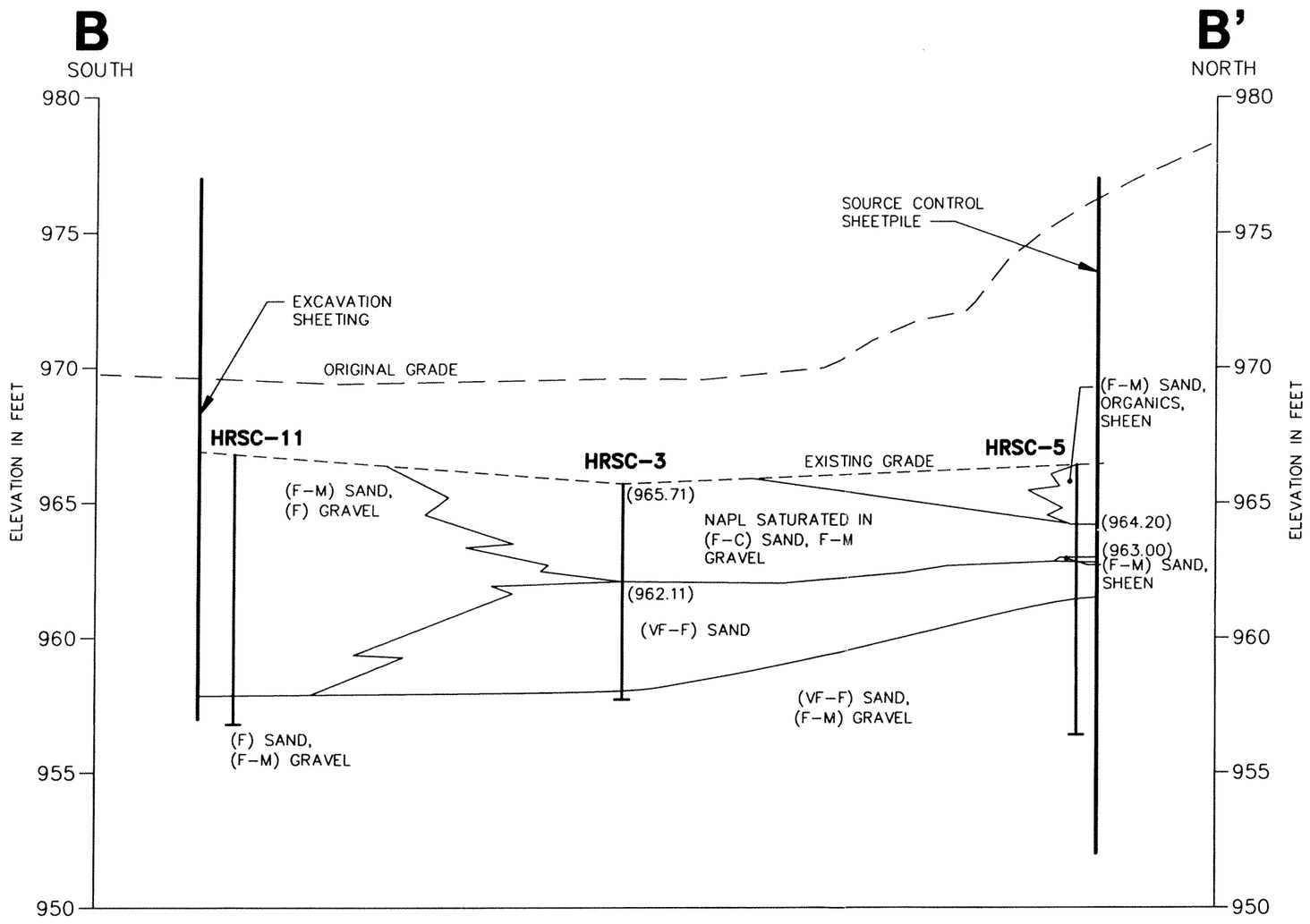
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
REMOVAL ACTION
UPPER 1/2-MILE REACH OF HOUSATONIC RIVER

CROSS SECTION A-A'

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

FIGURE **2**

L: ON =* OFF=*REF*,SURV*,*SED-* ON=*SED-POLY
P: STD-PCP/BL
3/3/00 SYR-54-NES AK NES PGL
20197070/20197B05.DWG



LEGEND:

NAPL OBSERVED IN SOIL CORE SAMPLE

(962.11) ELEVATION

0 5' 10'

GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
REMOVAL ACTION
UPPER 1/2-MILE REACH OF HOUSATONIC RIVER

CROSS SECTION B-B'

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

FIGURE **3**

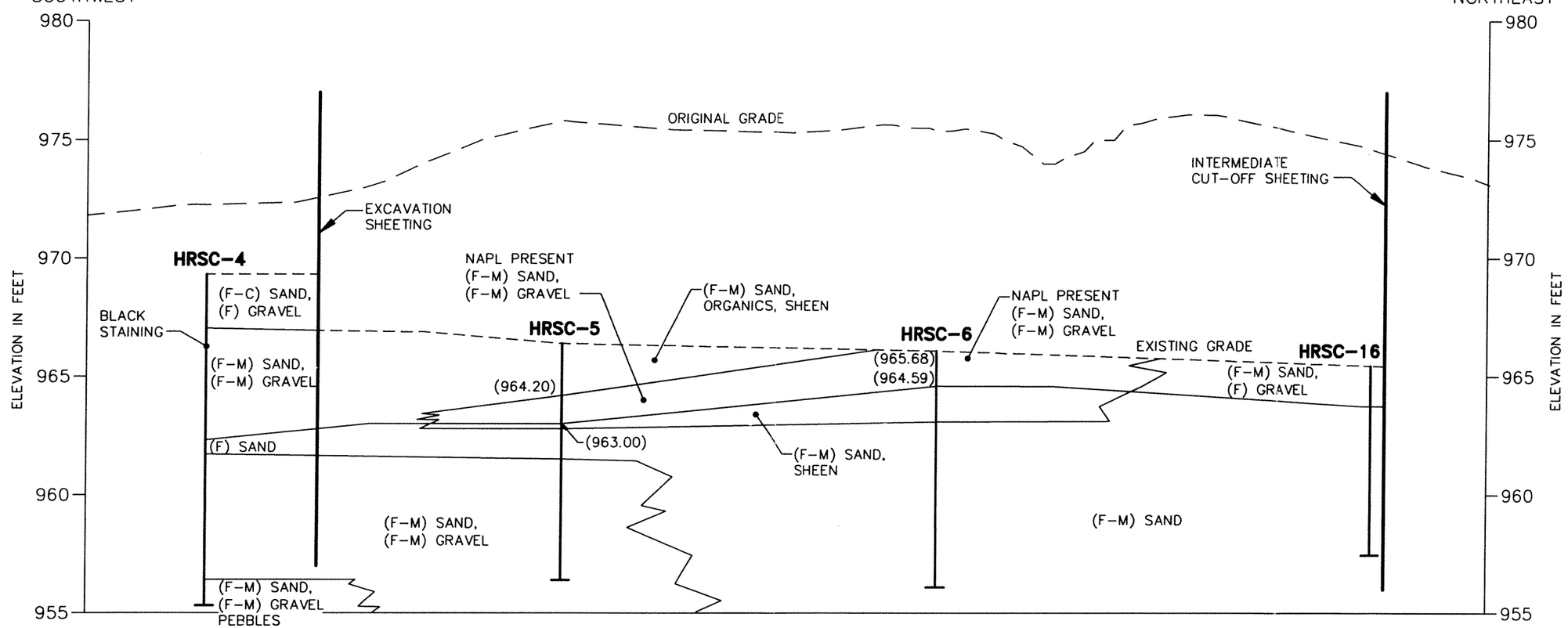
L: ON =* OFF=*REF*,SURV*,*SED-* ON=*SED-POLY
P: STD-PCP/BL
2/24/00 SYR-54-NES AK NES PGL
20197070/20197B07.DWG

C

SOUTHWEST

C'

NORTHEAST



LEGEND:

NAPL OBSERVED IN SOIL CORE SAMPLE

(964.20) ELEVATION

0 5' 10'

GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
REMOVAL ACTION
UPPER 1/2-MILE REACH OF HOUSATONIC RIVER

CROSS SECTION C-C'

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

FIGURE **4**

L: ON =* OFF=*REF*,SURV*,*SED-* ON=*SED-POLY
P: STD-PCP/BL
2/23/00 SYR-54-NES AK NES PGL
20197070/20197B06.DWG

Attachments

Attachment A

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Soil Boring Logs

DATE STARTED: 2/2/2000
DATE FINISHED:2/2/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 8.0 Feet
DESCRIPTIONS BY: Jim Hassett
NORTHING: 533415.74
EASTING: 133339.40
GROUND ELEVATION: 965.71

BORING ID: HR-SC-3
CLIENT: General Electric Company
Pittsfield, MA
SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	965.71	0-4	2.0				Dark gray-black fine-coarse SAND, some fine-medium Gravel, NAPL saturated.
1	964.71						
2	963.71						
3	962.71						Note: Entire core barrel coated with NAPL to 4 feet, but gray sand in lower 0.4 feet did not exhibit presence of NAPL within center of core.
4	961.71	4-8	3.75				3.6 (962.11') Gray very fine-fine SAND.
5	960.71						
6	959.71						
7	958.71						
							7.75' (957.96')
8	957.71						Gray very fine-fine SAND, some fine-medium Gravel.
							Boring terminated at 8.0 feet (957.71 feet).
9							
10							

REMARKS:
Boring backfilled with bentonite.

DATE STARTED: 2/17/2000
DATE FINISHED:2/17/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 14.0 Feet

DESCRIPTIONS BY: Nicholas A. Smith

NORTHING: 533418.25
EASTING: 133318.24
GROUND ELEVATION: 969.32

BORING ID: HR-SC-4

CLIENT: General Electric Company
Pittsfield, MA

SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	969.32	0-4	2.6	0-1	3.1	-	Gray fine SAND, trace fine Gravel.
1	968.32			1-2	5.5	TS	
2	967.32			2-4	4.8	-	
							1.9' (967.42')
							Dark gray fine-coarse SAND, some fine Gravel. 2.1' (967.22')
							Gray fine SAND, trace fine Gravel.
3	966.32						2.6' (966.72')
							Dark gray fine-medium SAND, little-some fine-medium Gravel
							Black staining from 3.0 to 3.1 feet.
4	965.32	4-8	2.6	4-5.6	1.2	-	
5	964.32						
				5.6-6.2		-	
							5.4' (963.92')
6	963.32			6.2-8	1.0	-	Gray fine-medium SAND and fine-medium GRAVEL.
7	962.32						
							7.0' (962.32')
							Gray fine SAND.
8	961.32	8-10	1.8	8-10	2.0	-	7.6' (961.72')
							Gray fine SAND, some fine Gravel.
							8.2' (961.12')
9	960.32						Dark gray fine-medium GRAVEL, some fine-medium Sand.
10	959.32	10-14	2.1	10-11	3.2	-	

REMARKS:
Boring installed through approximately 6 inches of standing water containing sheen.
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed; N denotes NAPL observed; S denotes sheen observed; T = trace.

DATE STARTED: 2/17/2000
DATE FINISHED:2/17/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 14.0 Feet
DESCRIPTIONS BY: Nicholas A. Smith
NORTHING: 533418.25
EASTING: 133318.24
GROUND ELEVATION: 969.32

BORING ID: HR-SC-4
CLIENT: General Electric Company
Pittsfield, MA
SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
11	958.32	10-14	2.1	11-14	4.5	-	Dark gray fine-medium GRAVEL, some fine-medium Sand.
12	957.32						
13	956.32						
							12.9' (956.42')
							Dark gray-black fine-medium SAND, some fine-medium Gravel and Pebbles.
14	955.32						
15							Boring terminated at 14.0 feet (955.32 feet).
16							
17							
18							
19							
20							
21							
22							

REMARKS:
Boring installed through approximately 6 inches of standing water containing sheen.
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed; N denotes NAPL observed; S denotes sheen observed; T = trace.

DATE STARTED: 2/14/2000
DATE FINISHED:2/14/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 10.0 Feet

DESCRIPTIONS BY: Nicholas A. Smith

NORTHING: 533429.11
EASTING: 133328.76
GROUND ELEVATION: 966.40

BORING ID: HR-SC-5

CLIENT: General Electric Company
Pittsfield, MA

SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	966.40	0-1.8	0.8	0-1.8	42	S	Black fine-medium SAND, trace Organics, sheen.
1	965.40						
2	964.40	1.8-6	3.8	1.8-3	280	N	
							2.2' (964.20')
3	963.40			3-4	175	N	Black fine-medium SAND, little fine-medium Gravel, contains NAPL.
							3.4' (963.00')
4	962.40			4-6	168	TN	Gray fine-medium SAND, multicolor sheen to 3.6 feet.
						S	
5	961.40						4.9' (961.50')
							Dark gray fine SAND, some medium Gravel, compact.
6	960.40	6-8	1.4	6-8	86	-	
7	959.40						6.8' (959.60')
							Gray fine SAND, trace sheen (may be from above).
							7.1' (959.30')
8	958.40	8-10	1.7	8-10	7.4	-	Dark gray fine SAND, some medium Gravel, compact. Isolated specks of sheen noted on loosened gravel pieces (may be from above).
9	957.40						
10	956.40						
							Boring terminated at 10.0 feet (956.40 feet).

REMARKS:
Boring installed through approximately 1 foot of standing water containing NAPL.
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed; N denotes NAPL observed; S denotes sheen observed; T= Trace.

DATE STARTED: 2/15/2000
DATE FINISHED:2/15/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 10.0 Feet

DESCRIPTIONS BY: Nicholas A. Smith

NORTHING: 533432.30
EASTING: 133344.55
GROUND ELEVATION: 966.09

BORING ID: HR-SC-6

CLIENT: General Electric Company
Pittsfield, MA

SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	966.09	0-3	2.2	0-0.7	178	N	Black fine-medium SAND, some fine-medium Gravel, contains NAPL.
1	965.09			0.7-1.2	75	N	
				1.2-3	26	N	
2	964.09						1.5' (964.59') Gray fine SAND, moderate sheen from 1.5 to 2.0 feet.
							2.4' (963.69')
3	963.09	3-7	4.0	3-4	24	-	Gray fine-medium SAND, trace sheen. Note: Core liner is coated with NAPL
							3.0' (963.09')
4	962.09			4-5	22	-	ALTERNATING SEQUENCE: LAYER 1 - Gray fine SAND, layers 2" to 6" thick; LAYER 2 - Gray fine-medium SAND, layers 2" to 6" thick;
5	961.09			5-7	28	-	
6	960.09						
7	959.09	7-10	3.0	7-8	17.5	-	
							7.0' (959.09')
8	958.09			8-10	17	-	ALTERNATING SEQUENCE: LAYER 1 - Gray fine SAND, layers 1" to 2" thick; LAYER 2 - Gray fine-medium SAND, layers 2" to 6" thick;
9	957.09						
10	956.09						
							Boring terminated at 10.0 feet (956.09 feet).

REMARKS:
Boring installed through approximately 1 foot of standing water containing NAPL.
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed; N denotes NAPL observed.

DATE STARTED: 2/17/2000
DATE FINISHED:2/17/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 10.0 Feet

DESCRIPTIONS BY: Nicholas A. Smith

NORTHING: 533404.97
EASTING: 133316.96
GROUND ELEVATION: 969.31

BORING ID: HR-SC-7

CLIENT: General Electric Company
Pittsfield, MA

SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	969.31	0-3	2.0	0-1	2.0	-	Brown fine-medium SAND and fine-medium GRAVEL.
1	968.31			1-3	0.5	-	
2	967.31						1.8' (967.51')
							Brown-gray fine SAND, little fine-medium Gravel, loose.
3	966.31	3-7	4.0	3-5	0.4	-	3.0' (966.31')
							Gray very fine-fine SAND, loose.
4	965.31						
5	964.31			5-7	0.5	-	
6	963.31						5.7' (963.61')
							Gray fine SAND.
7	962.31	7-10	2.6	7-8.5	0.4	-	7.4' (961.91')
							Gray fine SAND, loose, trace orange iron staining.
8	961.31						
				8.5-10	0.0	-	
9	960.31						8.9' (960.41')
							Dark gray fine-medium SAND, some fine Gravel.
10	959.31						
							Boring terminated at 10.0 feet (959.31 feet).

REMARKS:
Boring installed through approximately 1 foot of standing water.
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed; N denotes NAPL observed; S denotes sheen observed; T = trace.

DATE STARTED: 2/17/2000
DATE FINISHED:2/17/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 10.0 Feet

DESCRIPTIONS BY: Nicholas A. Smith

NORTHING: 533415.50
EASTING: 133327.43
GROUND ELEVATION: 969.92

BORING ID: HR-SC-8

CLIENT: General Electric Company
Pittsfield, MA

SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	969.92	0-2	1.0	0-2	4.8	S	Brown fine-medium SAND, little fine Gravel.
							1.2' (968.72')
1	968.92					-	Black fine SAND, little Silt, fine-medium Gravel, and Wood.
							Black staining from 1.6 to 2.0 feet.
2	967.92	2-6	2.5	2-3.5	5.2	-	
3	966.92						
				3.5-6	1.6	-	3.5' (966.42')
4	965.92						Dark gray-black fine SAND, trace medium Gravel.
5	964.92						5.1' (964.82')
							Black fine-medium SAND and fine-medium GRAVEL, some staining.
6	963.92	6-10	3.8	6-7	1.3	-	6.2' (963.72')
							Dark gray fine-medium SAND and fine-medium GRAVEL, slight staining from 6.2 to 6.7 feet.
7	962.92			7-9	1.0	-	7.2' (962.72')
							Brown-gray very fine-fine SAND, trace-little Pebbles, loose.
8	961.92						8.0' (961.92')
							Brown fine SAND, occasional Pebbles, firm.
9	960.92			9-10	1.2	-	
10	959.92						Boring terminated at 10.0 feet (959.92 feet).

REMARKS:
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed; N denotes NAPL observed; S denotes sheen observed; T = trace.

DATE STARTED: 2/14/2000
DATE FINISHED:2/14/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 10.0 Feet

DESCRIPTIONS BY: Nicholas A. Smith

NORTHING: 533420.22
EASTING: 133349.07
GROUND ELEVATION: 968.44

BORING ID: HR-SC-9

CLIENT: General Electric Company
Pittsfield, MA

SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	968.44	0-2	2.0	0-1	12	TS	Dark gray fine-medium SAND, little fine-medium Gravel, trace Organics.
							0.5' (967.94')
1	967.44			1-2	6	-	Brown fine-medium SAND, little fine-medium Gravel.
							1.0' (967.44')
2	966.44	2-6	3.0	2-4	4	-	Gray fine SAND, trace Organics and fine Gravel, compact.
3	965.44						
4	964.44			4-6	0.5	-	
							4.0' (964.44')
							Brown fine SAND, litttle medium Gravel.
5	963.44						
6	962.44	6-10	3.0	6-8	1.8	-	
7	961.44						
							7.0' (961.44')
							Dark gray-black fine-medium SAND, little fine Gravel.
8	960.44			8-10	0.0	-	7.5' (960.94')
							Dark gray-black fine-medium SAND and medium GRAVEL
							8.0' (960.44')
							Light brown-black fine-medium SAND 8.2' (960.24')
9	959.44						Light brown fine-medium SAND
10	958.44						
							Boring terminated at 10.0 feet (958.44 feet).

REMARKS:
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed: TS denotes trace sheen observed.

DATE STARTED: 2/14/2000
DATE FINISHED:2/14/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 10.0 Feet
DESCRIPTIONS BY: Nicholas A. Smith
NORTHING: 533426.78
EASTING: 133366.83
GROUND ELEVATION: 968.86

BORING ID: HR-SC-10
CLIENT: General Electric Company
Pittsfield, MA
SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	968.86	0-2	2.0	0-2	2.4	-	Dark brown fine SAND, little fine Gravel.
1	967.86						1.0' (967.86')
							Wood fragment 1.3' (967.56')
2	966.86	2-6	2.5	2-3	0.8	-	Dark brown fine SAND, trace woody Organics, very compact.
3	965.86			3-6	0.2	-	
4	964.86						3.5' (965.36')
							Dark brown-gray fine-medium SAND, trace-little fine Gravel and Organics.
5	963.86						Trace black coloring in organics from 4.5 to 4.8 feet.
							4.8' (964.06')
							Gray fine-medium SAND, trace fine Gravel.
6	962.86	6-10	3.0	6-8	0.0	-	
7	961.86						7.0' (961.86')
							Light brown-gray fine SAND.
8	960.86			8-10	0.0	-	
9	959.86						Fine-medium SAND seam from 8.9 to 9.1 feet.
10	958.86						Boring terminated at 10.0 feet (958.86 feet).

REMARKS:
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed.

DATE STARTED: 2/14/2000
DATE FINISHED:2/14/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 9.25 Feet
DESCRIPTIONS BY: Nicholas A. Smith
NORTHING: 533401.49
EASTING: 133341.53
GROUND ELEVATION: 966.79

BORING ID: HR-SC-11
CLIENT: General Electric Company
Pittsfield, MA
SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	966.79	0-1.25	0.5	0-1.25	0.0	-	Brown fine-medium SAND, trace-little fine Gravel.
1	965.79						
		1.25-5.25	1.7	1.25-5.25	0.0	-	
2	964.79						
							2.0' (964.79') Brown fine-medium SAND, little-some fine Gravel.
3	963.79						
4	962.79						
5	961.79						
		5.25-9.25	2.3	5.25-9.25	0.0	-	
6	960.79						
7	959.79						
8	958.79						
9	957.79						8.95' (957.84') Brown fine SAND, little fine-medium Gravel.
10	956.79						Boring terminated at 9.25 feet (957.54 feet).

REMARKS:
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed.

DATE STARTED: 2/14/2000
DATE FINISHED:2/14/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 10.0 Feet
DESCRIPTIONS BY: Nicholas A. Smith
NORTHING: 533407.25
EASTING: 133355.57
GROUND ELEVATION: 968.26

BORING ID: HR-SC-12
CLIENT: General Electric Company
Pittsfield, MA
SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	968.26	0-2	1	0-2	0.0	-	Dark brown fine-medium SAND, trace Organics and fine Gravel.
							1.2' (967.06')
1	967.26						Brown fine-medium SAND, trace fine Gravel, loose.
2	966.26	2-6	2.8	2-4	0.0	-	
3	965.26						
4	964.26			4-6	0.0	-	3.9' (964.36')
							Brown fine-coarse SAND, some fine Gravel.
5	963.26						5.2' (963.06')
							Brown-dark brown fine-coarse SAND, little fine-medium Gravel, trace Organics.
6	962.26	6-10	4.0	6-7	0.0	-	5.7' (962.56')
							Dark gray fine-medium SAND, little medium Gravel, trace Organics.
7	961.26			7-8	0.0	-	6.0' (962.26')
							Gray fine SAND, trace medium Gravel (black shale, rounded)
8	960.26			8-10	0.0	-	7.0' (961.26')
							Light gray fine SAND, trace medium Sand.
9	959.26						Boring terminated at 10.0 feet (958.26).
10	958.26						

REMARKS:
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed.

DATE STARTED: 2/15/2000
DATE FINISHED:2/15/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 10.0 Feet

DESCRIPTIONS BY: Nicholas A. Smith

NORTHING: 533432.02
EASTING: 133377.18
GROUND ELEVATION: 969.10

BORING ID: HR-SC-13

CLIENT: General Electric Company
Pittsfield, MA

SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	969.10	0-2	2.0	0-1.2	0.0	-	Brown fine-medium SAND, some fine-medium Gravel.
							1.2' (967.90')
1	968.10						Dark brown-black fine SAND, some Silt and organic Wood. Note: black color is from wood decay.
				1.2-2	0.0	-	
2	967.10	2-6	3.7	2-3.8	1.1	-	
3	966.10						
							3.5' (965.60')
4	965.10			3.8-6	0.0	-	Light gray fine SAND, layered with dark brown fine SAND, some silt and Organics.
							4.1' (965.00')
5	964.10						Gray medium-coarse SAND, trace fine Gravel.
6	963.10	6-10	4.0	6-8	0.0	-	
7	962.10						
							7.4' (961.70')
8	961.10			8-10	0.0	-	Gray fine-coarse SAND, trace fine Gravel. Pebble at 7.9 feet. 7.9' (961.20')
9	960.10						Light gray fine SAND, trace medium Sand lenses.
10	959.10						
							Boring terminated at 10.0 feet (959.10 feet).

REMARKS:
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed.

DATE STARTED: 2/15/2000
DATE FINISHED:2/15/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 10.0 Feet
DESCRIPTIONS BY: Nicholas A. Smith
NORTHING: 533419.60
EASTING: 133377.01
GROUND ELEVATION: 968.75

BORING ID: HR-SC-14
CLIENT: General Electric Company
Pittsfield, MA
SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	968.75	0-2	1.9	0-1	0.9	-	Brown fine-medium SAND, little fine Gravel.
1	967.75			1-2	2.2	-	1.1' (967.65')
							Dark brown-black fine SAND, some Silt and Woody Organics, compact.
2	966.75	2-6	4.0	2-4	0.3	-	2.0' (966.75')
							Dark brown fine SAND, some Silt, trace Woody Organics.
3	965.75						2.4' (966.35')
							Brown-gray fine-medium SAND, trace-little fine Gravel, coarsening downward.
4	964.75			4-6	0.0	-	
5	963.75						
6	962.75	6-10	3.3	6-9	0.0	-	
7	961.75						
8	960.75						
9	959.75			9-10	0.0	-	
							Trace pebbles from 8.7 to 9.1 feet. 9.1' (959.65')
10	958.75						Brown fine SAND.
							Boring terminated at 10.0 feet (958.75 feet).

REMARKS:
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed.

DATE STARTED: 2/15/2000
DATE FINISHED:2/15/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 8.0 Feet
DESCRIPTIONS BY: Nicholas A. Smith
NORTHING: 533449.39
EASTING: 133373.39
GROUND ELEVATION: 965.72

BORING ID: HR-SC-15
CLIENT: General Electric Company
Pittsfield, MA
SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	965.72	0-4	2.5	0-1	22	N	Brown fine-medium SAND, little-some fine Gravel, sheen. (Sheen may be from overlying water)
1	964.72			1-4	24	-	
2	963.72						1.9' (963.82')
							Gray fine SAND, loose, scattered sheens from 1.9 to 2.9 feet. (Sheen may be from overlying water)
3	962.72						
4	961.72	4-8	4.0	4-6	24	-	4.0' (961.72')
							Gray fine SAND, trace medium Sand partings.
5	960.72						
6	959.72			6-8	16	-	
7	958.72						
8	957.72						Boring terminated at 8.0 feet (957.72 feet).
9	956.72						
10	955.72						

REMARKS:
Boring installed through approximately 6 inches of standing water containing sheen and NAPL.
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed; N denotes NAPL observed.

DATE STARTED: 2/15/2000
DATE FINISHED:2/15/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 8.0 Feet

DESCRIPTIONS BY: Nicholas A. Smith

NORTHING: 533440.43
EASTING: 133361.22
GROUND ELEVATION: 965.46

BORING ID: HR-SC-16

CLIENT: General Electric Company
Pittsfield, MA

SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	965.46	0-4	3.4	0-1	3.8	S TN	Gray fine-medium SAND, trace fine Gravel, trace sheen.
1	964.46			1-2	1.2	-	
2	963.46			2-4	12.5		1.7' (963.76')
							Light gray fine SAND.
3	962.46						
4	961.46	4-8	4.0	4-6	32	-	4.0' (961.46')
							Light gray fine SAND, trace medium Sand.
5	960.46						
6	959.46			6-8	20	-	
7	958.46						
8	957.46						
							Boring terminated at 8.0 feet (957.46 feet)
9							
10							

REMARKS:
Boring installed through approximately 8 inches of standing water containing sheen and NAPL.
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed; N denotes NAPL observed; S denotes sheen observed; T = trace.

DATE STARTED: 2/17/2000
DATE FINISHED:2/17/2000
DRILLING COMPANY: BBL
DRILLING METHOD: Direct Push
BIT SIZE: 1.5 Inch X 4 Feet
RIG TYPE: Jackhammer

BOREHOLE DEPTH: 8.0 Feet
DESCRIPTIONS BY: Nicholas A. Smith
NORTHING: 533401.26
EASTING: 133284.29
GROUND ELEVATION: 972.40

BORING ID: HR-SC-17
CLIENT: General Electric Company
Pittsfield, MA
SITE: Housatonic River

DEPTH (ft)	ELEVATION (ft)	SAMPLE DEPTH INTERVAL (ft)	RECOVERY (ft)	SCREENING DEPTH INTERVAL (ft)	PID HEADSPACE (ppm)	SHAKE TEST	STRATIGRAPHIC DESCRIPTION
0	972.40	0-4	1.6	0-0.7	0.7	TS	Brown fine SAND and SILT, trace Organics, compact.
1	971.40			0.7-4	5.2	TS	
2	970.40						
3	969.40						
							3.1' (969.30')
							Brown fine-medium SAND. Black staining from 3.3 to 3.8 feet.
4	968.40	4-8	1.7	4-5	2.0	-	3.8' (968.60')
							Brown-black fine-medium SAND, little fine-medium Gravel.
5	967.40			5-8	2.0	-	
6	966.40						
							6.3' (966.10')
7	965.40						Brown-gray fine-medium SAND and fine-medium GRAVEL.
							7.3' (965.10')
8	964.40						Light brown-gray fine SAND, little-some Pebbles-Cobbles.
							Boring terminated at 8.0 feet (964.40 feet)
9	963.40						
10	962.40						

REMARKS:
Boring backfilled to 6 inches with bentonite grout, and to surface with bentonite chips.
Shake test: "-" denotes no sheen or NAPL observed; N denotes NAPL observed; S denotes sheen observed; T = trace.