FIVE-YEAR REVIEW REPORT FOR SOLVENTS RECOVERY SERVICE OF NEW ENGLAND, INC. SUPERFUND SITE HARTFORD COUNTY, CONNECTICUT

Prepared by

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Region 1
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9/24/15
Date

Table of Contents

LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	below ground surface
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Chemical of Concern
CT DEEP	Connecticut Department of Energy and Environmental Protection
CT DPH	Connecticut Department of Public Health
ELUR	Environmental Land Use Restriction
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
HCTS	Hydraulic Containment and Treatment System
ICs	Institutional Controls
ISTR	*In Situ* Thermal Remediation
MNA	monitored natural attenuation
NAPL	Non-aqueous Phase Liquid
NTCRA	Non-Time-Critical Removal Actions
O&M	Operation and Maintenance
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RCRA	Resource, Conservation and Recovery Act
ROD	Record of Decision
SRSNE	Solvents Recovery Service of New England, Inc
SVOC	semi-volatile organic compounds
TAL	target analyte list
VI	Vapor intrusion
VOC	Volatile Organic Compounds

EXECUTIVE SUMMARY

This is the second Five-Year Review (FYR) for the Solvents Recovery Service of New England, Inc (SRSNE) Superfund Site (Site) located in Southington, Hartford County, Connecticut The purpose of this FYR is to review information to determine if the remedy is and will continue to be protective of human health and the environment The triggering action for this statutory FYR was the completion of the previous FYR on 9/29/2010

The Site encompasses the former SRSNE Operations Area and the extent of impacted groundwater which is approximately 42 acres (Figures B-1A and 1B) Land use in the immediate vicinity of the SRSNE Site is mixed residential, commercial and light industrial, and has not changed since the Record of Decision (ROD) was issued in 2005 Public water is available to all downgradient properties

The SRSNE facility began operating in Southington in 1955 Spent solvents were received from customers and distilled to remove impurities until the facility's closure in 1991 During processing, numerous spills to bare ground occurred and two unlined lagoons were used for storage of still bottoms for part of the operational period As a result, soil and groundwater are impacted above acceptable risk levels, primarily by solvents Non-aqueous phase liquids (NAPL) are present in the overburden and fractured bedrock

Migration of contaminated groundwater is controlled by two Non-Time-Critical Removal Actions (NTCRAs) that were implemented at the Site in the mid-1990's and became the Hydraulic Containment and Treatment System (HCTS) component of the final remedy Contaminated groundwater in both the overburden and bedrock aquifers is hydraulically contained and treated on site

The remedy selected by EPA for the Site was set forth in the September 2005 ROD Key elements of the remedy are as follows

A Design, construct and operate an in-situ thermal remediation system (ISTR) to treat waste oil and spent solvents in the overburden in the former Operations Area.

B Excavate contaminated soil and wetland soil from the Cianci Property and culvert outfall Consolidate excavated soils with contaminated soil in the former Operations Area and construct a low-permeability, multi-layer RCRA Subtitle C cap

C Remove the existing concrete culvert, re-route drainage from the Site to the Quinnipiac River through a new impermeable pipe

D Design, construct and/or operate and maintain a hydraulic containment, extraction and treatment system for groundwater in the overburden and bedrock aquifers that exceeds federal and state drinking water standards or other risk-based levels Modify the system as necessary to meet changes in hydrogeologic or other site conditions including the installation of additional containment wells in the event that the Southington Water Department re-activates the Curtiss Street Well Field as a municipal water supply

E Monitor natural attenuation (MNA) of the groundwater outside the hydraulic containment area ("Severed Plume") that exceeds groundwater cleanup levels selected in the ROD, and natural attenuation of NAPL in bedrock and overburden not treated with ISTR

F Implement institutional controls in the form of CT Environmental Land Use Restrictions (ELURs) as necessary to restrict future use of site property and groundwater until cleanup levels are achieved

G Restore the functions and values of any and all habitats affected by the remediation

H Design and implement a long-term monitoring program to evaluate the performance of the HCTS and the overall effectiveness and protectiveness of the remedy, including the MNA component

I Implement changes to the selected remedy to meet the ROD requirements that may be necessary as a result of remedial design and construction processes

Pursuant to a Consent Decree entered on March 26, 2009, (U S v American Hoechst Corp et al (3 08cv1509 & 3 08cv1504), a group of potentially responsible parties (SRSNE Site Group) agreed to conduct the cleanup of the Site as set forth in the ROD

This is the second five-year review for the Site In the first review (September 2010), it was determined that the remedy will be protective when all components of the selected remedy are complete The 2010 FYR also recommended that if 1,4-dioxane is found in concentrations that exceed EPA's risk-screening level in the Severed Plume, MNA as a treatment for addressing this contaminant may need to be re-evaluated

The status of the recommended actions is as follows

- *In Situ* Thermal Remediation (ISTR) (ROD Element A) operated from May 2014 to April 2015 resulting in the removal of 496,400 pounds of VOCs from the subsurface EPA expects to approve a Remedial Action Completion Report for this phase of the remedy in September 2015 Site preparation for ISTR resulted in the completion of the culvert removal and re-routing (ROD Element C) in September 2012, and contaminated soil along the railroad right-of-way was excavated and placed in the former Operations Area where it will be capped, rather than capping it in place

- Excavation, consolidation and capping of soil (ROD Element B) is expected to be completed in 2016 Additional sampling to determine the final size of the cap and volume of soil to be excavated will be conducted in Fall 2015, followed by completion of the remedial design

- Shallow groundwater collected from within 100 feet of occupied buildings on Queen Street was compared to EPA vapor intrusion screening levels to evaluate the potential for the migration of Site-related constituents into the indoor air of nearby buildings EPA made the determination that the vapor intrusion pathway was incomplete and engineering controls were not required

- Pending CT DEEP approval of the ELURs, institutional controls (ICs) will be implemented on the properties identified in the May 2012 IC Plan (ROD Element F)

Other components of the selected remedy are functioning as intended The HCTS portion of the remedy (ROD Element D) is performing as expected, meeting hydraulic containment requirements and successfully treating extracted groundwater to meet NPDES-equivalent discharge limits set by CT DEP (now CT DEEP) The SRSNE Site Group continues to implement O&M of the HCTS, which will maintain the effectiveness of this component of the remedy Groundwater monitoring (ROD Elements E and H) continues, and while 1,4-dioxane was not found at unsafe levels beyond the hydraulic containment zone, within the containment zone 1,4-dioxane was found above protective levels Analysis of the groundwater MNA remedy has demonstrated multiple lines of evidence that natural attenuation of VOCs is ongoing, confirming the overall effectiveness of MNA as a component of the remedy A memorandum of agreement finalized in August 2014 ensures that the SRSNE groundwater plume will be adequately contained should municipal production wells in the Curtiss Street Well Field be activated (ROD Element D)

Access control in the form of fencing and paving are in place, and currently limit exposure to soil that presents an unacceptable human-health risk Institutional controls prohibiting non-remedial related building, construction or use of surface and groundwater on the former SRSNE properties were implemented pursuant to a 1994 Consent Decree (U S v SRSNE et al (Civ No H-79-704 (JAC) & H-90-598 (JAC)) Groundwater beneath and downgradient of the Site is not currently used as drinking water

Land use on and near the Site has not changed The physical site conditions have not changed Human health and ecological routes of exposure have not changed, therefore none of these issues call into question the protectiveness of the remedy

Based upon a review of the ROD, remedial design documents, data collected during sampling events, operation and maintenance reports and an inspection of the Site, the remedy at the SRSNE Site will be protective of human health and the environment upon completion of the remedy In the interim, exposure pathways that could result in unacceptable risks are being controlled Although 1,4-dioxane was not identified as a chemical of concern (COC) in the ROD, the selected remedy is effective at treating it and thus the remedy selected in the ROD will be protective when completed A legally enforceable groundwater cleanup level for 1,4-dioxane and a more protective soil cleanup level for 2,3,7,8-tetrachlorodibenzo-p-dioxin will be selected in a future decision document

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Solvents Recovery Service of New England, Inc Superfund Site		
EPA ID: CTD009717604		
Region: 1	**State:** CT	**City/County:** Southington/ Hartford County
SITE STATUS		
NPL Status: Final		

Multiple OUs?	Has the site achieved construction completion?
No	No

REVIEW STATUS

Lead agency: EPA
Author name (Federal or State Project Manager): Karen Lumino
Author affiliation: EPA Region 1
Review period: 12/18/2014 – 9/30/2015
Date of site inspection: 7/13/2015
Type of review: Statutory
Review number: 2
Triggering action date: 9/29/2010
Due date ***(five years after triggering action date)***: 9/29/2015

Issues/Recommendations

Issues and Recommendations Identified in the Five-Year Review:	
OU: Entire Site	**Issues:** None
	Recommendations: None

Protectiveness Statement(s)

Operable Unit	*Protectiveness Determination*	*Addendum Due Date*
Entire Site	Will be Protective	*(if applicable)* N/A

Protectiveness Statement

The remedy at the SRSNE Site is expected to be protective of human health and the environment upon completion of the components selected in the 2005 ROD In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks across the Site Although 1,4-dioxane was not identified as a COC in the ROD, the selected remedy is effective at treating it and thus the remedy selected in the ROD will be protective when completed

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment The methods, findings, and conclusions of reviews are documented in five-year review reports In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them

The U S Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP) CERCLA 121 states

> *"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews "*

EPA interpreted this requirement further in the NCP, 40 Code of Federal Regulations Section 300 430(f)(4)(ii), which states

> *"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action "*

EPA conducted a FYR on the remedy implemented at the Solvents Recovery Service of New England, Inc (SRSNE) Superfund Site (the "Site") in Southington, Hartford County, Connecticut. EPA is the lead agency for developing and implementing the remedy for the Site The Department of Energy and Environmental Protection (DEEP), as the support agency representing the State of Connecticut, has reviewed all supporting documentation and provided input to EPA during the FYR process

This is the second FYR for the SRSNE Superfund Site The triggering action for this statutory review is the date the first FYR was signed, September 29, 2010 The FYR is required due to the fact that hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure The entire Site is addressed in this FYR (i e , there are no separate and distinct operable units)

II. PROGRESS SINCE THE LAST REVIEW

Table 1 Protectiveness Determinations/Statements from the 2010 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Entire Site	Will be Protective	Based upon a review of the ROD, remedial design documents, data collected during sampling events, operation and maintenance reports and an inspection of the Site, the remedy at the SRSNE Site is expected to be protective of human health and the environment upon completion of the remedy, and in the interim, exposure pathways that could result in unacceptable risks are being controlled Access controls in the form of fencing and pavement are in place, and currently limit exposure to soil that presents an unacceptable human-health risk In addition, groundwater beneath and downgradient of the Site is not currently used as drinking water Finally, although the vapor intrusion investigation is not yet complete, there are currently no structures without vapor barriers above the area where groundwater presents possible vapor intrusion issues As a result, this possible exposure pathway is not complete Excavation of wetland soil and river sediment at the culvert outfall that pose an ecological risk, and, consolidation in the Operations Area where the contaminated material will be covered with clean fill is underway and will be completed by December 2010 However, in order for the remedy to be protective in the long term, the following actions need to be taken to ensure protectiveness major components of the remedy need to be implemented including in-situ thermal treatment of contaminants in the overburden aquifer, excavation, consolidation and capping of soil, vapor intrusion investigation and potential remediation and institutional controls In addition, if 1,4-dioxane is found in that portion of the groundwater plume that is not contained in concentrations that exceed EPA's risk-screening level, the monitored natural attenuation approach for addressing this contaminant in the may need to be re-evaluated

Table 2 Status of Recommendations from the 2010 FYR

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Party	Original Milestone Date	Current Status	Completion Date (if applicable)
Entire Site	Major components of the remedy need to be implemented	Implement in-situ thermal treatment	PRP	EPA	1/1/2011	Completed	3/2/2015
		Excavate, consolidate and cap soil			2014	Ongoing	N/A
		Complete vapor intrusion study and determine need for			12/2010	Completed	1/19/2011

		mitigation					
		Implement institutional controls			2011	Ongoing	N/A
	Evaluate effectiveness of MNA on 1,4-dioxane if present in severed plume	Review groundwater monitoring data to determine if 1,4-dioxane is present above EPA's risk-based screening level			12/2010	Completed	7/2015

Recommendation 1 – Implement *In Situ* Thermal Treatment

In situ thermal remediation (ISTR) of the non-aqueous phase liquids (NAPL) in the overburden is complete Approximately 57,000 cubic yards of soil in the former Operations Area was heated to over 100° C resulting in the removal of 496,400 pounds of volatile organic compounds (VOCs)

The ISTR system was constructed between April 2013 and May 2014 Heating was implemented in two phases starting on May 15, 2014 and ran continuously until March 2, 2015. Vapor recovery continued through April 2, 2015 until soil temperatures decreased to below 100° C and significant vapor was no longer being generated

ISTR achieved the following

- Interim NAPL Cleanup Levels were met in all confirmatory soil samples and on average, results were two orders of magnitude lower than required by the 2009 Consent Decree
- Thermal treatment exceeded the 95 to 99% mass removal anticipated in the ROD
- Groundwater data from the thermal treatment zone confirm that VOC contamination has been reduced to levels below those that are indicative of the presence of NAPL
- At the end of heating, mass removal rates had declined from a peak of about 10,000 pounds total VOCs per day to 26 pounds per day

Recommendation 2 - Excavate, consolidate and cap soil

Contaminated soil in the railroad right-of-way was excavated during site preparation activities for ISTR and placed in the former Operations Area where it will be capped The right-of-way was backfilled with clean materials from an off-site source and graded to re-establish the elevated railroad bed that will serve as the future rails-to-trails greenway Wetland soil demonstrating a potential ecological risk was excavated from the Quinnipiac River floodplain during construction of a re-located culvert pipe and discharge headwall and also placed in the area to be capped Five isolated "hotspots" of soil and

additional wetland soil/sediment will be excavated and consolidated with materials in the former Operations Area prior to construction of the RCRA Subtitle C cap currently planned for 2016

Recommendation 3 – Complete vapor intrusion study and determine need for mitigation controls

Between 2010 and 2011, three rounds of samples were taken from shallow groundwater monitoring wells within 100 feet of commercial buildings along Queen Street and compared to EPA risk-based vapor intrusion screening levels for commercial buildings (Figure B-2) VOCs in all samples were below screening levels with the exception of one location where benzene and vinyl chloride were above screening levels. However, that shallow groundwater monitoring well (P-101C) is located more than 100 feet from any occupied buildings Further, no exceedances of vapor intrusion screening levels were noted in monitoring wells (MW-903S, MW-904S, MW-501C and P-102C) located closer (within 100 feet) to the potentially affected buildings EPA made the determined that no vapor intrusion mitigation controls are needed at this time

Recommendation 4 – Implement Institutional Controls

Institutional controls will be implemented pending CT DEEP approval of the Environmental Land Use Restrictions (ELURs) which have undergone a change in format since they were first drafted for this Site in February 2011 and revised in May 2012

ELURs are the primary type of institutional control being used to restrict certain actions at the Site such as disturbance of engineered controls over contaminated soil (e g., RCRA cap) and the use of groundwater for drinking or other household uses in order to protect human health until cleanup levels are reached In addition, restrictions will be placed on certain parcels that are currently industrial/commercial in nature to prevent a change to residential use to prevent exposure to vapors that could present an unacceptable risk, and, prevent new construction without appropriate vapor barriers or other mitigation systems The properties that will require ELURs and the basis for requiring those land use restrictions is discussed in greater detail below in Section III C

Recommendation 5 – Evaluate presence of 1,4-dioxane outside the HCTS

1,4-dioxane was detected in nine of 24 groundwater monitoring wells in the Severed Plume in 2014 The Severed Plume is that portion of the groundwater that meets federal and state drinking water standards and risk-based requirements so does not require containment and treatment, but exceeds background cleanup levels Monitored natural attenuation (MNA) is the remedy selected for groundwater in the Severed Plume In the absence of a promulgated standard, concentrations of 1,4-dioxane collected in 2014 were compared to EPA's risk-based screening levels and were found not to exceed risk levels outside of the hydraulic containment zone (Table B-1) This contaminant will remain in the site-wide monitoring program and the effectiveness of MNA on this contaminant in the Severed Plume will be evaluated in the next FYR.

Inside the hydraulic containment zone, concentrations of 1,4-dioxane were found at concentrations ($\leq$ 5600 µg/L) well above protective levels A future decision document will select a cleanup level for 1,4-dioxane which was not identified as a COC in the 2005 ROD

III. REMEDY IMPLEMENTATION ACTIVITIES SINCE THE LAST REVIEW

III.A. Pre-ISTR Site Preparation

Preparation for the ISTR system was initiated on September 20, 2010 and included major earthworks, utility upgrades and modifications to the existing HCTS such as

- Demolition of remnants of structures in the former Operations Area
- Excavation of contaminated soil from the railroad right-of-way, deposition on site in the area to be capped, backfill with clean materials and re-grading of the elevated railroad bed that will serve as the future rails-to-trails pathway.
- Extensions to the existing sheet pile wall at both its north and south ends to restrict flow of groundwater within a highly-permeable sand layer encountered during excavation along the railroad right-of-way
- Replacement of a swale that conveyed water from the former Operations Area to a culvert under the railroad tracks to a discharge point at the Quinnipiac River, with a 30-inch HDPE pipe
- Relocation of a major AT&T fiber optic line that ran along the railroad right-of-way
- Installation of infrastructure for utilities (sewer, gas, electricity) and communications needed for implementation of ISTR

III.B. ISTR System Construction

ISTR well field installation began on April 23, 2013 As a result of sheens, staining and NAPL observed at drilling locations outside the designed thermal treatment zone, the area to be treated was expanded A second design change was required when depth to competent bedrock was encountered, on average, approximately 3 feet deeper than anticipated As a result, the stainless steel casings had to be lengthened on site

The heater wells were laid out on a triangular grid pattern with a spacing of approximately 14 feet (Figure B-4A) In portions of the site with sufficient vadose (soil) zone thickness, the vapor extraction wells were located approximately 3 ft from each heater well In the portion of the site to the east of the railroad right-of-way, where the vadose zone is thin, permeable fill was placed over the ground surface and horizontal vapor extraction wells were used Temperature/pressure and groundwater level monitoring wells were distributed evenly throughout the wellfield

The wells required to treat and monitor ISTR were as follows

- 593 heater wells
- 534 vertical vapor extraction wells across the unsaturated zone
- 260 linear feet of horizontal vapor extraction wells
- 53 boreholes for temperature monitoring

- 20 temperature/pressure and groundwater level
- 7 groundwater monitoring wells

The vapor treatment system consisted of the following major components

- Heat exchanger
- Cooling tower
- Moisture separator
- Vacuum blower
- Heat exchanger
- Chiller
- Moisture separator
- Duct heater
- Combustion blower
- Thermal oxidizer
- Scrubber

The ISTR system operated between May 15, 2014 and April 2, 2015 (including post-heating cool down period), removing 496,400 pounds of NAPL from the subsurface in the former Operations Area and achieving Interim Cleanup Levels for Overburden NAPL established in the 2009 Consent Decree, as detailed in the response to Recommendation 1 above

Remedial construction and operation activities are discussed in greater detail in the multiple documents submitted to EPA and CT DEEP that are listed in Appendix A

III.C. Institutional Controls (ICs)

Several ICs have been proposed for SRSNE to address groundwater, soil and vapor intrusion issues that will remain following implementation of the ISTR component of the remedy These ICs are generally described below and shown on Figure B-3

Table 3 Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	133061, 133066, 133070, 133071, 145001,145002, 145003, 145004, 145005, 145006, 145007, 145008, 145010, 145011 145012, 145013,	Groundwater use restriction for any purpose other than hydraulic containment, treatment and monitoring of groundwater in accordance with the	Environmental Land Use Restriction (planned)

			145014, 145022, 1450390001, 1450400002, 145410003, 1450420004, 145048	remedial action approved in the ROD	
Soil	Yes	Yes	145001, 145002, 145003, 145004, 145005, 145006, 145007, 145011, 145012	No human exposure to soil below 4 feet bgs as a result of excavation, demolition or other activities	Environmental Land Use Restriction (planned)
Vapor	Yes	Yes	133066, 145001, 145011, 145012	No residential use of parcels currently industrial/commercial to prevent exposure to vapors that could present an unacceptable risk, and, prevent new construction without vapor barriers or other mitigation systems	Environmental Land Use Restriction (planned)
RCRA Cap	Yes	Yes	145012	No disturbances that could adversely impact the cap, such as excavation, demolition, plant root growth, or other activities	Environmental Land Use Restriction (planned)

The planned Environmental Land Use Restrictions were first drafted for this Site in February 2011 and revised in May 2012, they will be implemented upon CT DEEP approval

III.D. Operation and Maintenance Activities (O&M)

A Compliance Monitoring Plan (CMP), prepared in April 2010, describes the monitoring and other measures to be performed, as necessary, "to demonstrate conformance and compliance with all Cleanup Levels and Additional Performance Standards listed in Section IV" of the Remedial Design/Remedial Action Statement of Work (Appendix B to the 2009 Consent Decree) The CMP references and summarizes the various work plans where monitoring scopes have been or will be developed, includes a description of sampling locations and frequencies, and indicates anticipated schedules for the work necessary to demonstrate compliance

III.D.1 Hydraulic Containment and Treatment System (HCTS)

Performance standards associated with the HCTS are to

- Confirm that groundwater upgradient of the extraction wells is flowing in the direction of the extraction wells

- Verify that groundwater flow downgradient of the extraction wells is reversed

- Treat extracted groundwater to meet cleanup levels in treated effluent

The general monitoring approach of the HCTS includes water level gauging at key pairs of wells and piezometers during routine O&M of the groundwater containment and treatment system, as well as periodic collection and analysis of treated water to confirm that concentrations of contaminants in the effluent water meet discharge limits

O&M activities are described in the following compliance monitoring reports which are provided to the SRSNE Site Group, EPA and CT DEEP on a regular basis throughout each year

- Monthly Discharge Monitoring Reports summarize the influent and effluent water quality results (sampled twice per month) and are used to confirm facility compliance with the November 1995 CT DEEP Substantive Requirements for discharge of pretreated groundwater A review of the data from these reports shows that the effluent water discharged meets the substantive discharge requirements This indicates that the HCTS is operating as intended in terms of effluent quality

- Quarterly Aquatic Toxicity Monitoring Reports summarize the effluent aquatic toxicity results (sampled four times per year) to confirm treated effluent is in compliance with the Substantive Performance Standards for discharge A review of the data from these reports shows that the toxicity of effluent water discharged meets the substantive performance standards for discharge This indicates that the HCTS is operating as intended in terms of aquatic toxicity

- Annual Demonstration of Compliance Reports summarize the effectiveness of the HCTS over the previous 12 months, and include groundwater hydraulic containment performance, the influent and effluent water quality results, the influent and effluent flow data, as well as provides a summary of O&M activities performed during each period It also includes an evaluation of ongoing natural attenuation, the evidence for which is discussed in greater detail in Section IV D A review of the data from these reports shows that the HCTS achieved compliance in the five years since the 2010 review, with the following notable exceptions which have been addressed

    - In 2011, 2012 and 2013, elevated levels of benzene were detected in a deep bedrock monitoring wells located outside the containment area in the Severed Plume Following modifications to the well depth and pumping equipment at bedrock extraction well RW-1R, redevelopment of overburden extraction wells RW-13 and RW-14, and the installation in October 2014 of new overburden extraction well RW-15, the benzene concentration at that location has declined to below the action level The addition of the third extraction well will also allow for continuous hydraulic containment during O&M

    - Locally (i e , near P-101C and MW-903S) hydraulic containment of the shallow overburden groundwater plume is aided by the influence of the Quinnipiac River Here shallow groundwater exceeding action levels for benzene and vinyl chloride has a component of flow towards the river, with no surface water impacts observed

- Following the detection of NAPL in deep bedrock east of the Quinnipiac River, modeling was performed to estimate the eastern extent of the VOC plume in bedrock to determine if the area where VOCs were detected was within the capture zone of the HCTS Four new bedrock monitoring wells were installed along modeled flow lines downgradient of the NAPL zone VOC concentrations detected at these new wells were used to refine the interpreted eastern and southern extent of the bedrock NAPL zone and VOC plume The modeled deep bedrock VOC plume east of the river is within the interpreted capture zone of the HCTS

Hydraulic containment and treatment will continue until federal and state drinking standards and risk-based levels identified in the ROD have been achieved throughout the groundwater plume (except for under the cap) in the overburden and bedrock aquifers At such time that groundwater cleanup levels are achieved, a risk evaluation will be performed to help support the finding that groundwater cleanup is complete

III.E. Curtiss Street Well Field Memorandum of Agreement (MOA)

In September 2014, EPA, the Southington Water Department (SWD), the Town of Southington, CT DEEP and the SRSNE Site Group entered into an MOA, as required by the 2005 ROD The MOA obligates both the SRSNE Site Group and the SWD to take certain actions to ensure that the groundwater plume from the Site is contained in the event that the SWD plans to re-activate existing municipal supply wells and/or install new municipal supply wells in the downgradient Curtiss Well Field

III.F. Financial Assurance Review

Paragraph 47 of the 2009 Consent Decree (CD) requires the Settling Defendants to establish and maintain financial assurance in the amount of $32,620,000 Pursuant to Section XIII, paragraph 50 of the CD, the SRSNE Site Group has twice requested EPA approval to decrease the amount of financial security required by the CD The SRSNE Site Group first requested a reduction in the amount of financial assurance on March 28, 2014, which EPA granted on July 10, 2014 On May 6, 2015, the SRSNE Site Group requested a second reduction in the amount of financial assurance The SRSNE Site Group updated the remedial costs projected in the ROD to reflect the current estimated costs of the Work, including performing a "present worth" analysis of the long-term O&M costs It was estimated that the net present value of the remaining Work is $17,092,288 Accordingly, the Settling Defendants requested approval to decrease the financial assurance from $23,950,000 (the amount approved on July 10, 2014) to $17,100,000 This amount is considered adequate pursuant to paragraph 52 of the CD EPA approved this request to reduce the amount of financial assurance on June 5, 2015

IV. FIVE-YEAR REVIEW PROCESS

IV.A. Administrative Components

The SRSNE Site Group was notified of the start of this five-year review on 5/21/2015 The five-year review was led by Karen Lumino, EPA's Remedial Project Manager for the Site, and Kate Melanson, EPA's Community Involvement Coordinator Shannon Pociu of the CT DEEP assisted in the review as the representative for the support agency

The review, which began on 12/18/2014, consisted of the following components

- Community Notification and Involvement,
- Document Review,
- Data Review,
- Site Inspection,
- Interviews and
- Five-Year Review Report Development and Review

IV.B. Community Notification and Involvement

Activities to involve the community in the five-year review process were initiated on 1/5/2015, when EPA Region 1 issued a press release announcing the start of reviews of 20 Superfund sites, including SRSNE, and invited the public to submit comments No comments were received This FYR report will be available at the Site information repository located at Southington Public Library and Museum, 255 Main Street, Southington, CT, and on EPA's website at www epa gov/region1/superfund/sites/srs

IV.C. Document Review

This five-year review consisted of a review of relevant documents including Annual State of Compliance Reports, O&M records, ISTR sampling reports and the 2015 *Updated Groundwater Conceptual Site Model* which is the result of a comprehensive review of groundwater data and trends at the Site Applicable cleanup standards, as listed in the September 2005 ROD, were also reviewed

IV.D. Data Review

Groundwater at the Site is to be remediated until concentrations of all constituents at all wells that are part of the monitoring network are below Interim Cleanup Goals (Table L-1 in the 2005 ROD) for a period of three years Groundwater remediation activities include continued groundwater extraction and treatment via the HCTS and monitored natural attenuation (MNA) of constituents in groundwater The groundwater monitoring plan includes the annual collection of samples from up to 131 monitoring wells situated across the entire plume for analysis of VOCs, 1,4-dioxane and target analyte list (TAL) metals A summary of the scope and key findings of groundwater monitoring and MNA evaluation performed since the previous FYR (2010) is provided below

Groundwater Trends

- Detected concentrations of VOCs, 1,4-dioxane and metals above action levels are contained within the capture zone of the HCTS

- VOC concentrations in groundwater across the Site are generally declining or remain constant (Figures B-5 to B-9) Increases have been observed in a small number of monitoring wells scattered throughout the overburden and bedrock all within the HCTS These are short-lived, isolated occurrences and do not represent a site-wide trend

- Chemical analysis of the HCTS influent indicates that the contaminant mass is decreasing which is consistent with the generally declining trend observed in groundwater concentrations across the Site

- Groundwater data collected during the implementation of thermal treatment confirm that VOC contamination in the former Operations Area has been reduced to levels below those that are indicative of the presence of NAPL

Evidence of Ongoing Natural Attenuation

Multiple lines of evidence indicate that natural attenuation is occurring and is contributing significantly to the overall reduction in total VOC mass, supporting the continued use of MNA as a component of the remedy for groundwater at the SRSNE Site The lines of evidence are summarized below and discussed in greater detail in the 2015 *Updated Groundwater Conceptual Site Model*

- The areal extent of the VOC plume with constituent concentrations above drinking water standards has decreased since the plume was delineated during the remedial investigation in 1996
- Since the startup of the HCTS in 1995, the VOC mass extraction rate has declined from an average of 4 7 pounds per day to 1 15 pounds per day
- Order-of-magnitude decreases in total VOC concentrations and concentrations of individual compounds have been observed at many locations Although VOC concentrations in groundwater at some monitoring locations within the deep bedrock NAPL zone have been relatively stable over time (e g , MW-706DR), decreasing concentrations downgradient of these locations (e.g , MW-704DR) indicate that mass flux from the bedrock NAPL is decreasing
- VOC concentrations are decreasing with time throughout the dissolved-phase plume, including near the leading edge of the plume at the MW-704 well cluster Estimated half-life values for total VOCs in groundwater range from 1 7 to 8 0 years (average 4 7 years) in the overburden In the bedrock, total VOC half-lives were estimated for the feasibility study in 2005 to range from 2 4 to 27 7 years Using more recent total VOC concentrations from two deep bedrock monitoring wells, MW-706DR (since 2010) and MW-707DR (since 2004), the range of total VOC half-lives in bedrock can now be estimated to be 2 4 to 10 4 years, with an average of 7 years
- Molar concentration plots for VOCs in groundwater demonstrate shifts from parent compounds to daughter products with time and with distance downgradient from source areas With increasing distance downgradient, concentrations of primary and secondary compounds decrease or compounds are not detected
- Groundwater redox conditions indicate moderately to strongly reducing conditions throughout the VOC plume demonstrating geochemical conditions conducive to degradation of Site contaminants
- Microbial population survey results indicate robust communities capable of both full reductive dechlorination to innocuous end products and co-metabolism of chlorinated compounds at 11 of the 12 monitoring locations sampled Microbes capable of degrading aromatic compounds were also detected at two locations

IV.E. Site Inspection

The Site inspection was conducted on 7/13/2015 In attendance were Karen Lumino, EPA Region 1,

Shannon Pociu, CT DEEP, and Meg Harvey, CT DPH The purpose of the inspection was to assess the protectiveness of the remedy No issues were noted

Hydraulic Containment and Treatment System The HCTS was on line and running, no obvious issues with recovery wells noted Sheet pile wall appears to be intact

In Situ Thermal Remediation All ISTR equipment and residual waste have left the Site See Appendix B for photos taken during active ISTR treatment (B-4A) and after demobilization (B-4B) in June 2015

IV.F. Interviews

During the FYR process, interviews were conducted with municipal representatives for the Town of Southington who are aware of the activities at the Site The purpose of the interviews was to document any perceived problems or successes with the remedy that has been implemented to date Phone interviews were conducted by EPA Community Involvement Coordinator Kate Melanson on 7/29/2015 and are summarized below CT DEEP comments on the FYR were received on 8/24/2015

- *Mark Sciota, Southington Deputy Town Manager and Town Attorney*

  Overall, Mr Sciota noted that he was impressed with the technology being used to clean the soil at the Site He noted he thought that the outreach that the Town has conducted in addition to the Responsible Parties implementing the remedy worked well for the community He said that most of the communication to his office about activities at the Site came through their health department, which had been very involved with the Site all along Mr Sciota expressed that the main concern he heard from the community was in relation to the steam that was going to be discharged from the Site during the thermal heating, and that was mitigated through monitoring done by the Responsible Parties There was an incident involving the steam getting into the police department's HVAC system and causing a smell that needed to be cleaned out professionally The police department ended up paying for the professional cleaning and Mr Sciota believes the Responsible Parties should have paid for that expense EPA has forwarded this comment on to the SRSNE Group

- *Shane Lockwood, Director, Plainville-Southington Regional Health District*

  Overall, Mr Lockwood had a positive view of Site activities The Site cleanup team has been timely in getting him reports, and keeping him involved in Site updates In his opinion they have been responsive to the public as well. Mr. Lockwood did note an issue with the police department involving the discharging steam getting into the police department's HVAC system and causing a smell that needed to be cleaned out professionally The police department ended up paying for the professional cleaning Mr Lockwood and the fire department ended up responding several times to the Site, at the request of the police department to make sure no contamination was in the steam that was causing the smell. While Mr Lockwood noted that overall he had a positive impression of the Site cleanup progress, he felt that the Responsible Parties should have taken a more active role in working with the police department on the smell issue He also encouraged the Responsible Parties to continue to keep the town in the loop as they work towards reuse of portions of the site. EPA has forwarded this comment on to the SRSNE Group

- *State of Connecticut Shannon Pociu, Environmental Analyst 3, Connecticut Department of Energy and Environmental Protection, Remediation Division, and Meg Harvey, MPH, Department of Public Health, Environmental and Occupational Health Assessment Program*

  The State of Connecticut represented by the Department of Energy and Environmental Protection (DEEP) and the Department of Public Health (DPH) continues to be supportive of the remedial actions occurring at the SRSNE Site and is satisfied with the progress to date However, they have informed EPA that the State disagrees with the dioxin clean up standard for soil of 50 ppt proposed by the SRSNE Site Group and approved by EPA Region 1 The State recommends use of a calculated residential direct exposure criterion (RDEC) for dioxin of 4 9 ppt, which is consistent with the Remediation Standard Regulations and a RDEC recently approved for a RCRA Corrective Action site elsewhere in the State Soil sampling is ongoing to determine the extent of dioxin contamination that exceeds 4 9 ppt

V. TECHNICAL ASSESSMENT

V.A Question A: Is the remedy functioning as intended by the decision documents?

Yes Components of the selected remedy that have been implemented are functioning as intended The HCTS portion of the remedy is performing as expected, meeting hydraulic containment requirements and successfully treating extracted groundwater to meet NPDES-equivalent discharge limits set by CT DEEP The SRSNE Site Group continues to implement O&M of the HCTS, which will maintain the effectiveness of this component of the remedy

Additional monitoring wells were installed to complete the delineation of the extent of VOCs in bedrock, and the capture zone for the HCTS system was subsequently confirmed using groundwater elevations, water quality data and modeling Groundwater outside of the capture zone meets drinking water standards for VOCs and TAL metals, and risk-based levels for 1,4-dioxane Groundwater inside the capture zone shows a declining trend in VOC concentrations and often meets drinking water standards as well

Access controls in the form of fencing and paving are in place limiting current exposure to soil that presents an unacceptable human-health risk, while the remedial design/remedial action process to address those areas of the Site continues towards implementation Groundwater that has been impacted by the Site is currently not used as drinking water or for any industrial uses Finally, the vapor intrusion assessment has been completed and has confirmed that there are currently no structures without vapor controls above the area where groundwater presents possible vapor intrusion issues As a result, this possible exposure pathway is not complete nor is expected to be complete in the foreseeable future

In situ thermal remediation (ISTR) – the remedy selected for the Overburden NAPL Area – was completed during the five year period included in this review The Feasibility Study estimated that the Overburden NAPL Area contained approximately 84% of the total VOC mass at the Site in the form of NAPL ISTR removed this NAPL mass and also reduced the dissolved VOC concentrations by 95% The total mass removed by the thermal remedy was approximately 496,400 pounds

Even before the thermal remedy, VOCs were already undergoing substantial degradation within the subsurface, as documented by annual MNA reports VOC concentrations in groundwater at the Site have been steadily declining since the completion of the remedial investigation in 1996 It is estimated that nearly 660,000 pounds of VOCs have been removed by degradation – including biotic and abiotic reactions - within overburden and bedrock groundwater

In total, over 1 million pounds of VOC mass has been removed or degraded, the VOC mass that remains is approximately 3% of that estimated to be present in 1996 As stated in the ROD, "Eventual restoration of the contaminated groundwater plume in both overburden and bedrock to cleanup levels is expected to take longer than 225 years, which is the estimated time frame for the entire plume at the Site to achieve safe drinking water standards " Groundwater geochemistry and microbiology data support the interpretation that VOC degradation will continue for the foreseeable future, at rates favorable for achieving groundwater restoration goals sooner than envisioned in the ROD, possibly within the next few decades to 100 years Future five-year reviews will continue to track progress toward groundwater remedy completion

In September 2014, a memorandum of agreement (MOA) was entered into between EPA, the Southington Water Department (SWD), the Town of Southington, CT DEEP and the SRSNE Site Group, as required by 2005 ROD The MOA obligates both the SRSNE Site Group and the SWD to take certain actions to ensure that the groundwater plume from the Site is contained in the event that the SWD plans to re-activate existing municipal supply wells and/or install new municipal supply wells in the downgradient Curtiss Well Field

Contaminated soil in the railroad right-of-way was excavated and placed in the area to be capped during site preparation activities for ISTR The right-of-way was backfilled with clean materials from an off-site source and graded to re-establish the elevated railroad bed that will serve as the future rails-to-trails greenway Wetland soil demonstrating a potential ecological risk was excavated from the Quinnipiac River floodplain during construction of a re-located culvert pipe and discharge headwall and also placed in the area to be capped In areas where excavation has already occurred, steps will be taken to confirm that soil that remains in these areas does not exceed 50 ppt for dioxin[1] Five isolated "hotspots" of soil and additional wetland soil/sediment will be excavated and consolidated with materials in the former Operations Area prior to construction of the RCRA cap currently planned for 2016 Similar to areas that have previously been excavated, steps will be taken to confirm that soil that remains in these areas does not exceed 50 ppt Confirmation that levels of dioxin are below 50 ppt in soil in all these areas will be documented in the next five-year review This will also include metals analysis to confirm that there are no impacts beyond what has previously been determined

Institutional controls are required by the ROD to prevent unacceptable exposure to groundwater, vapor and soil, however these controls have not yet been established Institutional controls will be implemented pending CT DEEP approval of the Environmental Land Use Restrictions which have undergone a change in format since they were first drafted for this Site in February 2011 and revised in May 2012

V.B. Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy section still valid?

No There have been changes to the exposure assumptions and toxicity data Most of these changes do not impact the protectiveness of the remedy 1,4-dioxane was not included as a COC in the ROD because there was no information at that time on this contaminant at the Site Recent groundwater sampling indicates that levels of 1,4-dioxane within the containment zone are above protective levels

V.B.1. Review of Human Heath and Ecological Risk Assessments and Toxicity Factors Serving as the Basis for the Remedy

Land use on and near the Site has not changed The physical site conditions have not changed Human health and ecological routes of exposure have not changed, therefore none of these issues call into question the protectiveness of the remedy

Furthermore, at such time that groundwater cleanup levels are achieved a risk evaluation will be performed to help support the finding that the groundwater cleanup is complete

[1] Consistent with EPA's February 2012 release of the final human-health non-cancer dioxin reassessment for 2,3,7,8 TCDD-TEQ (dioxin) This is discussed further in Section V B 1

Changes in Exposure Pathways and Exposure Assumptions, Toxicity Values and Risk Assessment Methods

- *Changes in Exposure Assumptions and Risk Assessment Methods*

  Since the 2005 ROD, changes have been adopted to the equations used to calculate risks from exposures to soil, sediment and groundwater

  - In 2014, EPA finalized the directive "Determining Groundwater Exposure Point Concentrations (EPCs)" which provides recommendations for developing EPCs The recommendation to calculate the 95% upper confidence limit (UCL) of the arithmetic mean concentration for each contaminant from wells within the core/center of the plume using the statistical software ProUCL could result in lower groundwater EPCs than the past practice of using maximum concentrations for EPCs, leading to changes in groundwater risk screening and evaluation In general, this approach could result in slightly lower risk levels or lower screening levels http //www epa gov/oswer/riskassessment/pdf/superfund-hh-exposure/OSWER-Directive-9283-1-42-GWEPC-2014 pdf

  - In 2014, EPA finalized the directive "Update of Standard Default Exposure Factors" and FAQs associated with these updates Many of these exposure factors differ from those used in the risk assessment supporting the ROD at SRSNE These changes in general would result in a slight decrease of the risk estimates for most chemicals See items #22 and #23 at the following link http //www epa gov/oswer/riskassessment/superfund-hh-exposure htm

  Although calculated risks from potential exposure pathways at the SRSNE Site may differ from those previously estimated, slightly higher for some contaminants and slightly lower for others, the revised methodologies themselves are not expected to affect the protectiveness of the remedy A review of Site information confirms that these updates do not call into question the protectiveness of the remedy because no one is exposed to contaminated groundwater or vapors emanating from the plume, and, fencing prevents exposure to contaminated soil and sediment until such time as the excavation and capping component of the remedy is implemented

  - In June 2015, EPA finalized the *Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* and updated the vapor intrusion screening levels (VISLs) calculator to develop media-specific risk-based VISLs for groundwater, soil gas and indoor air These VISLs are generally updated periodically to reflect any update in chemical toxicity and other contributing factors

  The 2014 groundwater data was evaluated using the updated VI screening levels[2] (Table B-2) Although there are some exceedances of the VISLs, there are currently no structures above the area where groundwater presents possible vapor intrusion issues (with the exception of the HCTS treatment building which was built on slab with a vapor barrier) Should future development occur, mitigation systems should be installed during construction or further vapor

[2] The lower of either the June 2015 EPA vapor intrusion screening levels, or, the June 2013 Groundwater Volatilization Criteria of the CT DEEP's Remediation Standard Regulations

intrusion evaluation is needed to assess this pathway at that time ELURs that are planned for the Site would require such mitigation and/or investigations in new construction on site

- *Changes in Toxicity Values*

Since the 2010 FYR, toxicity values have been updated for the following contaminants since issuance of the 2005 ROD 1,4-dioxane, trichloroethylene (TCE), perchloroethylene (PCE) and dioxin

- 2010 1,4-dioxane non-cancer toxicity value and 2013 cancer toxicity values

  In 2010 and 2013, EPA finalized the toxicity assessment for 1,4-dioxane. The new values indicate that 1,4-dioxane is more toxic than previously indicated for both cancer and non-cancer health effects These toxicity changes would result in increased non-cancer hazard and cancer risk from exposure to 1,4-dioxane The currently available 1,4-dioxane risk-based groundwater screening level for residential exposure is 0 46 µg/L for a target cancer risk level of 1×10^{-6}

Inside the groundwater capture zone, 1,4-dioxane exceeds the 1×10^{-6} target cancer level Outside of the capture zone, the maximum 1,4-dioxane concentration detected was 3 5 µg/L which exceeds the screening level of 1×10^{-6} but is less than the 1×10^{-5} screening level for direct contact including ingestion, inhalation via household uses and dermal contact Groundwater that exceeds risk-based levels is hydraulically contained and is being treated on site with ultra-violet/oxidation treatment which has proven effective at treating 1,4-dioxane in extracted groundwater The ROD does not currently include a cleanup level for 1,4-dioxane

- TCE cancer and non-cancer toxicity values

  On September 28, 2011, EPA finalized the December 2009 revised toxicity values for TCE The new values indicate that TCE is more toxic than previously indicated from both cancer and non-cancer health effects These toxicity changes would result in increased non-cancer hazard and cancer risk from exposure to TCE

- PCE cancer and non-cancer toxicity values

  On February 10, 2012, EPA finalized the cancer and non-cancer toxicity values for PCE These new values indicate that PCE is more toxic from cancer health effects but less toxic from non-cancer health effects These toxicity changes would result in increased cancer risk and a decreased non-cancer hazard from exposure to PCE

Although calculated risks from potential exposure pathways at the Site may differ from those previously estimated due to the updated toxicity values for most of the contaminants identified in the ROD, slightly higher for some contaminants and slightly lower for others, the selected cleanup levels for TCE and PCE in soil and wetland soil which are based on CT Remediation Standard Regulations (CT RSRs) remain unchanged because the levels selected in the ROD remain within EPA's acceptable risk range Groundwater cleanup levels are federal Maximum Contaminant Levels (MCLs) which are considered protective of human health and also remain unchanged since issuance of the ROD

- Dioxin non-cancer toxicity value

  EPA's dioxin reassessment has been developed and undergone review for many years, with the participation of scientific experts in EPA and other federal agencies, as well as scientific experts in the private sector and academia The Agency followed current guidelines and incorporated the latest data and physiological/biochemical research into the reassessment On February 17, 2012, EPA released the final human health non-cancer dioxin reassessment, publishing an oral non-cancer toxicity value, or reference dose (RfD), of 7 x 10^{-10} mg/kg-day for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in EPA's Integrated Risk Information System (IRIS) The dioxin cancer reassessment will follow thereafter The dioxin RfD was approved for immediate use at Superfund sites to ensure protection of human health

The soil cleanup level for 2,3,7,8 TCDD-TEQ selected in the 2005 ROD is "*the lower of the EPA policy for residential sites (0 001 mg/kg per OSWER Directive # 9200 4-26 April 1998) and the background concentration which will be determined based on future field study, or another concentration consistent with the RSRs, but not lower than background*" Background dioxin levels at the Site range from 0 36 to 1 3 ppt. The SRSNE PRP Group proposed and EPA Region 1 approved a new soil cleanup level of 50 ppt that will be used to delineate the area where soil remediation will be conducted 50 ppt is a risk-based level developed by using the non-cancer IRIS RfD value and standard exposure default parameters for residential scenario It also equates to an HI of 1 and is considered protective

Ecological Risk Assessment Review

The potential for ecological risk was evaluated by EPA in the ecological risk assessment (ERA) before the ROD was issued The ERA concluded that elevated risk exists in the area of the reinforced concrete culvert that conveyed flow from near the former SRSNE Operations Area to a discharge point in the Quinnipiac River floodplain The highest risks are primarily due to the presence of PCBs (Aroclor 1254) and two specific PAHs [bis(2-ethylhexyl)phthalate and 2-methylnaphthalene] in wetland soils The ROD calls for excavation of approximately 900 cubic yards of impacted material from this area, a portion of which was removed when a new culvert pipe and discharge headwall were constructed at the outfall in 2012 The remaining impacted wetland soil will be excavated, placed in the former Operations Area and subsequently capped in 2016 (anticipated) The assumptions used previously by EPA to complete the ERA are still appropriate and the previous risk characterization remains valid As such, the remedy, once fully implemented, will remain protective

V.B.2. ARARs Review

No changes have been made to the standards identified in the ROD since the first five-year review No new standards have been promulgated No changes have been made to the "To Be Considered" standards used in selecting cleanup levels that could affect the protectiveness of the remedy

V.B.3. Remedial Action Objectives (RAOs)

The RAOs (Appendix A, Section D) incorporated into the ROD are still appropriate, and the remedy is progressing as expected Protection of human health is currently being achieved with fencing, pavement and the fact that no one is drinking the groundwater The HCTS contains and treats all groundwater that

exceeds federal drinking water standards and other risk-based levels *In situ* thermal remediation has removed Overburden NAPL MNA is effective and is expected to continue to be effective into the future The other components that will address the remaining RAOs (capping, implementation of ICs, and soil excavation to address ecological risk) are currently in remedial design

V.C. Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No There is no other information that calls into question the protectiveness of the remedy

V.D. Technical Assessment Summary

Based upon the results of the five-year review, the remedy selected for the Site is expected to be protective of human health and the environment upon completion of the remedy, and in the interim, exposure pathways that could result in unacceptable risks to human health are being controlled Although 1,4-dioxane was not identified as a COC in the ROD, the selected remedy is effective at treating it in extracted groundwater A legally enforceable groundwater cleanup level for 1,4-dioxane and a more protective soil cleanup level for 2,3,7,8-tetrachlorodibenzo-p-dioxin will be selected in a future decision document

VI. ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 4 Issues and Recommendations/Follow-up Actions

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
						Current	Future
Entire Site	None	None					

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
Operable Unit Entire site	*Protectiveness Determination* Will be Protective	*Addendum Due Date (if applicable)* N/A
Protectiveness Statement The remedy at the SRSNE Site is expected to be protective of human health and the environment upon completion of the components selected in the 2005 In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks across the Site Although 1,4-dioxane was not identified as a COC in the ROD, the selected remedy is effective at treating it and thus the remedy selected in the ROD will be protective when completed		

VIII. NEXT REVIEW

Since hazardous substances, pollutants or contaminants remain at the SRSNE Superfund Site which do not allow for unlimited use or unrestricted exposure, in accordance with 40 CFR 300 430(f)(4)(ii), the Site will be reviewed no less often than every five years EPA will conduct another five-year review on or before September 2020

APPENDIX A – EXISTING SITE INFORMATION

A. SITE CHRONOLOGY

Table 5 Site Chronology

Event	Date
Solvents Recovery Service of New England (SRSNE) facility begins operations	1955
Use of on-site lagoons for sludge disposal terminates	1967
EPA files suit against SRSNE under RCRA	1979
Town Production Wells No 4 & No 6 close when they are found to contain VOCs	1979-1980
Investigations by EPA of Town Well Field property initiated	1980
EPA lawsuit under RCRA amended to include claims under CERCLA	1982
EPA lists SRSNE Site on Superfund National Priorities List	1983
On-site interceptor system (OIS) installed along with 25 groundwater extraction wells to capture contaminated groundwater	1985
SRSNE paves site and installs control measures in accordance with a RCRA Corrective Measures Plan	1986-1990
EPA initiates the remedial investigation for the Site	1990
CTDPH initiates a public health assessment for the SRSNE Site under cooperative agreement with ATSDR	1990-1997
SRSNE facility closes	1991
CTDEP (now CT DEEP) takes over operation of OIS, upgrades treatment to use UV/oxidation	1991-1995
EPA conducts an emergency removal of contaminated soils from the drainage ditch and chemicals stored at the property	1992
SRSNE Site Group enters into a settlement with EPA to construct overburden aquifer containment and treatment system (NTCRA 1)	1994
NTCRA 1 construction completed and operations began, OIS terminated	1995
SRSNE Site Group constructs a mitigation wetland on the Cianci Property to compensate for the potential impact from constructing/operating the NTCRA 1 system	1996
SRSNE Site Group enters into second settlement with EPA to construct bedrock aquifer containment, complete remedial investigation and prepare feasibility study	1997
SRSNE Site Group submits Remedial Investigation Report, implements phytoremediation study in NTCRA 1 containment area	1998
NTCRA 2 begins operating	1999
SRSNE Site Group decontaminates, demolishes and removes all remaining site structures, tanks, and distillation towers	1999

SRSNE Site Group conducts a field investigation to delineate the extent of NAPL in overburden	2003
SRSNE Site Group completes Feasibility Study Report	2005
EPA issues the Record of Decision which sets forth the remedy for the Site and will form the basis for all remedial design/remedial action (RD/RA) activities	2005
EPA/DOJ lodges RD/RA Consent Decree with the U S District Court in Connecticut	2008
Consent Decree entered by the U S District Court	2009
SRSNE Site Group submits remedial design work plan (RDWP) and Project Operations Plan, begins remedial design activities	2009
Overburden NAPL area delineation refined	2009
Pre-construction wetland delineation performed	2009
Soil sampling performed along railroad right-of-way to delineate capping limits	2009
Operation and maintenance performed on ~160 monitoring wells across the Site	2009
Groundwater sampling for vapor intrusion study performed	2010
A drilling event including the installation of 29 new monitoring wells, the abandonment of 43 existing monitoring wells and a site-wide well rehabilitation program is completed	2010
Initial comprehensive groundwater sampling event completed, consists of sampling of 110 monitoring wells and taking water-level measurements of ~160 wells	2010
Sampling of wetland soil and river sediment removal areas on the Cianci Property to define limits for excavation	2010
Begin site preparation for ISTR well installation	Sept 2010
Excavate, backfill and re-grade railroad right-of-way	October 2012
Lay conduit for fiber optic line re-route	October 2010
Extend NTCRA 1 sheet pile wall	October 2012
AT&T re-routes fiber optic line	August 2012
Begin installation of heater wells, vapor extraction wells, temperature monitoring points, pressure monitoring points and groundwater monitoring wells	April 2013
Begin perimeter air monitoring	April 2013
Initiate construction of ISTR system	October 2013
ISTR start-up – Phase 1 heating	May 2014
Comprehensive site-wide groundwater monitoring for FYR	June 2014
Phase 2 heating begins	July 2014
Phase 1 confirmation soil sampling	November 2014
Phase 1 heaters shut down	December 2014
Phase 2 confirmation soil sampling	January & February 2015
Phase 2 heaters shut down	March 2015
Vapor extraction turned off	April 2015
ISTR fully de-mobilized from Site	June 2015

B. BACKGROUND

The SRSNE Site is located on approximately 14 acres along Lazy Lane in Southington, Hartford County, Connecticut, approximately 15 miles southwest of the City of Hartford. The physical setting of the Site – including the regional geology, overburden geology, bedrock geology, hydrogeology, groundwater use and classification, drainage, and surface water use and classification – is summarized below

The SRSNE Site encompasses portions of several properties/areas that include the former SRSNE Operations Area, the former Boston & Maine railroad right-of-way, the former Cianci Property, and the Town of Southington municipal well field The Site includes all areas where contamination, which includes a broad range of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, pesticides and polychlorinated biphenyls (PCBs), has come to be located (Figures B-1A & 1B) There are no areas of architectural or historical importance within the Site

- **Former SRSNE Operations Area:** The former SRSNE Operations Area ("Operations Area") comprises approximately 2 5 paved acres on a 3 7-acre lot, south of Lazy Lane in the Quinnipiac River basin, approximately 600 feet west of the Quinnipiac River channel This is the area where SRSNE historically performed solvent recovery and related operations The Operations Area is bordered on the east (downhill) by an abandoned railroad right-of-way and the former Cianci Property, to the north by commercial businesses, to the west (uphill) by private property, and to the south by private property, the Connecticut Light & Power electrical transmission line easement, and the Town of Southington municipal well field

- **Railroad Right-of-Way:** The railroad right-of-way is an approximately 50-foot wide corridor running north-south that separates the Operations Area (to the west) from the former Cianci Property (to the east). The railroad was historically owned and operated by Boston & Maine, but is presently abandoned and the rails have been removed CT DEEP purchased the right-of-way in this area in support of extending the Farmington Canal Heritage Trail, a rails-to-trails greenway, from New Haven to the Massachusetts border

- **Former Cianci Property:** The former Cianci Property is a 10-acre parcel located immediately east of the Operations Area and railroad right-of-way The Quinnipiac River borders the eastern edge of the former Cianci Property Lazy Lane is to the north, and the Town Well Field Property borders the property to the south

- **Town of Southington Municipal Well Field:** The Town of Southington municipal well field ("Town Well Field") consists of approximately 28 acres of undeveloped land south of the Cianci Property and southeast of the Operations Area The well field is bounded to the east by the Quinnipiac River and to the south by the Quinnipiac River and Curtiss Street The railroad right-of-way and the Delahunty property border its western perimeter and the CL&P easement runs northwest-southeast through the northern portion of the Town Well Field

Soil contamination above acceptable levels is present on the Operations Area, railroad right-of-way, and Cianci Property Groundwater contamination (dissolved phase and NAPL) has been identified in both

the overburden and bedrock aquifers A groundwater extraction and treatment system that was installed in the 1990's to prevent the migration of groundwater that exceeds federal safe drinking water standards and other risk-based levels continues to operate, and is described in greater detail in Section III D 1

Geology, Hydrogeology, Land and Resource Use

Geology. The Site is located within the Connecticut Valley Lowland section of the New England physiographic province The Connecticut Valley Lowland occupies a regional, structural rift basin, which is characterized by block-faulted and tilted bedrock strata The geology of the region, in general, consists of the Upper Triassic New Haven Arkose bedrock, overlain by Wisconsin-age unconsolidated deposits formed when glaciers eroded and smoothed the bedrock hills

The depth to bedrock varies throughout the Site, from approximately 15 to 40 feet below ground surface (ft bgs) at the Operations Area, to approximately 25 to 45 ft bgs, on the Cianci property, to approximately 80 to 100 ft bgs at the Town Well Field Core samples and drilling observations indicate that the upper five feet of the bedrock is severely weathered and partially decomposed, and that the degree of weathering generally decreases with depth

The overburden geology beneath the Operations Area and Cianci Property consists primarily of two unconsolidated layers The upper layer, called outwash, extends from ground surface to approximately 10 to 25 ft bgs and consists of reddish-brown silty sand and gravel deposits, interbedded with discontinuous layers of silt and relatively well-sorted sand and gravel The lower layer consists of glacial till, a generally unstratified unit consisting of reddish-brown clay, silt, sand, gravel, cobbles and boulders, but also including isolated, discontinuous sandy seams Fill materials are present above the outwash in portions of the Operations Area and Cianci Property, where grading operations reworked the upper few feet of soil and filled low areas Fill materials (ballast) are also observed along the railroad right-of-way The overburden in the Town Well Field grades to a coarser distribution of sand and gravel, lacking fine-grained material

Hydrogeology. Groundwater is present in the overburden and bedrock units In the overburden, depth to the water table generally ranges from 0 to 10 ft bgs throughout the Site The overburden and bedrock groundwater is recharged primarily via precipitation, although groundwater underflow also occurs from the north within the saturated zone in the vicinity of the Quinnipiac River.

Essentially all overburden and bedrock groundwater within the monitored geologic zones ultimately discharges to the Quinnipiac River and associated wetlands The overburden and bedrock units are hydraulically connected Where the till layer is relatively thick, it may limit the rate of groundwater flow between them In areas where till is anomalously thin or absent, or lacks fine-grained material, more groundwater flow may occur between the overburden and bedrock

Surface Water Hydrology. Surface water from precipitation falling within the Operations Area generally drains to the east, with surface runoff collected in a ditch on the west side of the existing railroad right-of-way This ditch also collects runoff from areas to the north of the Operations Area, including areas north of Lazy Lane An existing 30-inch culvert conveys water from this ditch easterly to the Quinnipiac River

The former Cianci property currently drains by overland flow to the east towards the Quinnipiac River and adjoining wetland and low-lying areas. The Town Well Field also drains by overland flow towards

the east, although an intermittent stream collects some runoff in the eastern and central portions of the property

Land and Resource Use. Land use in the immediate vicinity of the SRSNE Site is mixed residential, commercial and light industrial, and has not changed since the issuance of the ROD in 2005

Currently, use of the Site is limited to activities that support the cleanup activities selected in the ROD There are no anticipated future uses for the Operations Area and Cianci Property other than those needed to perform the long-term components of the remedy (e g , operation and maintenance on the cap, groundwater monitoring, etc)

With respect to the railroad right-of-way, the reasonably anticipated future use of this parcel is for recreational purposes, specifically, to redevelop this property to create a multi-purpose public path, known as a "rails-to-trails greenway "

Groundwater at the Site is not currently being used for drinking water The on-site treatment building, the commercial/residential properties adjacent to and north of the Operations Area, the Southington police headquarters across the street from the Cianci Property, and the commercial/light industrial properties along Route 10 are all on public water Approximately 85 residences on Lazy Lane, Melcon Street, Curtiss Street, Juniper Road, Little Fawn Road and Carrier Court are on domestic supply wells, but these properties are all to the west of and hydraulically upgradient from the SRSNE Site

The potential beneficial use of groundwater at the Site and surrounding areas is for drinking water Groundwater within the Site is currently classified by CT DEEP as GA, GA-degraded or GAA The State's goal for this aquifer is to maintain or restore the groundwater to its natural quality, suitable for drinking or other domestic uses without treatment

The Quinnipiac River is not used as a drinking water supply Adjacent to and south of the SRSNE Site there is limited access, as the river is a narrow, shallow meander bordered by steep banks along Queen Street to the east and the Town Well Field and fenced Cianci Property to the west Seasonally low water and lack of access leads to little to no recreational use of the river in the vicinity of the Site

Surface water along the Quinnipiac River adjacent to the Site is currently classified by CT DEEP as Class C/B This means that the state's goal for this surface water is Class B, although it is currently degraded to Class C Class B surface waters are designated for recreational use, fish and wildlife habitat, agricultural and industrial supply, and other legitimate uses including navigation Conditions that result in a Class C designation are usually correctable, and commonly relate to combined sewer overflows, urban runoff, inadequate municipal or industrial waste water treatment, and community-wide septic system failures

Based on the State's classification, the potential beneficial use of the surface water is recreational use, fish and wildlife habitat, agricultural and industrial supply, and other legitimate uses including navigation

History of Contamination

The SRSNE facility began operating in Southington in 1955 From approximately 1955 until the facility's closure in 1991, spent solvents were received from customers and distilled to remove impurities, and the recovered solvents were returned to the customer or sold to others for reuse

Liquid wastes processed at the SRSNE facility included unrecoverable or spent solvent-based fuels, spent chlorinated solvents, and wastes generated from fuel-blending operations Contact and non-contact distillation stream generated during the facility's distillation process were discharged into a subsurface drain pipe that discharged into a ditch along the west side of the Operations Area From 1957 to approximately 1967, the non-recoverable portion of distilled solvents, consisting of distillation or still-bottom sludge, was stored in two unlined lagoons located in the Operations Area

After the closure of the lagoons in 1967, wastes, including still-bottom sludge and flammable liquids, were incinerated in an open pit on site or disposed of off site The open-pit incinerator burned approximately 1,000 gallons of solvent sludge per day between 1966 and 1974, when it was decommissioned The solvent-burning and fuel-blending operations involved handling, storage, and transfer activities that resulted in leaks and spills to bare ground within the Operations Area.

In 1976, VOCs were detected at the Town of Southington's Production Well No 4, forcing its closure Water-supply pumping shifted to Production Well No 6 until 1979 when it too was closed due to the presence of VOCs Subsequent environmental investigations revealed that the SRSNE Site was a major source of VOC contamination to the groundwater in the Town Well Field

In 1983, EPA and SRSNE executed a Consent Decree that required the installation of a groundwater interceptor system along the downgradient property line of the Operations Area The on-site interceptor system (OIS) was installed in 1985 and began operating in 1986 with the intended purpose of capturing overburden groundwater migrating from the Operations Area Between 1986 and 1991, the OIS was used to extract and treat contaminated groundwater The OIS used a cooling tower on the roof of the operations building that was converted to an air stripper to capture contamination, with treated groundwater discharging via a subsurface pipe to the ditch along the railroad tracks east of the Operations Area.

The 1983 Consent Decree also required modifications to SRSNE's solvent handling practices and the performance of subsurface investigations to assess environmental impacts associated with the Site Between 1983 and the facility's closure in 1991, SRSNE made some improvements including spill control measures, paving the Operations Area, fire protection measures, and installation of a groundwater treatment system but did not meet other requirements

In 1988, the three batch stills were removed, and spent solvents received by SRSNE were transferred to other facilities for the remainder of SRSNE's period of operations An EPA RCRA inspection in February 1989 documented 75 cases of solvent releases from drums, tank trucks, hoses, and other solvent containers and transfer equipment during the previous year

Additional EPA and CT DEP (now CT DEEP) enforcement orders were subsequently issued to compel SRSNE to perform further cleanup work at the facility The facility ceased operating in March 1991 and was closed down in May 1991

Pre-1994 Response Actions

Key regulatory milestones prior to 1994 are as follows

- 1983 EPA adds SRSNE to the National Priorities List, thereby designating it a Superfund Site, SRSNE signs a Consent Decree with EPA to install an on-site groundwater interceptor system and properly store/manage hazardous waste on site.

- 1983 – 1988 EPA and the State of Connecticut take enforcement actions to require cleanup of the facility operations and the property

- 1989 – 1990 Site paving and control measures were installed in accordance with a RCRA Corrective Measures Plan

- 1991 SRSNE operations cease

- 1990 – 1994 EPA conducts the remedial investigation in three phases

- 1992 EPA takes emergency actions to remove contaminated soils from the railroad grade drainage ditch and some chemicals stored in buildings in the Operations Area for proper off-site disposal

- 1992 – 1994 CT DEEP operates the on-site groundwater interceptor system and an ultra-violet/oxidation (UV/ox) treatment system

Post-1994 Response Actions

NTCRA 1 Groundwater Extraction System. In 1994, the SRSNE Site Group entered into a settlement with EPA that required construction and operation of a pump and treat system to contain the contaminated groundwater in the overburden (NTCRA 1) Pumping from the NTCRA 1 system began in July 1995 and continues to operate today. The NTCRA 1 system is located on the Cianci Property It consists of a 700-foot long by 30-foot deep steel sheetpile wall through the overburden to the top of bedrock, and overburden groundwater extraction wells on the upgradient side of the wall Contaminated groundwater is extracted from the wells to maintain hydraulic gradient reversal across the sheetpile wall, which prevents its migration Other work conducted under this settlement included the construction of a mitigation wetland in the northeast corner of the Cianci Property, a full-scale phytoremediation study within the sheetpile wall, and extension of public water to three buildings immediately adjacent to the Site

NTCRA 2 Groundwater Extraction System. In 1997, EPA and the SRSNE Site Group entered into a second settlement that expanded the groundwater containment system (NTCRA 2) The NTCRA 2 groundwater extraction system consists of three extraction wells (two in the deep overburden and one in the bedrock) just north of the CL&P easement The purpose of these wells is to prevent the migration of contaminated groundwater in the bedrock aquifer It, too, continues to operate Other work conducted under this settlement included the completion of a remedial investigation/feasibility study (described below in greater detail) and the decontamination, demolition and removal of the remaining buildings and tanks from the Operations Area

On-site Groundwater Treatment System. Groundwater extracted from the NTCRA 1 and 2 systems is treated on site using a process that consists of the following metals pretreatment, filtration, UV/ox, and granular activated carbon adsorption Vapor phase carbon adsorption is also used to capture contaminants that volatize during treatment The system precipitates and extracts metals, reduces suspended solids, and captures and destroys VOCs Treated water is discharged to the Quinnipiac River in accordance with the Revised CT DEEP Substantive Requirements for Discharge of Pre-Treated Groundwater, issued November 5, 1995

The SRSNE Site Group continues to operate the overburden and bedrock groundwater containment systems and on-site treatment system which, following entry of the Consent Decree in 2009, became part of the groundwater remedy specified in the ROD Those systems are now collectively referred to as the Hydraulic Containment and Treatment System (HCTS) Since 1995, more than 250 million gallons of groundwater have been recovered and treated, with 18,000 pounds of VOCs removed

Remedial Investigation/Feasibility Study (RI/FS). As part of the 1997 settlement, the SRSNE Site Group also agreed to complete the RI/FS which they completed in 2004 Based on the RI/FS, EPA issued a proposed cleanup plan for the Site (June 2005), held a public comment period (June 9, 2005 to August 8, 2005) and ultimately selected a final cleanup plan with the issuance of the ROD on September 30, 2005

C. BASIS FOR TAKING ACTION

This section summarizes the extent of contamination found at the Site and the human-health and ecological risks associated with exposure to that contamination

Site Contamination

Soil. The distribution of contaminants in soil covers much of the Operations Area This suggests that solvent VOCs and other contaminants entered the surface and subsurface soil in varying quantities at many locations within the Operations Area Likely known entry points include two unlined lagoons, drum storage areas, and truck loading/unloading areas Overflow from the lagoons drained into a ditch east of the Operations Area, alongside the railroad tracks and into a concrete culvert that crosses the Cianci Property and discharges directly to the Quinnipiac River

Groundwater. The plume of contamination in the overburden aquifer that is associated with the SRSNE Site extends deep into the Town Well Field The highest contaminant concentrations are found beneath the Operations Area, particularly in the area where the unlined lagoons were located The plume in the bedrock aquifer does not extend as far into the well field but does extend into the northern portion of the Cianci Property It is believed that a production well on the Cianci Property pulled the plume in the bedrock to its current location, which is hydraulically upgradient of the Operations Area Groundwater that exceeds federal drinking water standards and other risk-based levels is contained and treated on site

NAPL Zones. Waste oil and solvents in the form of non-aqueous phase liquid (NAPL) were present in the unconsolidated deposits in the overburden aquifer and are in the fractured sandstone in the bedrock aquifer

Surface Water and Wetlands Soil. Surface water and wetland soils, including river sediment, at the outlet of the concrete culvert to the Quinnipiac River have been impacted by runoff from the two

unlined lagoons that were located on the Operations Area, and, contaminated groundwater infiltrating the cracked and leaky concrete culvert

Summary of Risk Assessments

Human-Health Risk Assessment. In 1994, a baseline human-health risk assessment was performed that evaluated both current and future risks from exposure to contamination under a variety of different exposure scenarios. Approximately 40 of the more than 80 chemicals detected in groundwater and approximately 30 of the more than 65 chemicals detected in soils at the Site were identified as contaminants of potential concern and evaluated for possible adverse health effects to human receptors to determine the total cancer and total non-cancer hazards present

With respect to groundwater, the baseline risk assessment assumed a future residential exposure scenario and evaluated risks from ingestion, dermal contact and inhalation of VOCs and SVOCs emitted from showers, toilets, dishwashers, washing machines and other turbulent water-use sources With respect to soil, surface water and river sediment, the baseline risk assessment considered residential, recreational and trespasser exposure scenarios Exposure pathways included direct contact with soil, surface water and river sediment, as well as inhalation of soil particulates and vapors

In 1999, portions of the risk assessment were updated to incorporate new data and to reflect new risk assessment guidance issued by EPA the previous year. The update re-evaluated the potential risks and hazards associated with incidental ingestion and dermal contact with surface and subsurface soils for residential, recreational and commercial/industrial land uses and re-evaluated the potential risks and hazards associated with hypothetical future ingestion of groundwater

Neither risk assessment looked at the potential for impacts from volatile chemicals emanating from the groundwater plume into overlying buildings that may be constructed in the future The vapor intrusion pathway was addressed in the 2005 ROD with a requirement that the remedy include a study to determine the extent of impacts, if any, and the imposition of institutional controls and/or mitigation systems on those parcels where risk was determined to be present A vapor intrusion study was completed in 2011

Ecological Risk Assessment. Surface water and soil/wetland soil to depths of 10 feet were considered for the ecological risk assessment The chemicals considered in the exposure assessment based on occurrence, distribution, toxicity, persistence and bioaccumulation potential were

- benzene
- xylenes
- phthalate esters
- polycyclic aromatic hydrocarbons (PAHs)
- 1,2,4-trichlorobenzene
- PCBs or Aroclors
- dioxin
- several pesticides
- metals (cadmium, copper, lead, mercury, nickel, selenium, zinc)

These chemicals persist, undergo bioaccumulation and biomagnify though food webs Although plants and invertebrates are at potential risk from the contaminants present at the Site, species at higher levels

received special emphasis The selection of indicator species to assess the potential effects of contaminant exposure on wildlife was based on observations in the field, feeding habits, food webs and routes of exposure The indicator species used for the ecological risk assessment were raccoon, red-tailed hawk, mallard duck, eastern garter snake, and green frog

Summary of Site Risks

Groundwater Risk. Contaminants in groundwater exceed both cancer and non-cancer EPA target risk requirements and state and federal regulatory requirements assuming that the groundwater is used for potable use in the future The highest calculated groundwater ingestion risks are related to the Operations Area, the Cianci Property, and the northern portion of the Town Well Field Groundwater in these areas is not currently used for drinking water or other domestic purposes

Soil and Wetland Soil Risk. Soil in the Operations Area and railroad right-of-way presented unacceptable cancer and/or non-cancer risks to adults and children who might live on the property in the future (residential scenario) and workers (industrial scenario) Although the future use scenario for the Site is expected to be recreational, per Connecticut law, areas used for recreational purposes must meet cleanup standards for residential use In addition, soil in the Operations Area, railroad right-of-way, isolated areas on the Cianci Property, and the drainage ditch north of the culvert exceed Connecticut remediation standards for pollutant mobility criteria and/or direct exposure criteria Wetland soil (including river sediment) at the culvert outfall also exceeds Connecticut remediation standards for direct exposure criteria and presents an unacceptable ecological risk from PCBs

River Sediment and Surface Water Risk. The total cancer risk and non-cancer risk calculated for accidental ingestion and dermal contact with surface waters and sediment in the Quinnipiac River indicate that surface water and sediment do not present an unacceptable risk to human health Surface water and river sediment at the outlet of the 30-inch concrete culvert pose an unacceptable risk to ecological receptors from PCBs and PAHs

D. REMEDIAL ACTIONS

Remedy Selection

Remedial action objectives (RAOs) were established based on types of constituents, environmental media of concern (e g , soil, groundwater) and potential exposure pathways The RAOs were developed to guide plans to mitigate, restore, and/or prevent existing and future potential threats to human health and/or the environment from soil and wetland soil, overburden and bedrock groundwater, and NAPL in the overburden and bedrock aquifers, and to meet applicable or relevant and appropriate requirements (ARARs)

The specific RAOs presented in the ROD issued on September 30, 2005, are summarized in the following table

Remedial Action Objectives

Site Area/ Medium	Protection of Human Health	Protection of the Environment
Former SRSNE Operations Area/ Railroad Soil	• Prevent potential human exposure (dermal contact, ingestion and inhalation) to soil with contaminants that exceed an excess carcinogenic risk of 10^{-4} to 10^{-6}, that pose a non-carcinogenic Hazard Index greater than 1, or that exceed ARARs • Prevent migration of contaminants from soils to groundwater that would result in groundwater concentrations in excess of ARARs or which otherwise present an unacceptable risk in groundwater	• Prevent migration of contaminants from soils to groundwater that would result in groundwater concentrations in excess of ARARs
Former Cianci Property Soil	• Same as Former SRSNE Operations Area/Railroad Soil Area	• Prevent ecological risks associated with SRSNE-related contaminants
Overburden NAPL Area	• Reduce or stabilize contaminants in the NAPL area that would otherwise result in groundwater concentrations that pose a carcinogenic risk in excess of 10^{-4} to 10^{-6}, non-carcinogenic Hazard Index greater than 1, or that exceed ARARs	• Reduce contaminants in the NAPL area to achieve one or more of the following - Shorten the timeframe that groundwater standards are exceeded - Shrink the size of the groundwater plume - Reduce groundwater constituent concentrations - Prevent the migration of NAPL
Overburden Groundwater	• Prevent potential human exposure (dermal contact, ingestion and inhalation) to groundwater in the overburden aquifer with contaminants that pose an excess carcinogenic risk of 10^{-4} to 10^{-6}, non-carcinogenic Hazard Index greater than 1, or that exceed ARARs	• Restore groundwater quality to meet ARARs
Bedrock NAPL Area	• Minimize expansion of the extent of impacted bedrock groundwater due to further NAPL migration	• Minimize expansion of the extent of impacted bedrock groundwater due to further NAPL migration
Bedrock Groundwater	• Prevent potential human exposure (dermal contact, ingestion and inhalation) to groundwater in the bedrock aquifer with contaminants that pose an excess carcinogenic risk of 10^{-4} to 10^{-6}, non-carcinogenic Hazard Index greater than 1, or that exceed ARARs	• Prevent continuing migration of contaminants that exceed ARARs, and restore bedrock groundwater to meet ARARs once VOC residuals are depleted

Key elements of the selected remedy are summarized as follows

- In-situ thermal treatment of contaminants in the overburden aquifer NAPL area until site-specific NAPL performance standards are achieved,

- Excavate, consolidate and cap soil and wetland soil that exceeds cleanup levels,

- Capture and on-site treatment of contaminated groundwater in both the overburden and bedrock aquifers, until federal and state safe drinking water standards and other risk-based levels are achieved,

- Over time, modification of the configuration of the on-site groundwater extraction and treatment system, as appropriate, based on expected reductions in contamination,

- Monitor natural attenuation of the groundwater plume including a) groundwater outside the capture zone of the extraction and treatment system until groundwater cleanup levels are achieved and b) contaminants in the NAPL area of the bedrock aquifer until groundwater cleanup levels are achieved,

- Implement restrictions on uses of the Site in perpetuity to prevent human exposure to contaminants in the subsurface soils and to prohibit activities that might harm the cap Implement institutional controls to prevent human exposure to contaminated groundwater and NAPL areas until appropriate levels are met These restrictions will also prohibit construction above that portion of the groundwater plume that exceeds federal and state volatilization criteria, if studies conducted during remedial design confirm the need for such restrictions,

- Maintain the cap in the long term, and

- Perform reviews at least every five years to ensure that the remedy remains protective of human health and the environment

- Contingent remedy – In the event that the Southington Water District decides to re-activate municipal production wells located near the Site prior to attainment of federal drinking water standards and other risk-based levels throughout the Site, additional groundwater containment may be required

Remedy Implementation

Pursuant to a Consent Decree entered on March 26, 2009 by the United States District Court for the District of Connecticut, the SRSNE Site Group agreed to conduct the cleanup of the Site as set forth in the ROD The Consent Decree included a Statement of Work (SOW) that sets out the framework for conducting the remedy selected in the ROD This section summarizes the more significant remedial activities that have been undertaken by the SRSNE Site Group to date, and provides a status report on implementation of the other key components of the remedy

Community education and outreach. A public information web site was launched on August 28, 2009 (www srsnesite com) An open house was held at the Site on July 10, 2010, satisfying the SOW requirement for a pre-construction public meeting prior to site preparation activities which began on September 13, 2010 A second open house was held on September 7, 2014, to allow the community to view the thermal treatment system before startup

Capture and on-site treatment of contaminated groundwater (HCTS). In the five-year period covered by this review, the HCTS has operated in compliance with the Demonstration of Compliance

requirements first in the 1994 and 1997 NTCRA settlements and subsequently, the 2009 Consent Decree Since 1995, more than 250 million gallons of groundwater have been recovered and treated, with 18,000 pounds of VOCs removed. No noteworthy problems have occurred during operation and maintenance of the HCTS

In-situ thermal treatment (ISTR) of Overburden NAPL Area. Site preparation started in September 2010 and included significant earthworks, installation of thermal infrastructure (new gas, sewer, power), re-routing of a major AT&T optics line, and removing and replacing the existing concrete culvert The ISTR system was installed between April 2013 and May 2014, and heating was conducted in two phases to better manage vapor recovery Phase 1 was initiated on May 15, 2014 Heating in Phase 2 started on July 16, 2014 Heating continued until process monitoring suggested that Interim NAPL Cleanup Levels (INCLs) were achieved, at which point confirmation soil sampling was performed Phase 1 confirmation sampling was completed on November 19, 2014 Phase 2 confirmation sampling was completed on February 17, 2015 Heating was discontinued on March 2, 2015. Vapor recovery continued through April 2, 2015 until soil temperatures decreased to below 100° C and additional vapor was no longer being generated ISTR achieved the following

- Interim NAPL Cleanup Levels required by SOW Section IV A 4 were met in all confirmatory soil samples On average, soil samples results were two orders of magnitude below INCLs
- 496,400 pounds of VOCs were removed from the subsurface
- Calculations of mass removed show that ISTR exceeded the expectation of 95 to 99% removal
- Groundwater data from the thermal treatment zone indicate that VOC contamination has been reduced to levels below those that are indicative of the presence of NAPL
- At its peak, ISTR was removing mass at a rate of approximately 10,000 pounds total VOC per day, which at system shutoff had dropped off to 26 pounds total VOC per day

Excavation, consolidation and capping soils. Contaminated soils that run along the railroad right-of-way were excavated and used as fill to re-grade the Operations Area during the ISTR site preparations The area was backfilled with clean soil and re-graded to accommodate the future rails-to-trails. Wetland soils and river sediments at the outfall of the existing culvert were excavated during culvert re-location and also placed in the Operations Area. The discharge point to the Quinnipiac River floodplain will be restored to enhance the functions and value of the habitat in that area after excavation and consolidation of additional wetland soils and sediments occurs The remaining, isolated areas of contaminated soil on the Cianci Property will be excavated and placed with the other materials in the Operations Area prior to construction of the RCRA cap which is currently in remedial design Construction is planned for 2016

Monitored natural attenuation and vapor intrusion. New monitoring wells were needed to further refine the delineation of the groundwater plumes in the overburden and bedrock aquifers for purposes of monitoring natural attenuation in three dimensions and the vapor intrusion study The wells were installed over fall/winter of 2009 and spring 2010 and sampled in 2011 and again in 2014

Groundwater monitoring. The groundwater monitoring program includes the collection of samples from up to 131 wells located across the entire plume with analysis for VOCs, 1,4-dioxane, metals and MNA parameters The results are included in Annual State of Compliance reports A comprehensive

review of annual groundwater data and trends undertaken for this FYR was the basis for an updated groundwater conceptual site model.

Implementation of institutional controls. Institutional controls are required by the ROD to prevent unacceptable exposure to groundwater, soil, subsurface NAPL, and possibly vapor intrusion in the future but have not yet been put in place Institutional controls will be implemented pending approval by CT DEEP of Environmental Land Use Restrictions revised to be consistent with the State's current formatting requirements

RD/RA Document Submittals. Remedial activities have also included the submittal of the following documents to EPA and CT DEEP for agency review and comment

- *Curtiss Street Well Field Memorandum of Agreement* (effective August 2014)
- *Annual State of Compliance Reports #1-6*
- *In-Situ Thermal Remedial (ISTR) Conceptual Design* (April 2010)
- *Pre-ISTR Preparation Plan (PIPP) Final Design and Remedial Action Work Plan* (April 2010)
- *Independent Quality Assurance Team Plan* (April 2010)
- *In Situ Thermal Remediation Remedial Action Work Plan and Project Operations Plan* (July 2011)
- *SRSNE Site – Vapor Intrusion Technical Memorandum* (December 2011)
- *SRSNE Site – Submission of Revised Field Sampling Plan and Quality Assurance Project* (August 2012)
- *Pre-ISTR Site Preparation Completion Report* (April 2013)
- *Thermal Wellfield Implementation Support Plan* (April 2013)
- *Institutional Control Plan* (May 2013)
- *In Situ Thermal Remediation Remedial Action Work Plan and Project Operations Plan* (revised May 2014)
- *Memorandum Thermal Oxidizer – Summary of Root Cause Analysis* (September 2014)
- *In-Situ Thermal Remediation Phase 1 Confirmation Sampling Results and Recommended Operating Modifications* (December 2014)
- *In-Situ Thermal Remediation – Demonstration of Attainment of Interim NAPL Cleanup Levels and Recommendations* (February 2015)
- *Groundwater Conceptual Site Model Update* (April 2015)

APPENDIX B – Tables and Figures

Table B-1
1,4-Dioxane Results Comparison
2010 to 2014
Solvents Recovery Service of New England, Inc. (SRSNE) Superfund Site
Southington, Connecticut

Hydrostratigraphic Unit	SampleLocation	2010 Comprehensive Event: 1,4-Dioxane Result	2014 Comprehensive Event: 1,4-Dioxane Result	Relative Change
Shallow Overburden	MW-703S	1 U	0.141 J	No Definable Change - ND <1 to Detect <1
Shallow Overburden	MW-707S	9.7 J	0.501	Decrease
Shallow Overburden	P-13	1 U	0.196	No Definable Change - ND <1 to Detect <1
Middle Overburden	MW-03	17	3.46	Decrease
Middle Overburden	MW-127B	1 U	0.231	No Definable Change - ND <1 to Detect <1
Middle Overburden	MW-205B	7	0.32	Decrease
Middle Overburden	MW-707M	1.4 J	0.834	Decrease
Middle Overburden	MW-905M	1 U	0.212	No Definable Change - ND <1 to Detect <1
Middle Overburden	PZO-3M	1 UJ	0.139 U	No Definable Change - Both ND
Middle Overburden	PZO-4M	1 U	0.147 U	No Definable Change - Both ND
Deep Overburden	DN-3	2.8 J	2	Decrease
Deep Overburden	MW-703D	1 U	0.144 U	No Definable Change - Both ND
Deep Overburden	MW-707D	1 U	0.139 U	No Definable Change - Both ND
Deep Overburden	PZO-3D	1 U	0.15 U	No Definable Change - Both ND
Deep Overburden	PZO-4D	1 U	0.144 U	No Definable Change - Both ND
Deep Overburden	SRS-1	1 U	0.17 U	No Definable Change - Both ND
Shallow Bedrock	MW-127C	8	4.22	Decrease
Shallow Bedrock	MW-128	1 U	0.136 J	No Definable Change - ND <1 to Detect <1
Shallow Bedrock	MW-707R	1 U	2.28	Increase
Shallow Bedrock	PZR-4R	1 U	0.413	No Definable Change - ND <1 to Detect <1
Shallow Bedrock	PZR-5R	1.2	0.998	Decrease
Deep Bedrock	MW-703DR	1 UJ	0.142 U	No Definable Change - Both ND
Deep Bedrock	MW-707DR	6.7 J	3.5	Decrease
Deep Bedrock	PZR-4DR	1 U	0.142 U	No Definable Change - Both ND

Notes:

U = Analyte not detected above the laboratory reporting limit

J = Analyte result is estimated

ug/L = micrograms per liter

Concentration > $1x10^{-6}$ carcinogenic risk level of 0.46 ug/L

Concentration > $1x10^{-5}$ carcinogenic risk level of 4.6 ug/L

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Table B-2
VOCs for Comparison to Vapor Intrusion
Select Shallow and Middle Overburden Wells
Solvents Recovery Service of New England, Inc. (SRSNE) Superfund Site
Southington, Connecticut

			Sample Location	MW-415		MW-501C		MW-703S		MW-704S		MW-707S		MW-902M		MW-903S		MW-904S		MW-910S		MWL-303		MWL-304		MWL-307	
			Sample Date	7/17/2015		6/11/2014		6/10/2014		6/11/2014		6/11/2014		7/17/2015		6/13/2014		6/12/2014		6/11/2014		6/10/2014		7/17/2015		7/17/2015	
			Location Near Buildings	Greater than 100 ft		Less than 100 ft		Greater than 100 ft		Greater than 100 ft		Greater than 100 ft		Greater than 100 ft		Less than 100 ft		Less than 100 ft		Less than 100 ft		Greater than 100 ft		Greater than 100 ft		Greater than 100 ft	
			Well Group	MOB		SOB		SOB		SOB		SOB		MOB		SOB		SOB		SOB		SOB		SOB		SOB	
			HydroStratZone(s)	N		C		C		C		C		N		C		C		C		C		N		N	
			Field Sample ID	MW-415-HS-07172015		MW-501C-06112014		MW-703S-06102014		MW-704S-HS-06112014		MW-707S-06112014		MW-902M-HS-07172015		MW-903S-06132014		MW-904S-06122014		MW-910S-06112014		MWL-303-06102014		MWL-304-HS-07172015		MWL-307-HS-07172015	
Analyte	**CAS No.**	**Unit**	**Risk-Based**																								
VOCs (8260C)			**Screening Level**																								
1,1,1,2-Tetrachloroethane	630-20-6	ug/L	2	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	1.25	U	2.5	U
1,1,1-Trichloroethane	71-55-6	ug/L	6500	**1.13**	--	0.5	U	**0.512**	--	0.5	UJ	0.5	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	**7.35**	--	2.5	U
1,1,2-Trichloroethane	79-00-5	ug/L	5.2	0.75	U	0.75	U	0.75	U	0.75	UJ	0.75	U	30	U	0.75	U	0.75	U	0.75	U	0.75	U	**1.88**	U	3.75	U
1,1-Dichloroethane	75-34-3	ug/L	7.6	**4.78**	--	0.75	U	0.75	U	0.75	UJ	0.75	U	**26.1**	J	**0.282**	J	0.75	U	0.75	U	0.75	U	**88.5**	--	**2.91**	J
1,1-Dichloroethene	75-35-4	ug/L	190	**0.864**	--	0.5	U	0.5	U	0.5	UJ	0.5	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	1.25	U	2.5	U
1,2,4-Trichlorobenzene	120-82-1	ug/L	36	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	6.25	U	12 5	U
1,2-Dichlorobenzene	95-50-1	ug/L	2700	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	**1.18**	J	12.5	U
1,2-Dichloroethane	107-06-2	ug/L	2.2	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	1.25	U	2.5	U
1,4-Dichlorobenzene	106-46-7	ug/L	2.6	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	U	2.5	U	2.5	U	6.25	U	12.5	U
2-Butanone (MEK)	78-93-3	ug/L	50000	**44.3**	--	5	U	5	U	5	U	5	U	200	U	5	U	5	U	5	U	5	U	12.5	U	**113**	--
2-Hexanone	591-78-6	ug/L	8200	5	U	5	U	5	U	5	U	5	U	200	U	5	U	5	U	5	U	5	U	12.5	U	**21.6**	J
4-Methyl-2-pentanone (MIBK)	108-10-1	ug/L	13000	**4.32**	J	5	U	5	U	5	U	5	U	200	U	5	U	5	U	5	U	**8.72**	--	12.5	U	**257**	--
Acetone	67-64-1	ug/L	50000	**97.5**	--	5	U	5	U	5	U	5	U	200	U	5	U	5	U	5	U	**3.46**	J	**16.2**	--	**133**	--
Benzene	71-43-2	ug/L	1.6	**0.232**	J	0.5	U	0.5	U	0.5	UJ	0.5	U	**18.2**	J	0.5	U	0.5	U	0.5	U	0.5	U	**26.2**	--	**5.49**	--
Bromomethane	74-83-9	ug/L	17	**0.859**	J	1	U	1	U	1	U	1	U	40	U	1	UJ	1	UJ	1	U	1	U	2.5	U	**1.39**	J
Carbon disulfide	75-15-0	ug/L	1200	5	U	5	U	5	U	5	U	5	U	200	U	5	U	5	U	5	U	5	U	**4.11**	J	25	U
Carbon tetrachloride	56-23-5	ug/L	0.41	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	1.25	U	2.5	U
Chlorobenzene	108-90-7	ug/L	410	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	20	U	0.5	U	**1.26**	--	0.5	U	0.5	U	1.25	U	2.5	U
Chloroethane	75-00-3	ug/L	12000	**2.16**	--	1	U	1	U	1	UJ	1	U	**1970**	--	**0.558**	J	1	U	1	U	1	U	2.5	U	**5.59**	--
Chloroform	67-66-3	ug/L	0.81	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	30	U	0.75	U	0.75	U	0.75	U	0.75	U	1.88	U	3.75	U
Chloromethane	74-87-3	ug/L	260	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	100	U	2.5	U	2.5	UJ	2.5	U	2.5	U	6.25	U	12.5	U
cis-1,2-Dichloroethene	156-59-2	ug/L	830	**57.1**	--	0.5	U	0.5	U	0.5	UJ	0.5	U	**15.2**	J	0.5	U	0.5	U	0.5	U	0.5	U	**22**	--	**55.3**	--
Ethylbenzene	100-41-4	ug/L	3.5	**3.13**	--	0.5	U	0.5	U	0.5	U	0.5	U	**1620**	--	0.5	U	0.5	U	0.5	U	0.5	U	**161**	--	**47.5**	--
Hexachlorobutadiene	87-68-3	ug/L	0.3	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	24	U	0.6	U	0.6	U	0.6	U	0.6	U	1.5	U	3	U
Methylene chloride	75-09-2	ug/L	160	**0.766**	J	5	U	5	U	5	U	5	U	**41.6**	J	5	U	5	U	5	U	5	U	12.5	U	25	U
Naphthalene	91-20-3	ug/L	4.6	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	100	U	**0.29**	J	2.5	U	2.5	U	2.5	U	6.25	U	**4.99**	J
Styrene	100-42-5	ug/L	3100	1	U	1	U	1	U	1	U	1	U	40	U	1	U	1	U	1	U	1	U	2.5	U	**2.23**	J
Tetrachloroethene	127-18-4	ug/L	15	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	1.25	U	2.5	U
Tetrahydrofuran	109-99-9	ug/L	720000	**3.04**	J	5	U	5	U	5	UJ	5	U	**133**	J	**8.14**	--	5	U	5	U	5	U	**12.8**	--	**106**	--
Toluene	108-88-3	ug/L	7100	**15.8**	--	0.75	U	0.75	U	0.75	U	0 75	U	**3890**	--	0.75	U	0.75	U	0.75	U	**0.224**	J	**333**	--	**267**	--
trans-1,2-Dichloroethene	156-60-5	ug/L	1000	**1**	--	0.75	U	0.75	U	0.75	U	0.75	U	30	U	0.75	U	0.75	U	0.75	U	0.75	U	**5.26**	--	**3.07**	J
trans-1,3-Dichloropropene	10061-02-6	ug/L	4.8	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	20	U	0.5	U	0.5	U	0.5	U	0.5	U	1.25	U	2.5	U
Trichloroethene	79-01-6	ug/L	1.2	**0.674**	--	0.5	U	0.5	U	0.5	UJ	**0.566**	--	20	U	0.5	U	0.5	U	0.5	U	0.5	U	**1.18**	J	2.5	U
Vinyl chloride	75-01-4	ug/L	0.15	**11.8**	--	1	U	1	U	1	U	1	U	**22.9**	J	1	U	1	U	1	U	1	U	**106**	--	**74.6**	--
Xylenes, Total	1330-20-7	ug/L	493	**7**	--	1	U	1	U	1	U	1	U	**1030**	--	1	U	1	U	1	U	1	U	**193**	--	**42.8**	--

Notes:
U = Analyte not detected above the laboratory reporting limit
J = Analyte result is estimated
ug/L = micrograms per liter
VOCs = volatile organic compounds
Risk-Based Screening Level = values represent the more stringent of CT RSR VI criteria (R.C.S.A. 22a-133k-1 through -3, effective June 27, 2013) or USEPA values calculated from the most recent version of Vapor Intrusion Screening Level (VISL) calculator (June 2015). VISL-based values are calculated based on the lower of a cancer risk of 10-6 or a hazard index of 1.
Bold = Analyte detected above the laboratory reporting limit
Shaded Cell = Analyte detected above the Action Level
SOB = Shallow Overburden
MOB = Middle Overburden

Table B-2
VOCs for Comparison to Vapor Intrusion
Select Shallow and Middle Overburden Wells
Solvents Recovery Service of New England, Inc (SRSNE) Superfund Site
Southington, Connecticut

			Sample Location	MWL-309		MWL-312		MWL-313		P-101C		P-102C		P-11B		P-13		P-3B		P-5B		TW-08A	
			Sample Date	6/10/2015		6/10/2014		6/10/2014		6/10/2015		6/10/2014		6/11/2014		6/9/2015		6/13/2014		6/13/2014		7/17/2015	
			Location Near Buildings	Greater than 100 ft		Greater than 100 ft		Greater than 100 ft		Greater than 100 ft		Greater than 100 ft		Greater than 100 ft		Greater than 100 ft		Greater than 100 ft		Greater than 100 ft		Greater than 100 ft	
			Well Group	SOB		SOB		SOB		SOB		SOB		SOB		SOB		SOB		SOB		MOB	
			HydroStratZone(s)	R		C		C		R		C		C		R		C		C		N	
			Field Sample ID	MWL-309-HS-06102015		MWL-312-06102014		MWL-313-06102014		P-101C-HS-06102015		P-102C-06102014		P-11B-HS-06112014		P-13-06092015		P-3B-06132014		P-5B-06132014		TW-08A-HS-07172015	
Analyte	**CAS No.**	**Unit**	**Risk-Based**																				
VOCs (8260C)			**Screening Level**																				
1,1,1,2-Tetrachloroethane	630-20-6	ug/L	2	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	20	U
1,1,1-Trichloroethane	71-55-6	ug/L	6500	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	**2.96**	--	0.5	U	0.5	U	20	U
1,1,2-Trichloroethane	79-00-5	ug/L	5.2	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	UJ	0.75	U	0.75	U	0.75	U	30	U
1,1-Dichloroethane	75-34-3	ug/L	7.6	**0.777**	--	0.75	U	0.75	U	**1.07**	--	0.75	U	0.75	UJ	**1.17**	--	**2.65**	--	0.75	U	30	U
1,1-Dichloroethene	75-35-4	ug/L	190	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**0.417**	J	**2.36**	--	0.5	U	**38.6**	--
1,2,4-Trichlorobenzene	120-82-1	ug/L	36	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	100	U
1,2-Dichlorobenzene	95-50-1	ug/L	2700	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	100	U
1,2-Dichloroethane	107-06-2	ug/L	2.2	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	20	U
1,4-Dichlorobenzene	106-46-7	ug/L	2.6	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	100	U
2-Butanone (MEK)	78-93-3	ug/L	50000	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	**1600**	--
2-Hexanone	591-78-6	ug/L	8200	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	200	U
4-Methyl-2-pentanone (MIBK)	108-10-1	ug/L	13000	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	**240**	--
Acetone	67-64-1	ug/L	50000	5	U	5	U	5	U	5	U	5	U	5	U	10	U	5	U	**7.93**	--	**2050**	--
Benzene	71-43-2	ug/L	1.6	0.5	U	0.5	U	0.5	U	**3.53**	--	0.5	U	0.5	UJ	0.5	U	**0.449**	J	0.5	U	**13.6**	J
Bromomethane	74-83-9	ug/L	17	1	U	1	U	1	UJ	1	U	1	UJ	1	U	1	U	1	UJ	1	UJ	40	U
Carbon disulfide	75-15-0	ug/L	1200	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	**27.3**	J
Carbon tetrachloride	56-23-5	ug/L	0.41	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	20	U
Chlorobenzene	108-90-7	ug/L	410	0.5	U	0.5	U	0.5	U	**1.4**	--	0.5	U	**0.273**	J	0.5	U	**0.843**	--	0.5	U	20	U
Chloroethane	75-00-3	ug/L	12000	1	U	1	U	1	U	**8.22**	--	1	U	**0.682**	J	1	U	1	U	1	U	40	U
Chloroform	67-66-3	ug/L	0.81	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	30	U
Chloromethane	74-87-3	ug/L	260	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	100	U
cis-1,2-Dichloroethene	156-59-2	ug/L	830	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	**1.32**	--	**20.9**	--	0.5	U	**3330**	--
Ethylbenzene	100-41-4	ug/L	3.5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**0.217**	J	0.5	U	**178**	--
Hexachlorobutadiene	87-68-3	ug/L	0.3	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	24	U
Methylene chloride	75-09-2	ug/L	160	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	200	U
Naphthalene	91-20-3	ug/L	4.6	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	100	U
Styrene	100-42-5	ug/L	3100	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	**16.7**	J
Tetrachloroethene	127-18-4	ug/L	15	0.5	U	0.5	U	**0.223**	J	0.5	U	0.5	U	0.5	U	**0.564**	--	0.5	U	0.5	U	20	U
Tetrahydrofuran	109-99-9	ug/L	720000	5	U	5	U	5	U	**2.25**	J	5	U	5	UJ	5	U	**1.61**	J	5	U	**61.8**	J
Toluene	108-88-3	ug/L	7100	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	**0.278**	J	**1000**	--
trans-1,2-Dichloroethene	156-60-5	ug/L	1000	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	**0.319**	J	0.75	U	**63.2**	--
trans-1,3-Dichloropropene	10061-02-6	ug/L	4.8	0.5	U	**0.428**	J	0.5	UJ	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	20	U
Trichloroethene	79-01-6	ug/L	1.2	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	**0.426**	J	**2.36**	--	0.5	U	20	U
Vinyl chloride	75-01-4	ug/L	0.15	1	U	1	U	1	U	**0.872**	J	1	U	1	U	1	U	1	U	1	U	**472**	--
Xylenes, Total	1330-20-7	ug/L	493	1	U	1	U	1	U	**0.37**	J	1	U	1	U	1	U	1	U	1	U	**423**	--

Notes:
U = Analyte not detected above the laboratory reporting limit
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ug/L = micrograms per liter
VOCs = volatile organic compounds
Risk-Based Screening Level = values represent the more stringent of CT RSR VI criteria (R.C.S.A. 22a-133k-1 through -3, effective June 27, 2013) or USEPA values calculated from the most recent version of Vapor Intrusion Screening Level (VISL) calculator (June 2015). VISL-based values are calculated based on the lower of a cancer risk of 10-6 or a hazard index of 1.
Bold = Analyte detected above the laboratory reporting limit
Shaded Cell = Analyte detected above the Action Level
SOB = Shallow Overburden
MOB = Middle Overburden

FAWN ROAD

CURTISS STREET

CL&P EASEMENT

NTCRA 2 CAPTURE ZONE

NTCRA 1 CAPTURE ZONE

FORMER SRSNE OPERATIONS AREA

RAILROAD RIGHT-OF-WAY

FORMER CIANCI PROPERTY

TOWN WELL FIELD PROPERTY

INTERMITTENT STREAM

RW-15
RW-14
RW-16
RW-13

NTCRA 2 EXTRACTION WELLS

TREATMENT SYSTEM BUILDING

LAZY LANE

QUINNIPIAC RIVER

(CONN. ROUTE 10)

QUEEN STREET

FLANDERS STREET

LEGEND:

- PROPERTY LINE
- PROPERTY LINE – ADJOINER
- BUILDING
- BUILDING – ADJOINER
- RAILROAD
- ROAD
- GRAVEL ROAD
- DRAINAGE SWALE
- RIVER
- EASEMENT
- CHAINLINK FENCE
- SHEETPILE
- UTILITY POLE
- NTCRA 1 CONTAINMENT AREA
- OVERBURDEN GROUNDWATER AREA (FROM FIGURE 2-4 OF FEASIBILITY STUDY [BBL AND USEPA 2005])
- SEVERED PLUME (FROM FIGURE 2-4 OF FEASIBILITY STUDY [BBL AND USEPA 2005])
- OVERBURDEN NAPL AREA (FROM FIGURE 2-3 OF FEASIBILITY STUDY [BBL AND USEPA 2005])

NOTES:

1. BASEMAP INFORMATION OBTAINED FROM A FIGURE CREATED BY CONKLIN & SOROKA, INC., ENTITLED "TOPOGRAPHIC SURVEY" DATED 1/13/09 AT A SCALE OF 1"=50'.
2. ALL LOCATIONS ARE APPROXIMATE.
3. THIS FIGURE PRESENTS AN OVERLAY OF THE ESTIMATED EXTENTS OF THE GROUNDWATER PLUME IN THREE MONITORED OVERBURDEN ZONES, BASED ON PLUME DELINEATION LIMITS PRESENTED IN THE FEASIBILITY STUDY (BBL AND USEPA 2005).

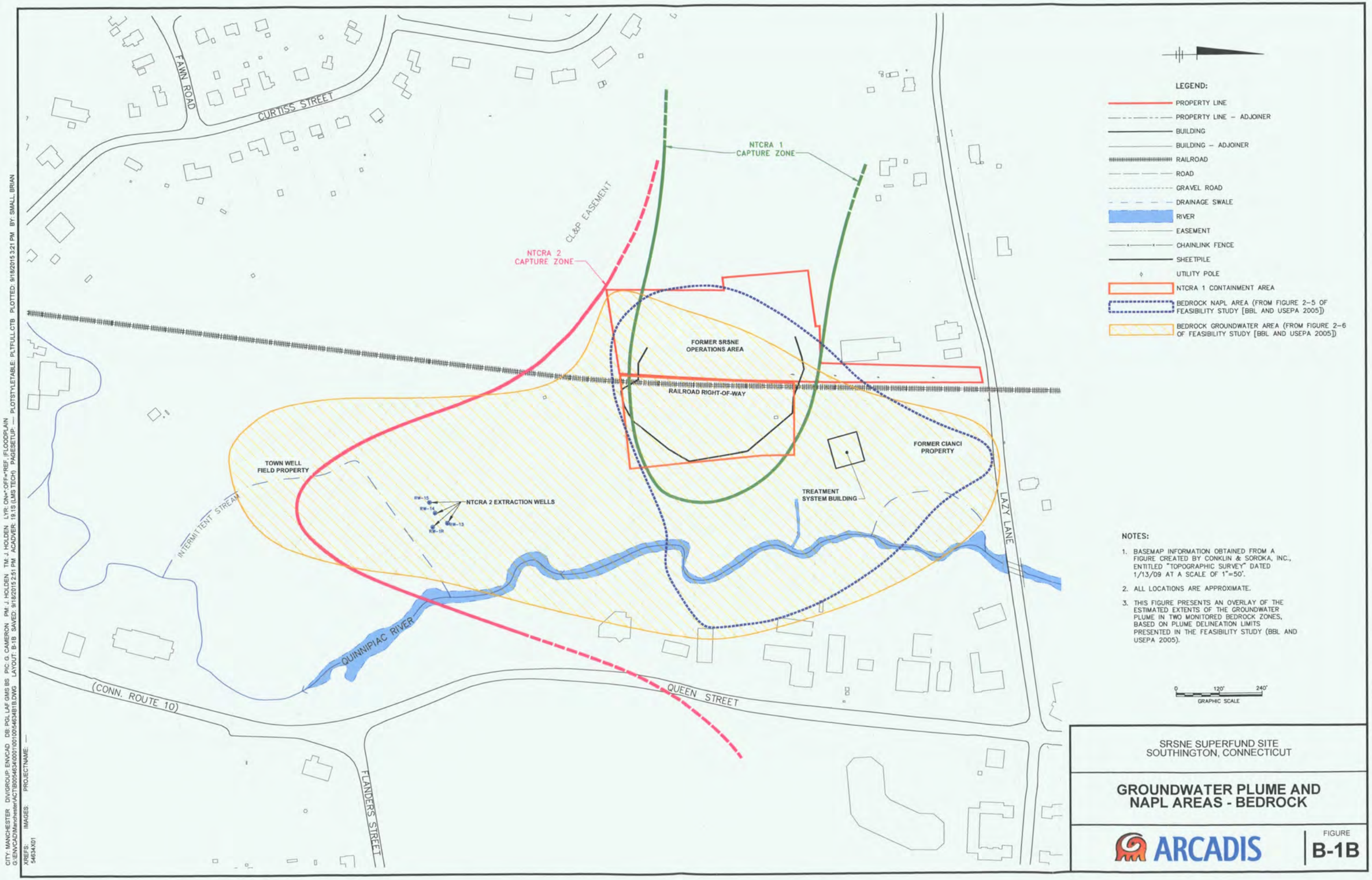
0 120' 240'
GRAPHIC SCALE

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

GROUNDWATER PLUME AND NAPL AREAS - OVERBURDEN

ARCADIS

FIGURE
B-1A



NOTES:

1. BASEMAP INFORMATION OBTAINED FROM A FIGURE CREATED BY CONKLIN & SOROKA, INC., ENTITLED "TOPOGRAPHIC SURVEY" DATED 1/13/09 AT A SCALE OF 1"=50'.
2. ALL LOCATIONS ARE APPROXIMATE.
3. THIS FIGURE PRESENTS AN OVERLAY OF THE ESTIMATED EXTENTS OF THE GROUNDWATER PLUME IN TWO MONITORED BEDROCK ZONES, BASED ON PLUME DELINEATION LIMITS PRESENTED IN THE FEASIBILITY STUDY (BBL AND USEPA 2005).

0 120' 240'
GRAPHIC SCALE

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

GROUNDWATER PLUME AND NAPL AREAS - BEDROCK

ARCADIS

FIGURE
B-1B

CITY: MANCHESTER DIV/GROUP: ENVCAD DB: PGL LAF GMS BS PIC: G. CAMERON PM: J. HOLDEN TM: J. HOLDEN LYR: ON=*;OFF=*REF;FLOODPLAIN
G:\ENVCAD\Manchester\ACTIVE\054634\0001\001\005463481B.DWG LAYOUT: B-1B SAVED: 9/18/2015 2:51 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 9/18/2015 3:21 PM BY: SMALL, BRIAN
XREFS: IMAGES: PROJECTNAME: ---
54634X01

FAWN ROAD
HART STREET
KANE STREET
CURTISS STREET
CURTISS STREET
CLAP EASEMENT
FORMER OPERATIONS AREA
FORMER BUILDINGS
TW-08A
MW-307
MW-304
MW-902M
MW-415
NTCRA 1 SHEETPILE WALL
HYDRAULIC CONTAINMENT AND TREATMENT SYSTEM BUILDING
INTERMITTENT STREAM
LAZY LANE
MW-703S
P-13
MW-313
P-5B
MW-303
MW-312
P-11B
MW-309
P-3B
MW-704S
MW-707S
P-101C
P-102C
NTCRA 1 CONTAINMENT AREA
FORMER IDEAL FORGING
NORTH MAIN STREET
INTERMITTENT STREAM
MW-903S
MW-904S
MW-501C
MW-910S
QUINNIPIAC RIVER
QUEEN STREET
(CONN. ROUTE 10)
FLANDERS STREET

0 300' 600'

NOTE:

1. MAPPING BASED ON FIGURE "SOLVENT RECOVERY SERVICE OF NEW ENGLAND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LAZY LANE, SOUTHINGTON, CONN." DATED 6-28-93 BY DIVERSIFIED TECHNOLOGIES CORPORATION.

2. WELLS SHOWN ON THIS FIGURE INCLUDE SHALLOW OVERBURDEN WELLS, PLUS MIDDLE OVERBURDEN WELLS WHERE THE BOTTOM OF THE SCREEN DEPTH IS LESS THAN 30' BELOW GROUND AND NO CORRESPONDING SHALLOW OVERBURDEN WELL IS PRESENT. THIS REPRESENTS THE MONITORING WELL NETWORK SUPPORTING THE VAPOR INTRUSION (VI) EVALUATION.

LEGEND:

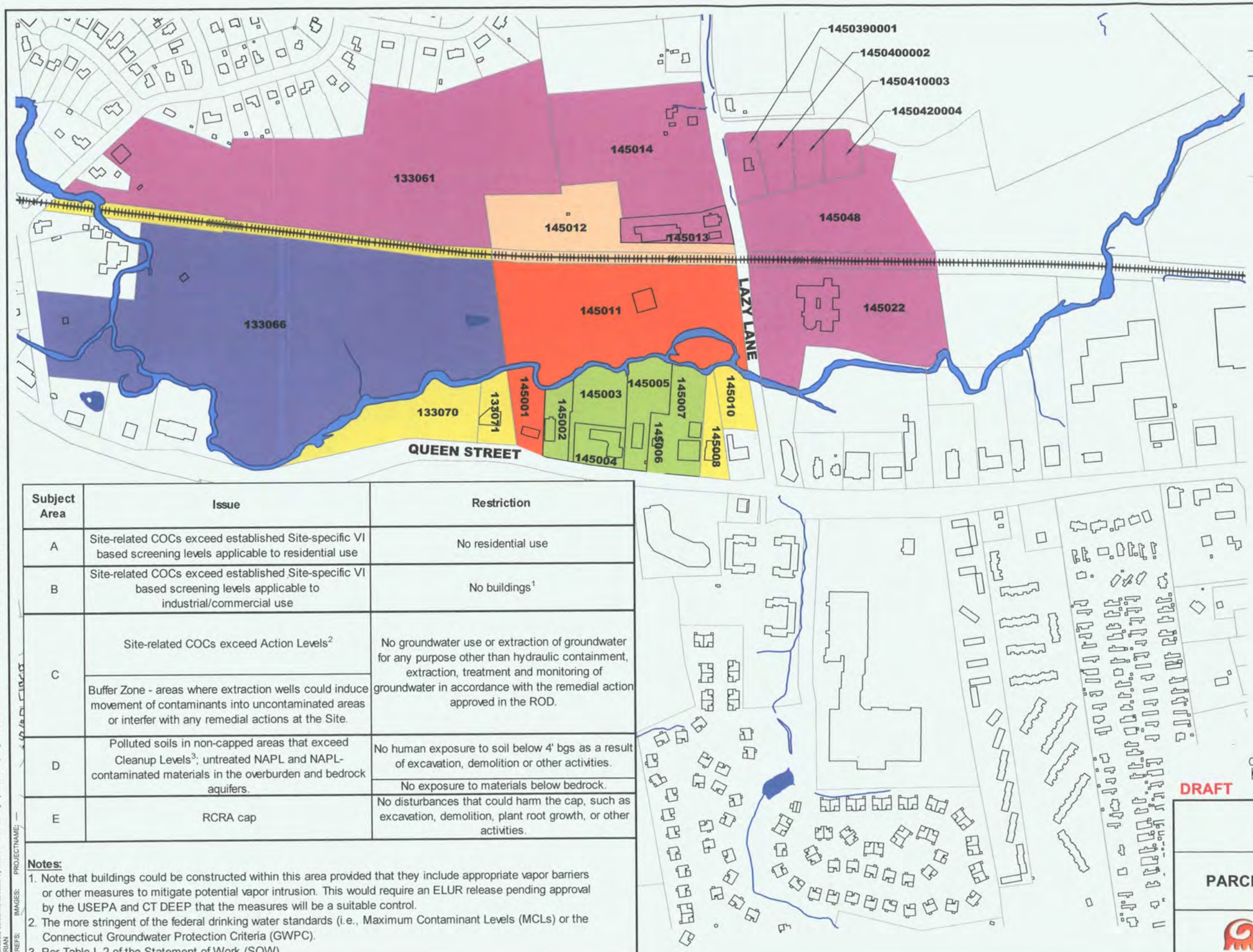
- SHALLOW OVERBURDEN MONITORING WELL
- MIDDLE OVERBURDEN MONITORING WELL
- ESTIMATED EXTENT OF GROUNDWATER VOC EXCEEDANCES OF VAPOR INTRUSION SCREENING LEVELS (2014 SAMPLING RESULTS)
- INDICATES ZONE WITHIN 100' OF OCCUPIED STRUCTURE (EXCLUDING HYDRAULIC CONTAINMENT AND TREATMENT SYSTEM BUILDING)
- GENERAL GROUNDWATER FLOW DIRECTION

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

VAPOR INTRUSION WELLS

ARCADIS

FIGURE
B-2



LEGEND:

- RAILROAD
- STREAM
- BUILDING
- LAKE
- RIVER
- PARCEL BOUNDARY
- RESTRICTIONS ASSOCIATED WITH SUBJECT AREA C APPLY
- RESTRICTIONS ASSOCIATED WITH SUBJECT AREAS C AND D APPLY
- RESTRICTIONS ASSOCIATED WITH SUBJECT AREAS A, B AND C APPLY
- RESTRICTIONS ASSOCIATED WITH SUBJECT AREAS A, B, C AND D APPLY
- RESTRICTIONS ASSOCIATED WITH SUBJECT AREAS A, B, C, D AND E APPLY
- BUFFER ZONE (PROPERTIES NOT PRESENTLY AFFECTED BY THE PLUME, BUT WHICH COULD BE AFFECTED IF A WATER SUPPLY WELL WAS INSTALLED AND OPERATED IN A MANNER THAT COULD CAUSE THE PLUME TO MIGRATE BEYOND ITS CURRENT CONFIGURATION (SEE NOTE 1).

Subject Area	Issue	Restriction
A	Site-related COCs exceed established Site-specific VI based screening levels applicable to residential use	No residential use
B	Site-related COCs exceed established Site-specific VI based screening levels applicable to industrial/commercial use	No buildings[1]
C	Site-related COCs exceed Action Levels[2]	No groundwater use or extraction of groundwater for any purpose other than hydraulic containment, extraction, treatment and monitoring of groundwater in accordance with the remedial action approved in the ROD.
	Buffer Zone - areas where extraction wells could induce movement of contaminants into uncontaminated areas or interfer with any remedial actions at the Site.	
D	Polluted soils in non-capped areas that exceed Cleanup Levels[3]; untreated NAPL and NAPL-contaminated materials in the overburden and bedrock aquifers.	No human exposure to soil below 4' bgs as a result of excavation, demolition or other activities.
		No exposure to materials below bedrock.
E	RCRA cap	No disturbances that could harm the cap, such as excavation, demolition, plant root growth, or other activities.

Notes:

1. Note that buildings could be constructed within this area provided that they include appropriate vapor barriers or other measures to mitigate potential vapor intrusion. This would require an ELUR release pending approval by the USEPA and CT DEEP that the measures will be a suitable control.
2. The more stringent of the federal drinking water standards (i.e., Maximum Contaminant Levels (MCLs) or the Connecticut Groundwater Protection Criteria (GWPC).
3. Per Table L-2 of the Statement of Work (SOW).

NOTE:

1. THE SRSNE SITE GROUP PROPOSES TO WORK WITH THE SOUTHINGTON HEALTH DEPARTMENT AND CT DEEP PERMITTING AUTHORITY TO ESTABLISH MEASURES WHEREBY APPLICATIONS FOR NEW WELL INSTALLATIONS WITHIN THE "BUFFER ZONE" WOULD BE DENIED OR, AT A MINIMUM, THAT THE PERMITTING AGENCY WOULD CONSULT WITH THE SRSNE SITE GROUP TO SIMULATE THE LOCATION AND EXPECTED FLOW RATE OF SUCH NEW WELL(S) TO ASSESS THE POTENTIAL FOR AFFECTING THE SRSNE-RELATED PLUME (AS IT EXISTS AT THAT FUTURE POINT IN TIME) PRIOR TO ISSUING ANY PERMIT.

0 400' 800'

GRAPHIC SCALE

DRAFT

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

PARCELS PROPOSED FOR ELURs

ARCADIS

FIGURE
B-3

Figures B-4A & B

During and After *In Situ* Thermal Remediation (ISTR)

CITY: SYRACUSE, NY GROUP: ENVCAD DB: P. LISTER PM: M. GEFELL TM: M. GEFELL TR: R. STEVENSON LYR: ON=*;OFF=REF, (FRZ)
G:\ENVCAD\Manchester\ACT\B0054634\0000\02200\54634C27.dwg LAYOUT: 27 SAVED: 9/11/2014 2:09 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: — PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 9/11/2014 2:09 PM BY: SMALL, BRIAN
XREFS: IMAGES: PROJECTNAME: —

Shallow Overburden Wells

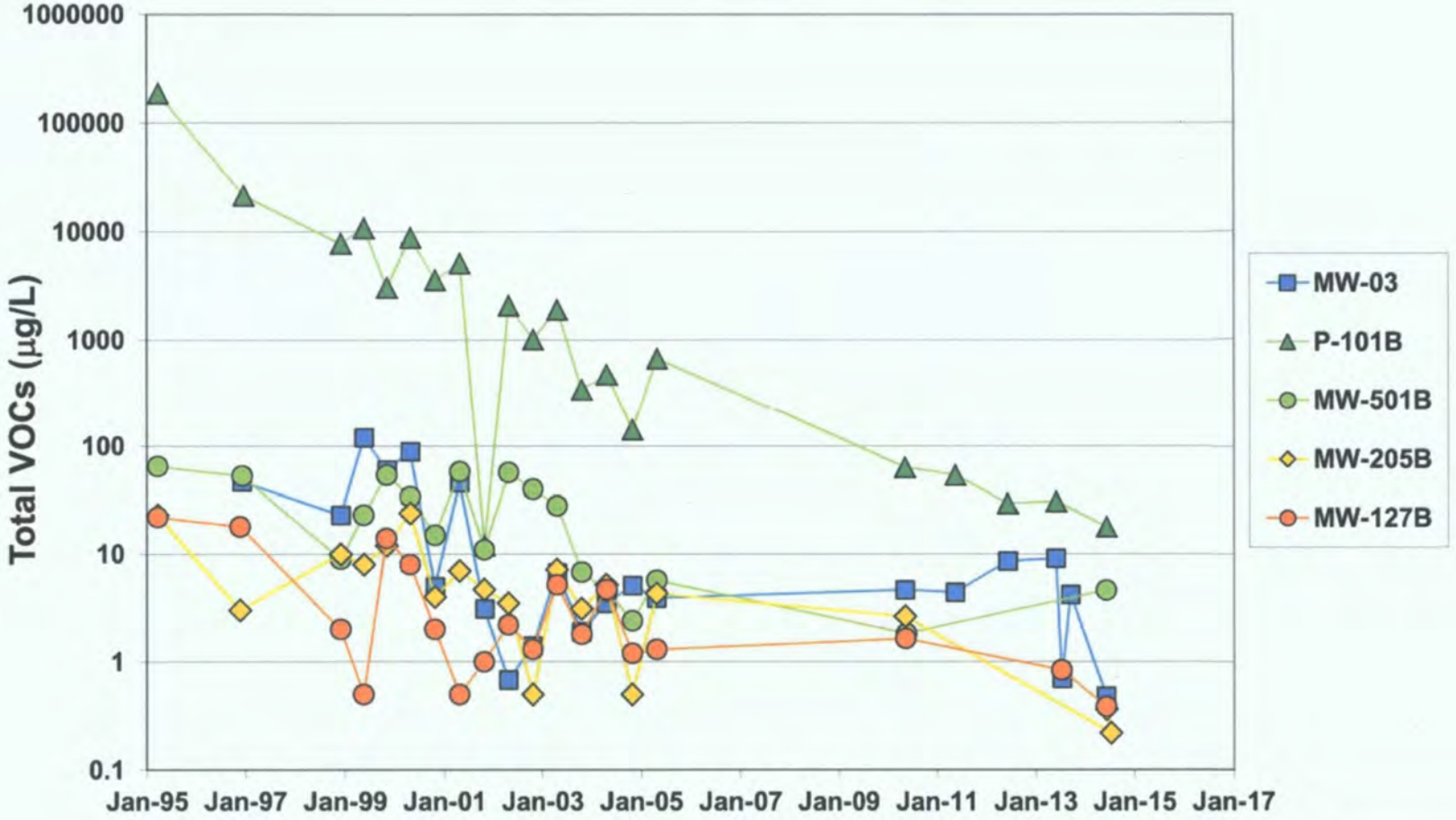
SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

GROUNDWATER TOTAL VOC CONCENTRATIONS WITH TIME SHALLOW OVERBURDEN

ARCADIS

FIGURE
B-5

Middle Overburden Wells



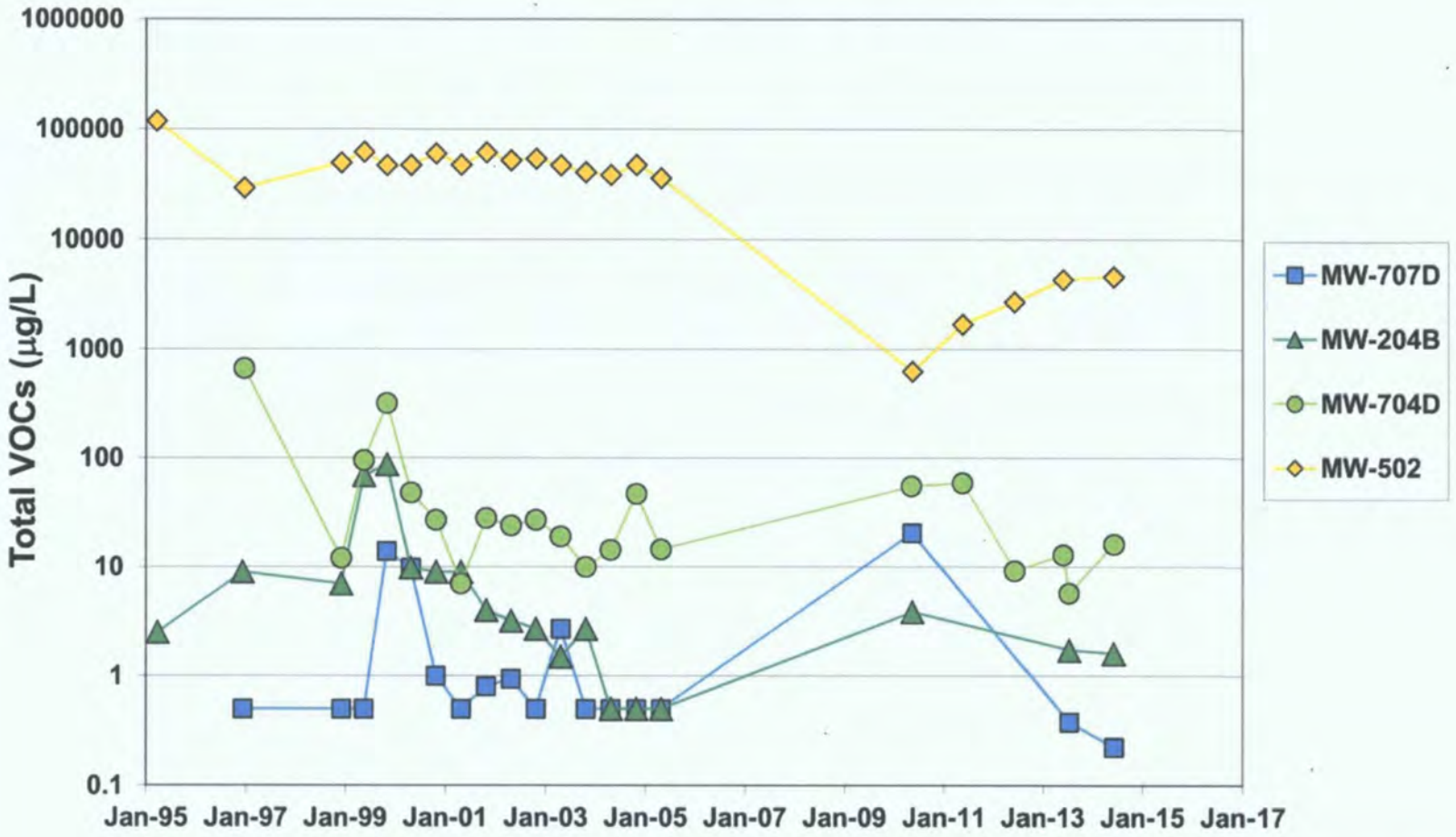
SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

GROUNDWATER TOTAL VOC CONCENTRATIONS WITH TIME MIDDLE OVERBURDEN

ARCADIS

FIGURE
B-6

Deep Overburden Wells



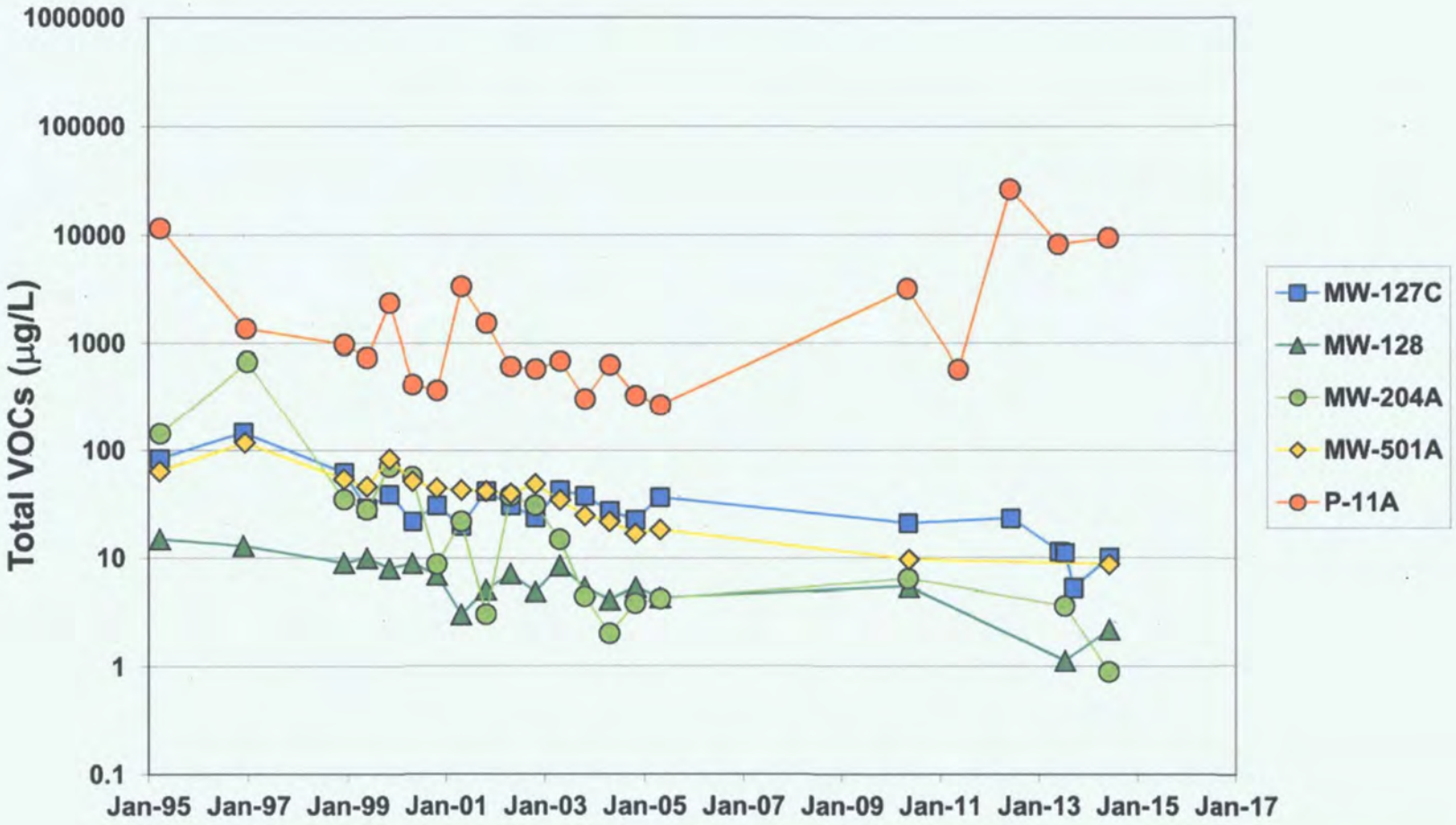
SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

GROUNDWATER TOTAL VOC CONCENTRATIONS WITH TIME DEEP OVERBURDEN

ARCADIS

FIGURE
B-7

Shallow Bedrock Wells



SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

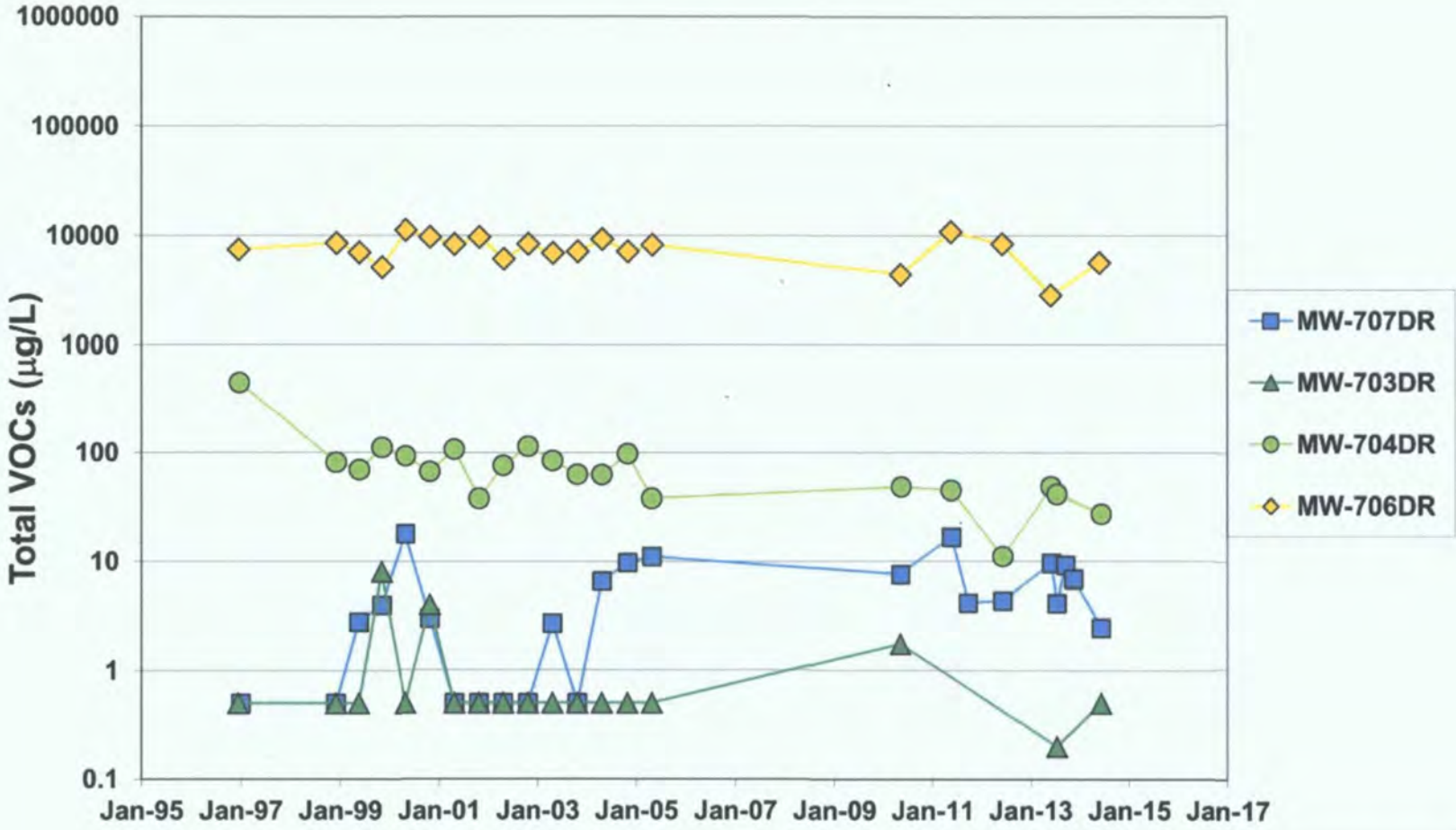
GROUNDWATER TOTAL VOC CONCENTRATIONS WITH TIME SHALLOW BEDROCK

ARCADIS

FIGURE
B-8

CITY: SYRACUSE, NY GROUP: ENVCAD DB: P. LISTER PM: M. GEFELL TM: M. GEFELL TR: R. STEVENSON LYR: ON=*;OFF=REF, (FRZ)
G:\ENVCAD\Manchester\AVD\2014-12-31\ACT\B0054634\0000\02200\54634C31.dwg LAYOUT: 28 SAVED: 9/11/2014 4:21 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: — PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 7/30/2015 11:23 AM BY: SMALL, BRIAN
XREFS: IMAGES: PROJECTNAME: —

Deep Bedrock Wells



SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

GROUNDWATER TOTAL VOC CONCENTRATIONS WITH TIME DEEP BEDROCK

ARCADIS

FIGURE
B-9