# ARCADIS

# Remedial Design Work Plan Attachment A

# Overburden NAPL Delineation Plan

Solvents Recovery Service of New England, Inc. (SRSNE) Superfund Site Southington, Connecticut

Prepared for: SRSNE Site Group

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#### I. Purpose and Scope

This document has been prepared on behalf of the SRSNE Site Group, an unincorporated association of Settling Defendants to a Consent Decree (CD) and Statement of Work (SOW) for the Remedial Design/Remedial Action (RD/RA) at the Solvents Recovery Service of New England, Inc. (SRSNE) Superfund Site in Southington, Connecticut (Site). The CD was filed on October 30, 2008 with the United States District Court for the District of Connecticut in connection with Civil Actions No. 3:08cv1509 (SRU) and No. 3:08cv1504 (WWE). The CD was entered by the Court on March 26, 2009.

This *Overburden NAPL Delineation Plan* has been prepared to address the requirements of Section V.C.1.a of the SOW, which requires an investigation to complete the delineation of non-aqueous phase liquid (NAPL) in and near the northwest portion of the Overburden NAPL Area (Figure A-1). During activities completed in support of the Feasibility Study<sup>1</sup> for the Site, a preliminary NAPL delineation was established for the Overburden NAPL Area. That delineation was based on the results of prior site investigation activities, including a NAPL Delineation Pilot Study performed in 2003, and resulted in a nearly complete delineation of NAPL in the overburden NAPL Area was identified in the 2005 Record of Decision (ROD) as the target area for in-situ thermal treatment of soil. The ROD also indicated, however, that further NAPL delineation was required in the vicinity of prior boring location PTB-30 in the northwest portion of the former Operations Area (Figure A-2). Visible NAPL was noted at this location as part of the NAPL Delineation Pilot Study, but steep upward slopes and adjacent property access limitations precluded additional investigation at that time.

The SRSNE Site Group will implement a phased approach to delineate NAPL in the vicinity of boring location PTB-30. Initially, delineation efforts will focus on the area within the SRSNE property boundary. In the event that visible NAPL is observed at one or more soil borings within the property boundary, the SRSNE Site Group will negotiate for off-property access to continue delineation as needed. Consistent with the approach used in the NAPL Delineation Pilot Study,<sup>2</sup> soil borings, visual observation, and hydrophobic dye "Oil Red O" will be used to assess and delineate the extent of visible NAPL. The approach is further discussed below.

<sup>&</sup>lt;sup>1</sup> Blasland, Bouck & Lee, Inc. and United States Environmental Protection Agency, May 2005. *Feasibility Study, Solvents Recovery Service of New England, Inc., Southington, Connecticut.* 

<sup>&</sup>lt;sup>2</sup> Blasland, Bouck & Lee, Inc., December 15, 2003. *NAPL Delineation Pilot Study*, Solvents Recovery Service of New England, Inc., Southington, Connecticut.

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In addition to NAPL delineation in the northwest portion of the Operations Area, this plan includes provisions for collecting samples of NAPL and NAPL-containing soil to support ISTR-related pre-design testing. This is further discussed in Section IV below.

#### II. Technical Considerations

Boring location PTB-30 is situated near the northern edge of the former Operations Area at the base of a hill that slopes upward to the west and north. While visible NAPL was identified at this location as part of the NAPL Delineation Pilot Study, the NAPL is not expected to extend significantly north or west of this location based on the following considerations:

- This area is at the perimeter of the former Operations Area; potential NAPL sources associated with historical facility operations are not anticipated to exist substantially beyond this location to the north or west.
- The ground surface topography slopes steeply upward to the north and west, such that releases within the former Operations Area would be unlikely to have migrated toward the north or west along the ground surface.
- The bedrock surface (Figure A-3, inferred from a compilation of prior soil boring data) dips toward east-southeast; NAPL migrating downward via gravity would follow the bedrock surface towards the delineated Overburden NAPL Area rather than toward the north or west.
- Overburden groundwater flow is from the northwest toward the southeast; hydraulic influences on NAPL migration would also be in that direction.
- No evidence of NAPL was observed at well PZO-7, located approximately 40 feet west of boring PTB-30.

#### III. Technical Approach

This section summarizes the planned approach for performing initial investigations within the SRSNE property boundary and, if needed, additional investigation beyond the property boundary. It also summarizes the approach for soil boring and NAPL assessment procedures. The overall objective of the approach is to identify one or more boring locations where NAPL is not present that, combined with the findings of the NAPL Delineation Pilot Study, will result in the identification of a perimeter of NAPL-free locations that fully encompass the locations where NAPL has been observed.

#### A. On-Property NAPL Delineation

Based on these technical considerations, overburden NAPL is not expected to extend significantly beyond PTB-30 to the north or west, and NAPL delineation efforts will initially focus

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on the immediate area north and west of PTB-30 and within the SRSNE property boundary. The planned investigation approach is consistent with the approach used during the NAPL Delineation Pilot Study. Considering the topography of the planned on-property investigation area, the following approach will be implemented for this area:

- 1. The portion of the property line separating the SRSNE property from the adjacent property will be survey-located and clearly marked in the field. The location of boring PTB-30 will also be located and marked as a point of reference.
- 2. Using a backhoe or bucket loader, a portion of the slope north and west of PTB-30 will be excavated/graded so that a small Geoprobe-type boring rig can access the area to advance soil borings at the initial target locations shown on Figure A-2. The depth of soil removal in each targeted location will vary based on topography, but will likely range from 2 to 6 feet below ground surface (bgs). Any soils removed from the hillside for this purpose will be temporarily staged on plastic sheeting in the adjacent paved portion of the former Operations Area. Existing surficial materials, which are comprised primarily of stone and concrete, will be staged separately so that these materials can be re-placed at the surface at the completion of the investigation.
- 3. The vertical soil profile exposed during the excavation/grading process will be visually observed for staining, sheen, or other evidence of NAPL presence. If NAPL is visibly evident, the occurrence of NAPL at that location will be recorded and no further vertical assessment will be performed at that location. If NAPL is not visibly evident, the soil profile will be screened with a photoionization detector (PID) and any interval exhibiting PID readings greater than 100 part per million (ppm) will be subject to further evaluation using the NAPL Assessment Procedure described in Section III.D below.
- 4. After determining NAPL is not present in the soil profile exposed by the excavation/grading process, further evaluation at each location will proceed using the Soil Boring Procedures described in Section III.C below.
- 5. Once a given on-property investigation location is complete, the staged soils will be replaced and graded into the hillside. To the extent possible, materials comprising the existing surface will be re-placed as the surface of the restored slope.

If NAPL is observed to be present at any location (either during the excavation/grading process or soil boring process), no further vertical assessment will be performed at that location. In that case, and provided sufficient additional space is available within the property boundary, additional investigation will proceed further north and/or west in a step-wise fashion until NAPL delineation is achieved. If NAPL delineation cannot be achieved within the property boundary, additional off-property delineation will be performed using the procedure described below.

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### B. Off-Property NAPL Delineation

In the event that NAPL delineation cannot be completed within the SRSNE property boundary, the SRSNE Site Group will contact the adjacent property owner (Yorski) in an effort to negotiate access to perform additional soil borings to the north and/or west (as needed) to complete the delineation. The solicitation of off-property access will follow the general procedure described in the *Site Management Plan* (Attachment A to the *Remedial Design Project Operations Plan* [RD POP]).

Once the requisite property access approval is obtained, additional soil borings will be advanced to the north and/or west of the SRSNE property boundary to complete the NAPL delineation. Although the specific number and locations of such borings will depend on the findings of the initial on-property investigations, potential off-property boring locations are indicated on Figure A-2 for illustrative purposes. Because this area is currently wooded, it is expected that limited clearing may be necessary for the boring rig to access the target locations. However, the topography of this area is relatively flat, so the locations of any soil borings that may be needed will likely be accessible without the need for the type of grading planned for the on-property area.

Any necessary soil borings on the adjacent property for the purposes of NAPL delineation will be advanced and characterized using the soil boring and NAPL assessment procedures described below. Based on the results of initial borings, additional borings would be advanced if necessary in a step-wise fashion until NAPL delineation is achieved.

### C. Soil Boring Procedures

Direct-push drilling will be conducted using a Geoprobe-type boring rig. Soil samples will be obtained continuously in 4-foot (maximum) increments and characterized as described below. If NAPL is determined to be present in any retrieved soil sample, the occurrence of NAPL at that location will be recorded, no further vertical assessment will be performed at that location, and the investigation will proceed further north and/or west, as needed. Provided that NAPL is not observed, the boring will continue to the top of bedrock (approximately 12 feet bgs, based on nearby location PTB-30) or refusal. Regardless of whether NAPL is observed, each soil boring location will be grouted upon completion, staked, and labeled in the field.

Each sample from the soil boring process will be retrieved in a Lexan<sup>™</sup> sleeve, capped at both ends, and taken to a central sample processing area at the Site. The Lexan<sup>™</sup> sleeve will be cut open axially, and the soil sample will be visually assessed and quickly screened for volatile organic vapors using a PID. During screening, the soil will be split open and the PID probe will be placed in the opening and covered with a gloved hand. Such readings will be obtained along the entire length of the sample. In the event that NAPL is visibly observed during this process, further assessment of NAPL presence will not be required; the presence of NAPL will be documented and the boring will be discontinued. For any specific soil interval where NAPL is not

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readily apparent but a PID reading greater than 100 ppm is observed, the sample will undergo further detailed evaluation for potential NAPL presence following the assessment procedure described in Section III.D below.

If further NAPL evaluation is not needed (i.e., because NAPL is readily observed in the sample or because the PID reading is below 100 ppm), or after completing the assessment described below as needed, the soil will be classified in terms of (1) soil type; (2) color; (3) percent recovery; (4) relative moisture content; (5) texture; (6) grain size and shape; (7) consistency; (8) staining, if any; (9) odors, if any; and (10) any other noteworthy observations. The descriptions will be recorded in a field notebook or appropriate Subsurface Log.

Upon completion, each soil boring will be backfilled with neat cement grout to ground surface.

#### D. NAPL Assessment Procedure

For any sample (from the soil profile exposed during the excavation/grading process or retrieved from a soil boring) that exhibits a PID reading greater than 100 ppm, and for which the presence of NAPL is not readily evident from visual inspection, an assessment of potential NAPL presence will be made using a combination of the following tests/observations:

- Evaluation for visible NAPL sheen or dark brown NAPL in soil The NAPL sheen will have a colorful iridescent appearance on the soil sample. NAPL may also appear as droplets or continuous accumulations of dark brown, opaque liquid.
- Soil/dye smear test A portion of the selected soil interval will be placed in a disposable polyethylene dish, along with Oil Red O powder. The soil and powder dye will be manually mixed and smeared in the dish using a new nitrile glove-covered hand for approximately 30 to 60 seconds to create a paste-like consistency. A positive test result will be indicated by bright red (not faint pink) color on the dish and/or glove. After results are recorded, the dish will be emptied and gently rinsed using distilled or potable water.
- Soil-water shake test A small quantity of soil (up to 15 cubic centimeters [cc]) will be placed in a clear, colorless, 40 milliliter (mL) vial containing an equal volume of potable or distilled water. After the soil settles into the water, the surface of the water will be evaluated for a visible sheen. Then the jar will be closed and gently shaken for approximately 10 to 20 seconds. Again, the surface of the water will be evaluated for a visible sheen or else a temporary layer of foam. A positive test result will be indicated by the presence of a visible sheen or foam on the surface of water.

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- Oil Red O Shake Test Following the soil-water shake test, a small quantity (approximately 0.5 to 1 cc) of Oil Red O powder will be placed in the jar. The sheen layer will be evaluated for reaction with the dye (change to bright red color). Then the jar will be closed and gently shaken for approximately 10 to 20 seconds. The contents in the closed jar will be examined for visible bright red-dyed liquid. A positive test result will be indicated by a reaction between the dye and the sheen layer upon first addition of the Oil Red O. The reaction will appear as a bright red coating on the inside of the vial particularly above the water line after gentle shaking, or as red-dyed droplets within the soil.
- Estimation of Relative Degree of NAPL Saturation When NAPL is interpreted as present in a
  particular portion of soil, the field team will estimate the relative degree of NAPL saturation in
  the soil. Specifically, an interpretation will be made as to whether the observed NAPL is
  pooled (continuous section of soil in which the pore spaces are filled with a mixture of NAPL
  and water) or residual (isolated droplets or blebs of NAPL, surrounded by pore spaces
  containing only water).

The results of each test or observation will be recorded on a NAPL evaluation log sheet. Any evidence of visible NAPL in a sample will be documented in the field book or Subsurface Log in terms of the depth and thickness of the interval(s) containing visible NAPL. In addition, any shake tests vial or smear-test glove or dish that produces positive results in terms of NAPL presence will be photographed and placed in ZipLoc<sup>™</sup> bags, labeled in terms of soil boring location and depth interval, and archived in the NTCRA 1 treatment system building. Excess soil cuttings, vials, polyethylene dishes, and other investigation-derived wastes will be drummed, labeled, and disposed in accordance with the procedures described in the *Field Sampling Plan* (Attachment B to the RD POP).

#### IV. Sample Collection for ISTR Testing

Samples of NAPL and/or NAPL-containing soils are needed to support the NAPL characterization and corrosion testing described in the *System Design Evaluation Work Plan* (Attachment E to the *Remedial Design Work Plan* [RDWP]). Ideally, these tests would be performed using approximately one gallon of representative NAPL from the Site. However, given the nature of the proposed tests (described in the *System Design Evaluation Work Plan*), certain of the tests can be performed with less NAPL and a larger amount of NAPL-containing soils. The preferred sample matrices and amounts, in order of preference, are indicated below:

- 1 gallon of NAPL
- Two 40-mil vials of NAPL, plus two to three 5-gallon containers of NAPL-containing soils
- Two to three 5-gallon containers of NAPL-containing soils

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Three measures will be undertaken in an effort to collect the necessary sample media and volumes:

- 1. Existing wells that have historically contained NAPL or sheens will be gauged to assess the potential for current NAPL accumulations in the well. Specific wells targeted for potential NAPL presence include, but are not limited to P-1B, P-2B, P-4B, CPZ-7R, CPZ-8R, CPZ-9R, MWD-601, and MW-705DR. If sufficient NAPL is present in a given well, efforts will be made to recover the NAPL using a bottom load bailer or peristaltic pump. Recovered liquids would be decanted to remove co-generated water, and the NAPL obtained from one or more wells will be combined into a composite sample. If necessary, repeated attempts may be made at wells over the course of several weeks in an effort to obtain as much NAPL as possible.
- 2. Unless sufficient NAPL volume can be readily obtained from existing wells, a boring rig will be used to construct one to three wells in the vicinity of former boring location PTB-39 (Figure A-2). This area is targeted because a NAPL "pool" was interpreted at this location during the NAPL Delineation Pilot Study. Accordingly, temporary wells will be installed at this location for the purpose of collecting NAPL to support the ISTR-related testing. Such wells would be constructed to a depth of 14 feet, with a 1 foot long blank sump at the bottom, surrounded by neat cement grout. Given the temporary nature of these wells, the screen and riser will be constructed of polyvinyl chloride (PVC). The screen length(s) will be 10 feet. The annulus will be backfilled with Morie No. 0 or equivalent sand to 2 feet above the top of the screen, and the remainder of the annulus will be filled with a bentonite plug and concrete surface completion using concrete and/or sand. Installation of these wells would be performed in conjunction with the overburden NAPL delineation activities described above. The wells would then be developed and gauged for potential NAPL accumulation. Any recoverable NAPL obtained from these wells would be combined with NAPL available from existing wells up to a total volume of 1 gallon. The wells would subsequently be abandoned. along with existing wells, prior to implementing the ISTR activities.

To the extent that NAPL-containing soils are recovered during the soil boring and well installation process (the most highly NAPL-saturated soils preferred), those soils will be containerized for use as test media if insufficient NAPL quantity can be obtained for all targeted tests. These materials would be provided to TerraTherm for delivery to the selected analytical laboratories to perform the required tests. If sufficient volume of NAPL is subsequently obtained from wells, the soil will be discarded by the laboratory. If sufficient NAPL is not available to perform all targeted test, certain of the tests can be modified for the use of soil in lieu of NAPL.

3. In the event that less than 10 gallons of NAPL-containing soils are obtained from the well installation, an excavator may be used to obtain additional volume (up to three 5-gallon containers) of NAPL-containing soils from the vicinity of boring PTB-39. These materials will be containerized for delivery to TerraTherm in conjunction with any soils retained from the soil boring process.

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The following table summarizes activities and operating procedures and materials to be used as engineering controls for collection of soil samples from soil borings or excavations to support ISTR pre-design studies. These details are in addition to procedures identified in the Site-specific Health and Safety Plan (Attachment D of the RD POP).

Activity	Procedure	Materials Needed
Prior to Soil Borings and or Excavation(s)	Notify Connecticut's Call Before You Dig (CBYD)	N/A
Soil Borings	Excess soils will be placed back into the bore hole after each boring has been completed.	polyethylene sheeting
Excavation (open hole)	Open hole excavations will only remain open for the duration necessary to collect the target soil sample volume (i.e., less than two hours). Excess soils will be placed back into the excavation prior to placing a new asphalt surface.	Hay Bale/Temporary Silt Fences/Coir Erosion Logs, and/or polyethylene sheeting, Rusmar Foam Unit and Asphalt to repair the surface cover
Post-Soil Borings and or Excavation (s)	The equipment used that comes in contact with potentially contaminated soils will be decontaminated. Water from the decontamination process will be placed back into the excavation prior to completing backfill activity.	Potable Water and/or Steam Cleaner

#### V. Schedule and Reporting

Final delineation of the Overburden NAPL Area is a requisite step for initiating the design of the in-situ thermal treatment component of the remedial approach. To expedite this phase of the RD/RA, the SRSNE Site Group requests accelerated approval of this work plan by the United States Environmental Protection Agency (USEPA) and Connecticut Department of Environmental Protection (CTDEP) such that the field work can be initiated in the late spring or early summer of 2009. The investigation approach described in this plan incorporates field procedures consistent with the previously approved NAPL Delineation Pilot Study. Also, the NAPL delineation process does not involve laboratory analyses, and the analyses to be performed on the NAPL/soil media as part of the ISTR-related testing are screening-level only (i.e., no specific QA/QC or detailed laboratory protocols are needed). Therefore, approval of this work plan is not necessarily contingent on agency approval of the two primary work products required by the SOW – the RDWP and the RD POP.

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Once the NAPL delineation is complete, a NAPL Delineation Investigation Report will be prepared and submitted to the USEPA and CTDEP. This report will summarize the scope and findings of the completed investigations and identify the final delineation of the Overburden NAPL Area. USEPA approval of the NAPL Delineation Investigation Report, and the resulting NAPL delineation described therein, will then trigger the initiation of the initial design of the insitu thermal treatment component of the remedy. It is anticipated that the NAPL Delineation Investigation Report will be submitted separately from and – depending on the need for and duration of property access negotiation and off-property investigations – in advance of a report summarizing the remainder of the pre-design investigations described in the RDWP. This approach will result in timely initiation of design activities for the in-situ thermal treatment component.

The results of the ISTR-related characterization and corrosion testing will be reported in ISTRrelated design submittals.

# ARCADIS

Figures











# INTERPRETED TOP OF BEDROCK ELEVATION CONTOURS

# SRSNE SUPERFUND SITE SOUTHINGTON, CONNECTICUT OVERBURDEN NAPL DELINEATION PLAN



4. ELEVATIONS ARE BASED ON NGVD 29.

MAPS G-7, G-8, G-9; PHOTOGRAPHY DATED NOV. 1978, SCALE: 1"=100'. PROPERTY LINES REPORTED TO HAVE BEEN DIGITIZED AND LOT NUMBERS TAKEN FROM "PROPERTY MAP, TOWN OF SOUTHINGTON" MAPS 134 & 147, SCALE: 1"=100' BY DIVERSIFIED TECHNOLOGIES CORPORATION.

APPROXIMATE TOP OF BEDROCK ELEVATION CONTOURS INTERPRETED FROM SOIL BORING DATA.

3. BEDROCK AND GROUND SURFACE ELEVATION CONTOUR INTERVAL IS 2 FEET.

- SITE PLAN TAKEN FROM DIVERSIFIED TECHNOLOGIES CORP., 556 WASHINGTON AVE., NORTH HAVEN, CT, DATED 6/93. TOPOGRAPHY REPORTED TO HAVE BEEN DIGITIZED FROM TOWN OF SOUTHINGTON TOPOGRAPH
- NOTES:

-



160 -

147-12

LEGEND: PROPERTY LINE EXISTING CONCRETE PAD

WETLAND

NTCRA 1 CONTAINMENT AREA

FENCE

VEGETATION

INDEX CONTOUR

INTERMEDIATE CONTOUR

LOT NUMBER

ABOVE-GROUND TANK

APPROXIMATE TOP OF BEDROCK ELEVATION CONTOURS