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September 18, 2015

Ms. Karen Lumino  
Office of Site Remediation and Restoration  
CT Superfund Section  
USEPA Region 1  
5 Post Office Square, Suite 100  
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Boston, MA 02109

**Subject: Solvents Recovery Service of New England Inc. Superfund Site  
Southington, Connecticut  
Revised In-Situ Thermal Remediation  
Construction Completion Report**

Dear Ms. Lumino:

Pursuant to paragraph 37 of the Consent Decree (CD) for the Remedial Design/Remedial Action at the Solvents Recovery Service of New England, Inc. Superfund Site entered on March 26, 2009 by the United States District Court for the District of Connecticut in connection with Civil Actions No. 3:08cv1509 (SRU) and No. 3:08cv1504 (WWE), and in accordance with Paragraph VI.H of the Statement of Work (SOW) attached to the CD as Appendix B, enclosed please find the revised Construction Completion Report for the In-Situ Thermal Remediation portion of the Remedial Action.

Responses to Agency comments are attached.

Please contact me if you have any questions.

Sincerely,

Bruce Thompson  
Project Coordinator

Enclosures

cc: Shannon Pociu, CTDEEP  
SRSNE Executive Committee

## Responses to Comments Dated September 10, 2015 on Draft In-Situ Thermal Remediation Construction Completion Report

### Comments

1. Page 8, section 3.3. Include the Root Cause Memorandum regarding the oxidizer shut-down as an attachment and reference it in this section.

**Response:** The Root Cause Memorandum is now referenced and included as Attachment E to the Report.

2. Page 10, section 3.6. Add anticipated date (month, year) for delivery of compliance report #7.

**Response:** The anticipated report submission date has been added

3. Page 11, section 4 table.

a) include the heaters being reduced to 10% at the time the oxidizer was shut down, and when the oxidizer was brought back online, the heaters were ramped up from 10% to 100%.

b) 8/26/14 entry should specify that these repairs were made to the oxidizer

c) include dates for disassembly of the well field piping entry

d) delete groundwater monitoring entries that are not related to ISTR operation (e.g., 6/3/13, 7/12/13, 9/17/13)

**Response:** The requested edits have been made.

4. Page 12, section 5. Please add to this section a summary of the supporting rationale for the system shutdown as was contained in the shutdown memo. the discussion of partial vs full shut down is/could be confusing especially to those unfamiliar with the site.

**Response:** The requested summary has been added.

5. Page 13, section 5.3. Was the mass removal estimate based on the post-treatment mass estimate or the pre-treatment mass estimate? Please clarify.

**Response:** The requested clarification has been added.

6. Page 14, bottom two paragraphs. These two paragraphs are written in future tense and do not indicate whether any significant issues were tracked or non-

conformance reports issued during the course of the project, which should be included. Update as appropriate.

**Response:** The requested edits have been made.

7. Page 17, section 6.2, 3rd paragraph. a) indicate that an air monitoring station was moved to the police station yard and discuss (briefly) the results, and, b) it is our understanding that the source of the odors was narrowed down to the scrubber exhaust and the vapor extraction piping?

**Response:** The requested edits have been made.

8. Page 18, section 7.2. Update information regarding the revised soil investigation plan.

**Response:** The requested update has been incorporated.

9. Page 19. Shannon's phone number is 860-424-3546.

**Response:** The phone number has been corrected.

10. Appendix C is written in future tense but should reflect any changes that were made during operations. Revised as necessary.

**Response:** The appendix has been revised.

11. Not all the as-builts are in color, nor do they need to be. However, in some case it is integral to the understanding - i.e., the wellfield layout. Include color submittals as appropriate.

**Response:** Appropriate as-builts have been provided in color.

### **Responses to Additional EPA Comments Received on September 18, 2015**

1. Section 8, contacts. Technically, the section I'm in is the "ME/VT/CT Superfund Section"

**Response:** This address has been corrected.

2. Last paragraph on page 4 – "PIPP" is not previously defined

**Response:** "PIPP" has been defined.



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# **In-Situ Thermal Remediation Construction Completion Report**

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- 1 Site Location Map

## Attachments

- A Summary of Wellfield Boring Depths
- B As-Built Drawings
- C Detailed Description of ISTR Treatment System Components
- D TerraTherm's Weekly ISTR Project Summary Reports
- E Oxidizer Shutdown Root Cause Analysis Memorandum (9/18/14)
- F April 2015 ISTR Demonstration of Attainment of Interim NAPL Cleanup Levels
- G Manifest Summary and Copies of the Certificates of Disposal
- H Monthly Progress and IQAT Reports for the ISTR Construction Period
- I Weekly Meeting Agenda and Minutes for the ISTR Construction Period

## **1. Introduction**

This document has been prepared on behalf of the Solvents Recovery Service of New England, Inc. (SRSNE) Site Group, an unincorporated association of Settling Defendants to a Consent Decree (CD) and Statement of Work (SOW) for the Remedial Design/Remedial Action (RD/RA) at the SRSNE Superfund Site located at 90 Lazy Lane in Southington, Connecticut (Site; Figure 1). The CD was lodged on October 30, 2008 with the United States District Court for the District of Connecticut in connection with Civil Actions No. 3:08cv1509 (SRU) and No. 3:08cv1504 (WWE). The CD was entered by the Court on March 26, 2009. The CD and the SOW define the response activities and deliverable obligations that the Group has to perform to implement RD/RA activities at the Site.

This Remedial Action Construction Completion Report summarizes the design, construction, and operation of the in-situ thermal remediation (ISTR) system at the SRSNE site. Consistent with the Record of Decision (ROD: United States Environmental Protection Agency [USEPA] 2005), the ISTR system was installed and operated to treat an area where non-aqueous phase liquid (NAPL) was present in the overburden material as a result of historical operations at the Site.

The remedial approach established for the site in the ROD included multiple components. The Remedial Design Work Plan (RDWP; ARCADIS 2010a) indicated that the design, implementation, and documentation of the various key components would each be addressed separately. As indicated above, this report is being submitted to the USEPA to document completion of the ISTR implementation component of the remedy. The content is intended to address the Completion Report requirements of Section VI.H of the Statement of Work (SOW), as well as applicable provisions of USEPA's May 2011 guidance titled "Closeout Procedures for National Priority List Sites."

## **2. Background**

### **2.1 Description of Site**

The SRSNE Site is located in the Town of Southington, Connecticut, in Hartford County, approximately 15 miles southwest of the City of Hartford. It is located on Lazy Lane, just off Route 10 (Queen Street), and adjacent to the Quinnipiac River. The SRSNE Site consists of the SRSNE Operations Area (4 acres), the Cianci property (10 acres), a railroad easement (the Railroad Right-of-Way), and those areas where groundwater contamination has come to be located, including Southington's Curtiss Street Well Field (the Town Well Field). The Town Well Field is a 28-acre parcel of undeveloped land containing two municipal drinking water wells that were closed in 1979 when they were found to be contaminated with volatile organic compounds (VOCs).

SRSNE performed spent solvent recycling operations at the Site from 1955 to 1976. After 1976, operations at SRSNE focused on blending the sludge and still bottoms with flammable liquid wastes for use as a waste-fuel product for rotary kilns. In 1988, the batch stills used in the distillation process were removed, and fuel blending became the primary enterprise of the facility until it closed in 1991.

The solvents and chemicals handled, stored and processed at the facility in the Operations Area included chlorinated solvents, ketones, alcohols, aromatic compounds and waste oils.

## **2.2 Summary of ROD Requirements and Performance Standards**

The ROD for the SRSNE Site was issued by the USEPA on September 30, 2005. It identified several remedial components, including:

1. Removal of a culvert that drained from the SRSNE property to the Quinnipiac River and relocation/replacement of that culvert through a new impermeable pipe
2. In-situ thermal remediation of the overburden NAPL area
3. Excavation of specific areas of impacted soil and wetland soil from the Cianci property and consolidation of those materials in the former SRSNE Operations Area
4. Construction of a Resource Conservation and Recovery Act (RCRA) Subtitle C cap over contaminated soils in the SRSNE Operations Area and Railroad Right-of-Way
5. Construction and operation of a Hydraulic Containment and Treatment System (HCTS) to contain, extract, and treat affected groundwater
6. Monitored natural attenuation (MNA) of groundwater in the “severed plume” area
7. Implementation of institutional controls

Of these components, Item 1 was completed as part of the pre-ISTR site preparation activities, which were documented in the *Pre-ISTR Site Preparation Completion Report* (ARCADIS, 2013a). Item 2 was recently completed and is the subject of this completion report. Items 3 and 4 are planned future activities to be designed and implemented now that ISTR activities have been completed. Item 5 is ongoing as part of the continued operation of extraction wells and the existing groundwater treatment system. Item 6 is currently ongoing as part of the approved MNA program. Item 7 is being addressed via the Institutional Control Plan currently being developed among the SRSNE Site Group, USEPA, and CT DEEP.

Specific to the ISTR component of the remedy, the remedial action objective (RAO) established in the ROD for human health was to “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 [Applicable or Relevant and Appropriate



Requirements].” For protection of the environment, the RAO was to “reduce contaminants in the NAPL area to achieve one or more of the following:

- Shorten the time frame that groundwater standards are exceeded;
- Shrink the size of the groundwater contaminant plume;
- Reduce groundwater contaminant concentrations; and
- Prevent the migration of NAPL.”

In consideration of these RAOs, the Performance Standards established for the Overburden NAPL Area (i.e., the area to be treated using ISTR) were described in Section IV.A.4 of the SOW. That section states that “VOC contamination in the treatment zone will be reduced to levels that are not indicative of the presence of pooled or residual NAPL.” Further, it established Interim NAPL Cleanup Levels (INCLs), which are soil-based concentrations of selected constituents at or below which are no longer indicative of the presence of NAPL. The INCLs were established as follows:

Compound	Interim NAPL Cleanup Level mg/kg (parts per million)
Trichloroethylene (TCE)	222
Tetrachloroethylene (PCE)	46
1,1,1-Trichloroethane	221
Ethylbenzene	59
Toluene	48
p/m-Xylene	70
o-Xylene	42

Once sampling indicated that the INCLs were attained, Section IV.A.4 of the SOW included further provisions for USEPA to “evaluate whether to continue to operate the in-situ thermal treatment system in areas within the Overburden NAPL Area where [US]EPA determines that appreciable amounts of NAPL continue to be recovered. For this purpose, [US]EPA will only require continued operation of the of the in-situ thermal treatment where ‘appreciable recovery of NAPL contamination’ continues to occur.” It also capped the extent of continued operation at the maximum number of days required to achieve the INCLs (i.e., if it takes 180 days of heating to achieve the INCLs, the maximum amount of time that USEPA could require continued operation of any or all wells would be 180 days).

### 2.3 Remedial Design

The remedial design for the ISTR system was prepared by TerraTherm, Inc. the vendor selected by the SRSNE Site Group to implement the thermal component of the remedy. The conceptual design was submitted in April 2010. Comments on the

conceptual design were received in e-mails dated March 22, September 20, October 6 and October 8, 2010. Responses to those comments were provided on December 3, 2010. Further draft comments were received on February 18, 2011, discussed on a conference call on March 1, 2011, and finalized on March 2, 2011. Responses to these additional comments were provided on April 6, 2011. The draft 100% ISTR Design Report and Remedial Action Work Plan (100% Design) was submitted on July 10, 2013. Comments on the draft 100% Design were received on September 3, 30, and October 1, 2013. Responses to these comments were provided on October 25, 2013. A revised 100% Design was submitted on December 26, 2013. The USEPA approved the final design on April 18, 2014 and the final 100% Design was submitted by TerraTherm in May 2014.

The 100% Design (TerraTherm 2014) provided ISTR-related design and implementation details such as a description of the thermal technology, identification of the target treatment zone, basis of design information, the system monitoring program, detailed design drawings and specifications, a description of the operations approach, emergency response plan, and performance evaluation methods.

Additional implementation details were also described in the following documents that were developed and submitted over the course of the work:

- *Thermal Wellfield Implementation Support Plan* (TWISP; ARCADIS 2013b). This document provided additional details regarding the process to be used for thermal wellfield installation, the various project team roles and responsibilities, the anticipated waste management approach, and the perimeter air monitoring program to be used during installation of the thermal wellfield.
- ISTR Confirmatory Soil Sampling Plan – Revised (ARCADIS November 2014). This document provided additional details regarding the confirmatory soil sampling approach. It was based on the sampling approach described in Section 13.10.2 of the 100% Design, but provided additional details regarding the specific sample locations, depths, and collection methods used for the confirmatory soil sampling to demonstrate when the INCLs were achieved.

#### **2.4 ROD Amendments, Differences, and Technical Impracticability Waivers**

No amendments, differences or Technical Impracticability Waivers were requested or implemented during pre-ISTR site preparation construction work or during operation of the thermal in-situ remediation system.

### **3. ISTR Construction and Operation Activities**

Development and construction of the remedial action was completed in several stages following entry of the CD in March 2009. Pre-ISTR site preparation activities were implemented between 2010 and 2012 and were summarized in the *Pre-ISTR Site Preparation Completion Report* (ARCADIS 2013). As described in that document, these activities were conducted to prepare the site for TerraTherm to construct and operate the ISTR system. The following subsections summarize the key elements associated with the construction and operation of the ISTR system. They also summarize key deviations from the initial system design expectations and provide reference to off-site disposal, compliance with Applicable or Relevant and Appropriate Requirements (ARARs), and cost-related details. A further chronology of the associated events is provided in Section 4, and Section 5 summarizes the monitoring activities that supported determination of the system shutdown.

#### **3.1 ISTR System Construction**

ISTR well field installation commenced on April 23, 2013 and was completed on September 24, 2013. The activities during this phase of work included installing the various heater wells, vapor extraction wells, monitoring wells, and subsurface monitoring points as necessary to implement the heating phase consistent with the 100% Design. As a result of sheen, staining, and/or NAPL observed at a few drilling locations outside the initially targeted thermal treatment zone, additional soil borings were performed to delineate the extent of overburden NAPL in those discrete areas. As a result of that investigation, eight additional heater wells were added southwest of the Thermal Treatment Zone (TTZ) and six additional heater wells were added along the eastern boundary of the TTZ.

During well field installation, it was noted that the depth to competent bedrock averaged approximately 3 feet deeper than expected. The expected depth to rock was based on historic knowledge, which included the prior NAPL delineation study and a limited number of monitoring wells in the Operations Area. The method used to determine “top of rock” was also different. During the NAPL delineation study conducted as part of the Feasibility Study, Geoprobe direct push drilling rigs were utilized, which met refusal at the interpreted top of weathered rock. The ISTR heaters were installed with rotasonic drilling, which does not easily differentiate weathered rock from the overlying till, so the drilling proceeded into the “competent rock” and the depths to top of weathered and competent rock are visually interpreted from the recovered core material. The approach used to assess the top of rock was described in the TWISP, and the interpreted top of rock was recorded for each of the heater well borings. Attachment A includes tables summarizing the various boring depths and interpreted depths to top-of-bedrock in the TTZ for the heater wells, groundwater monitoring wells, vapor extraction wells, and temperature/pressure monitoring points.

The greater-than anticipated depths to bedrock also triggered design revisions for the heater well network. Specifically, the lengths of certain heater wells were modified to account for the increased depth, and then the heater circuits were modified to balance the load associated with each circuit. The final well depths are recorded in the As-Built Drawings (Attachment B).

The following table summarizes the type and number of wells installed in the thermal wellfield:

Subsurface Item	Number Installed
Heater Wells	607
Vapor Extraction Wells (Vertical)	551
Vapor Extraction Wells (Horizontal)	290 lineal feet
Temperature Monitoring Points	99
Vacuum Monitoring Points	64
Groundwater Monitoring Wells	7

Once the well network was installed, a lightweight concrete cover was installed that encompassed the well network. The concrete mixture had high air entrainment to maximize its thermal insulating properties, and provided sufficient compressive strength to support the work to be performed atop the cover (e.g., operation of the drill rig to be used for confirmatory soil sampling). The cover was approximately 12 inches thick with a minimum R value of 0.12 W/m<sup>2</sup>K, and was constructed in a series of pours to mimic, to the extent practical, the surface grade of the TTZ. Installation of the ISTR cap commenced on September 30, 2013 and was completed on October 30, 2013.

Construction of the above ground portion of the ISTR system occurred after completion of the cap. Within the treatment zone, this included the vapor extraction well piping, manifolds, circuits, wiring and controls. Consistent with the 100% Design, the components of the treatment process were constructed on an equipment staging pad located east of the treatment area (Sheet C104 in Attachment B). These included the following major components:

- Heat exchanger
- Cooling tower(s)
- Moisture separator
- Vacuum blower
- Heat exchanger

- Chiller
- Moisture separator
- Duct heater
- Combustion blower
- Thermal oxidizer
- Scrubber

A summary description of each major component is presented in Attachment C. The various components are also shown on the as-built drawings provided in Attachment B. Shake down testing of the ISTR system components was completed in May 2014.

### **3.2 ISTR System Operation**

Consistent with the 100% Design, heating of the TTZ was divided into two phases. The purpose of the phased heating was to reduce the peak VOC generation rate. Based on design-related modeling, the heating phases were separated by approximately 60 days, and the expected treatment duration was approximately 135 days per area (i.e., 195 days from the start of Phase I to the end of Phase II). Phase 1 heating commenced on May 15, 2014 and Phase 2 heating commenced on July 16, 2014. Heating of both phases was suspended on August 13, 2014 as a result of failure of part of the oxidizer used to treat VOC vapors. While heating was suspended, the heaters were reduced to “idle” (approximately 10% of capacity, necessary to protect them from rapid cooling). The oxidizer was repaired, and additional process monitoring implemented to help prevent a re-occurrence. Heating of Phase 1 at full power resumed on September 12, 2014, Phase 2 heating resumed on September 30, 2014.

System monitoring was performed in general accordance with the monitoring program described in the 100% Design, with additional monitoring as needed for diagnostic purposes or based on consultation with USEPA over the course of the work. Details regarding the operational status of the system were reported in weekly summary reports that were provided to the project team. Copies of those reports are provided in Attachment D.

Confirmation soil sampling and completion of treatment in Phases 1 and 2 is discussed in Section 5.2 of this report.

### **3.3 Problems and Deviations**

As discussed in Section 3.1, modifications to the heater well lengths were made relative to the lengths indicated in the 100% Design. These modifications were made because, during wellfield installation, depths to bedrock were generally greater than had been anticipated based on data available at the time of the initial design. The final heater well depths, as well as the additional wells installed to the southwest and east of the originally targeted treatment zone (Section 3.1), are indicated on Sheet C-104 of the As-Built Drawings provided in Attachment B.

As indicated in the preceding section, an unexpected shutdown of the thermal oxidizer occurred in August 2014. Following a period of investigation, repairs, and system modification, the oxidizer was brought back on line in September 2014. A detailed memorandum summarizing the root cause of the oxidizer failure, as well as the subsequent system modifications and corrective actions, was submitted to the USEPA on September 18, 2014. A copy of that memorandum is included as Attachment E.

The As-Built Drawings represent the aboveground thermal treatment train as it was built and operated for approximately three months (May – August 2014), prior to the August 13, 2014 oxidizer shutdown. During the period that the oxidizer was being repaired, power to the heaters was minimized and vapors collected from the treatment zone were treated using granular activated carbon. Additional safety features and pre-treatment equipment was also installed during this period. The following are the major modifications that occurred:

- One additional flammability analyzer was installed at the influent to the heat exchanger upstream of the dilution blower;
- One additional thermocouple was installed at the influent to the oxidizer chamber;
- One organoclay vessel at the outlet of the oil-water separator to capture any free phase or emulsified organic material that may carry over (a third vessel was onsite but not installed);
- One liquid granular activated carbon vessel was installed at the end of the liquid process stream (just prior to discharge to the sewer) to facilitate changeouts to better manage higher loading rates; and
- During the cool down period, the oxidizer/scrubber were taken offline to mitigate potential odor concerns from the community and the backup vapor granular activated carbon vessels were brought online.

Other minor operational modifications from the 100% ISTR Design Document were made during the demonstration of compliance for Phase 2. These included adding insulation in one area of the site, and raising the elevation of the heaters in wells within that area. These changes are further discussed in the April 2015 ISTR Demonstration of Attainment of Interim NAPL Cleanup Levels document, a copy of which is provided in Attachment F.

### 3.4 Off-Site Transport and Disposal

Various wastes were generated in the course of the ISTR implementation and subject to off-site transport and disposal. Specific waste types, disposal method/facility, quantity, and shipping date ranges are summarized in the following table.

Waste Type	General Description	Disposal Facility	Disposal Method	Cumulative Amount Disposed	Unit	Shipping Start Date	Last Shipping Date
<b>NAPL</b>	Drummed NAPL recovered from ISTR system operations, including oil-water separator	Clean Harbors - Deer Park, TX	Incineration	105	55-gal drums	9/30/14	5/12/15
<b>LGAC</b>	Liquid phase granular activated carbon from the water treatment system	Clean Harbors - Deer Park, TX	Incineration	52	55-gal drums	1/13/15	6/25/15
<b>Filter Clay</b>	Spent organoclay used to filter effluent from the oil-water separator	Clean Harbors - El Dorado, AR	Incineration	50	55-gal drums	1/13/15	5/29/15
<b>VGAC</b>	Vapor phase granular activated carbon from the vapor treatment system	VEOLIA - Port Arthur, TX	Incineration	104,698	pounds	12/15/14	6/23/15
<b>Original Hose and Piping</b>	Original hose connections from the vapor extraction wells and spent fiberglass and steel pipe from the vapor collection system	USE Michigan	Micro-encapsulation	175	CY	4/29/15	7/13/15
<b>Replacement Hose</b>	Spent replacement hose from the vapor extraction wells (different manufacturer and characteristics than original hose)	VEOLIA - Port Arthur, TX	Incineration	4	CY box	6/23/15	7/13/15
<b>Diesel Solvent</b>	Spent solvent from ISTR equipment cleaning during demobilization	Clean Harbors - Deer Park, TX	Incineration	62	55-gal drums	6/25/15	6/25/15
<b>Soil Cuttings</b>	Miscellaneous soil cuttings generated in the course of the work	MDI, Michigan	stabilization and landfill	6	55-gal drums	6/23/15	6/23/15

Copies of the associated manifest details and certificates of disposal received thus far are included in Attachment G.

### 3.5 ARAR Conformance Evaluation

The ISTR activities were conducted in compliance with the ARARs identified in the ROD. As discussed in the 100% Design (TerraTherm 2014), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) exempts the need to obtain permits or implement administrative requirements under federal law (e.g., dredge and fill permits), state law (e.g., water discharge permits), and local law (e.g., building construction permits relative to fire prevention, electrical, and other code requirements). Notwithstanding the permit exemption, remedial action under CERCLA must comply with the substantive requirements of federal, state and local laws and regulations if they are identified as ARARs. Compliance with the substantive requirements of federal, state and local laws is also referred to as “permit equivalency.” The requirements and manner of compliance for the applicable or relevant rules and regulations for ISTR were summarized in a table provided in Section 10.4 of the 100% Design.

### 3.6 Cost Breakdown

Section VI.H of the SOW and USEPA’s 2011 “Closeout Procedures for National Priority List Sites” indicate completion reports are to include final, detailed cost breakdowns associated with the work. Detailed cost breakdowns are not included herein, but associated costs will be separately presented in the forthcoming *Annual State of Compliance Report #7* (anticipated submittal in March 2016).

## 4. Chronology of Events

Consistent with Exhibit 2-5 from USEPA’s 2011 “Closeout Procedures for National Priority List Sites,” this section summarizes the chronology of events related to the ISTR component of the Site remedy. More detailed descriptions of key components were presented in Section 3 above.

<b>Activities Associated with Installation and Operation of the In-Situ Thermal Remediation System</b>	<b>Start Date</b>	<b>Completion Date</b>
<b>Regulatory and Design Submissions</b>		
Record of Decision	9/30/2005	
Consent Decree lodged	10/30/2008	
Consent Decree entered by the court	3/26/2009	
Remedial Design Work Plan (RDWP) submitted	4/20/2009	
Pre-ISTR Preparation Plan (PIPP) approved	8/11/2009	
Conceptual Design/Remedial Action Work Plan submitted	4/10/2010	
Final Design/Remedial Action Work Plan submitted	7/10/2013	
Final Design/Remedial Action Work Plan approved	4/18/2014	
<b>Pre-ISTR Site preparation activities</b>	<b>9/20/2010</b>	<b>11/16/2012</b>



<b>Activities Associated with Installation and Operation of the In-Situ Thermal Remediation System</b>	<b>Start Date</b>	<b>Completion Date</b>
<b>ISTR Construction</b>		
TerraTherm mobilization and survey	4/15/2013	4/20/2013
Installation of heater wells, vapor extraction wells, temperature monitoring points, pressure monitoring points and groundwater monitoring wells.	4/23/2013	9/24/2013
Perimeter air monitoring	4/23/2013	4/1/2015
Investigation of seep and discovery/demolition of abandoned septic system	6/21/2013	6/26/2013
investigation of potential presence of NAPL on periphery of thermal treatment zone and installation of 2 additional heaters east of HO-530 and 4 east of HO-551	7/9/2013	7/11/2013
investigation of potential presence of NAPL on periphery of thermal treatment zone and installation of 8 additional heaters west of HO-47 through HO-50	7/31/2013	9/8/2013
Mobilization of Elastizell for installation of insulating cover	9/30/2013	10/30/2013
Initiate construction of ISTR treatment system	10/31/2013	
<b>ISTR System Operation</b>		
ISTR system startup	5/15/2014	4/1/2015
Final commissioning of oxidizer	5/29/2014	
Install turbulators to increase efficiency of heat exchange for process air to oxidizer	6/6/2014	
Shut dilution air valve	6/20/2014	
Set Phase II heaters to idle	7/9/2014	
Open vapor valves for Phase II	7/16/2014	
Phase I progress sampling	7/28/2014	7/30/2014
Oxidizer damaged and shut down; reduce heaters to idle (10%)	8/13/2014	
Clay filtration unit put online between the oil water separator and the scrubber	8/25/2014	
Replacement of daisy wheel and damaged refractory in oxidizer	8/26/2014	
Oxidizer online, block valve open, & heaters set to 10% and ramped up over 2-week period (full power on 9/12/14)	8/29/2014	
Phase I confirmatory sampling	11/11/2014	11/19/2014
Phase I heaters shutdown	12/8/2014	
Phase II progress sampling	12/1/2014	12/8/2014
Phase II confirmatory sampling	1/5/2015	1/14/2015
Oxidizer taken offline and vapor routed to carbon	1/10/2015	
Select Phase II heaters raised and insulation added to select area	1/21/2015	
Phase II ISTR soil re-sampling	2/3/2015	
Re-sampling CSL-32	2/17/2015	
Approval to shut down remaining heaters	3/1/2015	
Remaining heaters ramped down	3/2/2015	3/6/2015
Vapor recovery shut down	4/1/2015	
Disassembly of the wellfield piping	4/2/2015	5/7/2015
Final Demobilization by TerraTherm		6/5/2015
Final Inspection of the ISTR work	7/13/2015	

## **5. Performance Standards and Construction Quality Control**

### **5.1 Sample Collection and Analysis**

Various ISTR operational parameters were monitored to assess operational performance and treatment progress. This included soil temperature, sub-surface vacuum levels, VOC mass extracted and extraction rate, vapor stream flammability, energy usage, and caustic usage. The associated data were summarized in weekly reports, copies of which are provided in Attachment D.

In addition to monitoring the ISTR operational performance, soil and groundwater sampling were also performed to assess the treatment progress. Groundwater samples were collected from seven monitoring wells (ISTR-1 through -7) located within the thermal treatment area. Samples were collected before heating commenced, and monthly during ISTR. Sampling included “progress” soil sampling performed by TerraTherm to confirm treatment progress and help assess when each treatment Phase was ready for the final confirmation sampling. The confirmation sampling in each area was performed in general accordance with the approach described in Section 13.10.2 of the 100% ISTR Design Document and the ISTR Confirmatory Soil Sampling Plan – Revised. In total, 60 confirmation soil samples were collected from 28 locations within the Phase I area, and 83 confirmation soil samples were collected from 32 locations within the Phase II area (including supplemental samples collected by TerraTherm after initial samples from certain areas did not achieve INCLs). As further discussed in the following section, these data were used to support shutdown in the Phase I and Phase II areas, and the associated data are included in the ISTR Demonstration of Attainment of Interim NAPL Cleanup Levels included as Attachment F.

### **5.2 Demonstration of Achievement of Performance Standards**

Confirmation soil sampling was performed in each phase if the ISTR area once operational parameters and TerraTherm’s progress soil sampling events indicated that the Performance Standards were likely achieved in a given area. Confirmation soil sampling was performed in the Phase I area between November 11 and 19, 2014, and all of the associated samples indicated concentrations below INCLs. Those results and other relevant data were summarized in a report submitted to USEPA on December 1, 2014 titled “In-Situ Thermal Remediation - Phase 1 Confirmation Sampling Results and Recommended Operating Modifications.” On December 3, 2014, USEPA approved a partial shutdown of Phase 1 heaters as proposed in the report.

Confirmation soil sampling was initially performed in the Phase II area between January 5 and 14, 2015. Because certain samples from this area exceeded the INCLs, certain modifications were made (including extending certain heater lengths and adding surface insulation in certain areas for added heat retention) and additional heating was performed. The target area was resampled in February 2015, and samples collected on February 17, 2015 indicated that the INCLs had been achieved at all locations.

Having achieved INCLs at all final confirmation sampling locations, *de maximis* submitted a request for shutdown of the ISTR system on February 27, 2015. The request summarized not only the “progress” soil sampling results, confirmation soil sampling data, and groundwater analytical data, but other operational aspects of the ISTR system and groundwater monitoring data that provided supporting rationale. Pending discussion and comment, USEPA provided approval to shut down the ISTR system on March 1, 2015; shutdown of the heating system commenced on March 2, 2015. Based on comments received, *de maximis* provided a revised, final version of the shutdown request on April 6, 2015. In summary, the request for shutdown was premised on the following considerations:

- INCLs required by SOW Section IV.A.4 were met in all final confirmatory soil samples. On average, soil samples results were two orders of magnitude below INCLs.
- Calculations of mass removed suggest that ISTR resulted in 99.7% removal from soil, exceeding the ROD expectation of 95 to 99% removal.
- Soil temperatures within the ISTR treatment area met design goals, and exceeded the temperature where the target VOCs can exist as NAPL.
- Groundwater data from the thermal treatment zone indicated that VOC concentrations were below levels that are indicative of the presence of NAPL.
- The plot of Phase 2 VOC mass removal versus time had indicated that the rate of mass removal leveled off as of January 16, 2015, indicating the system operation had passed a point of diminishing returns.
- Mass removal rates had declined from a peak of ~10,000 pounds of VOCs per day to less than 26 pounds of VOCs per day.
- Given the dates at which final confirmation soil samples were collected relative to the date of system shutdown, the ISTR system had operated for a minimum of two weeks beyond the time at which INCLs had been achieved.

A copy of the shutdown request, which includes additional details regarding the associated monitoring data and rationale, is included in Attachment F.

### **5.3 VOC Mass Removed and Mass Extraction Rates**

An evaluation of the performance data from the ISTR treatment period indicates that a total of 496,400 lbs of VOCs were removed from the TTZ, which totals 56,770 cubic yards. Mass removal estimates were determined using three different components and then summing those components together. The three components were as follows:

- Data recorded from the flammability analyzer (converted from percent to a mass using laboratory calculated BTU content – ASTM method);
- USEPA TO-15 analytical laboratory data for chlorinated compounds that are assumed not to be detected by the flammability analyzer; and

- Accumulated LNAPL (assuming a density of toluene).

The ROD anticipated that ISTR would remove 95% to 99% of the NAPL. The pre-ISTR soil VOC concentration was calculated by distributing the VOC mass removed over the mass of soil in the treated volume, resulting in an average pre-treatment concentration of 2,795 mg/kg. The post-ISTR VOC concentrations remaining in the thermal treatment area was based on the average concentrations detected in confirmatory soil samples of 7.445 mg/kg. Comparing these concentrations, we concluded that 99.73% of the VOCs present in the subsurface were removed from the TTZ during operation of the ISTR system. This exceeds the expectations outlined in the ROD.

#### **5.4 Construction Quality Assurance/Control**

In accordance with the SOW, *de maximis* functions as the Independent Quality Assurance Team (IQAT) contractor for the RD/RA work at the site. As stipulated in the SOW, the functions and responsibilities of the IQAT, with respect to design and construction include:

1. Review design criteria, plans, and specifications for clarity and completeness;
2. Train Construction Quality Assurance (CQA) inspection personnel on project QA requirements and procedures;
3. Schedule and coordinate CQA inspections;
4. Verify that the Quality Control (QC) plan for construction and remediation activities are implemented in accordance with the site-specific QA plans;
5. Perform independent on-site inspections of the Work as needed to assess compliance with the approved design criteria, plans and specifications; and
6. Report the results of all inspections, including findings that the Work is not acceptable quality or fails to meet the specified design requirements to the SRSNE Site Group, USEPA and CT DEEP.

The site work was performed in accordance with requirements of the site-specific approved CD/SOW deliverables (Deliverables). Prior to beginning site work the draft deliverables were reviewed in detail by the IQAT to identify any potential conflicts among the documents.

The IQAT participated in Technical Information Meeting(s), Pre-Construction Conference(s), Construction Progress Meeting(s) and Final Construction Inspection(s) during the course of work including the construction of the remediation action and report on observations and progress. The IQAT was on-site during pre-design studies, such as soil sampling, monitoring well installation and monitoring well sampling.

Clayton Smith of *de maximis* served as IQAT Manager as the primary contact for all IQAT functions during work at the Site and the primary IQAT contact with the Agencies, Project Coordinator, Remedial Design Contractors and Remedial Action Contractors.

During the construction and remedial action periods, the IQAT prepared a Monthly IQAT Report detailing IQAT observations of the prior month's site activities and providing forecasts of QA/QC activities expected for the next month. A copy of each Monthly IQAT Report was delivered to the Project Coordinator by the 5<sup>th</sup> of each month in order to be included in the Monthly Progress Report due to the Agencies by the 10<sup>th</sup> of each month. Copies of the Monthly Progress and IQAT Reports are included as Attachment H.

As written in the SOW, the role of IQAT includes providing written notification to the Project Coordinator and the RA Contractors' CQC Manager(s) of work found to be inconsistent with relevant work plan. Upon encountering work inconsistency, the IQAT would complete a Significant Issue Tracking Sheet and submit a copy to the Project Coordinator and the CQC Manager. The tracking sheets identify the significant issue of work which merits review; document the status of the corrective action and who has been notified. The purpose of the Significant Issue Tracking Sheet is to alert project stakeholders of a potential problem that may be corrected without involving changes to the approved project plans and to prevent the issue from reoccurring. Any corrective action requiring changes to the approved project requirements would be documented as a non-conformance.

Immediately upon identifying any material or workmanship that does not meet project requirements, and determined that any corrective action would involve changes to the approved project plans, the IQAT would prepare a Non-conformance Report. All Non-conformance Reports were to be submitted as soon as possible to the Project Coordinator for distribution to the SRSNE Site Group, Agencies, entity responsible for the non-conformance, Design Engineer and at a minimum the non-conformance would be discussed during the next Weekly Project Meeting. No corrective action activities would be initiated that require changes to the approved project plans without prior communication and approval of the non-conformance corrective action from the USEPA.

While the above-described procedures were in place for identifying inconsistencies and non-conformances over the course of the ISTR implementation, no such issues arose over the course of the project.

The IQAT completed a field Report for each day on-Site. The IQAT Field Reports included the name of the IQAT inspector, date, general weather conditions, summary of the days Health & Safety program, list of Contractors on-Site, brief summary of work performed by each Contractor and meetings attended by the IQAT. The IQAT Daily Field Report also included a Health & Safety summary for each day on-Site summarizing meetings conducted, air quality monitoring conducted and if there were any health and safety incidents reported.

As identified in the Site Specific Health & Safety Plan, every employee injury, accident, and near miss must be reported within 24 hours of the injury. If the incident results in hospitalization, an immediate report must be made by telephone to the Project Manager and the Health and Safety Officer. One health and safety incident occurred during the

ISTR implementation activities. On December 8, the drilling helper for Aquifer Drilling and Testing was mounting the core barrel on the rig to push out the samples for collection during the Phase 2 confirmatory soil sampling event. Simultaneously the operator was moving the rig to have the mast footing cover the sample hole. The footing came down on the top of the helper's foot. This incident was caused by a miscommunication of set-up practice which was established the previous drilling day with a different helper. Following the incident, the preventative measure adopted was ensuring that the area is clear before moving/lowering the rig.

## **5.5 Performance Data Quality**

A Quality Assurance Project Plan (QAPP) was developed during the design of the treatment system and was included as Attachment C of the RD POP (ARCADIS 2010b). The QAPP was designed to address the requirements of Section V.C.2.c of the SOW and as intended to address the sampling and analytical methods to be employed during remedial design, construction, and system operation. Aspects of the CT DEEP Reasonable Confidence Protocol (RCP) were incorporated into the QAPP including reporting limit and data quality indicator control limits.

The data quality objectives (DQOs) are identified and discussed in Worksheet #10 of the QAPP. Worksheet #10, presents the individual goals for each aspect of the remediation program and discusses the analytic approach. According to the worksheet, the usability of the data is based upon the results of the validation. The data is considered suitable for use in making decisions if 90% of the data points are not rejected or deemed unsuitable. Performance and acceptance criteria are specified in the SOW along with sampling procedures for chain of custody, laboratory analytical and sampling protocols.

During the course of preparation and implementation of the remediation at the Site, analytical data was handled with the intent of meeting the DQOs. *de maximis* Data Management Solutions, Inc. (ddms) was contracted to manage, verify, and validate laboratory data in order to ensure that the data was suitable to meet the DQO's. ddms imported laboratory data from the laboratory contractors. As part of the data import process, ddms verified data formatting and valid values remained consistent and electronic data matched hard copy analytical reports. ddms then added the soil sample locations to the site database/GIS. ddms performed 3<sup>rd</sup> party validation on analytical data from the confirmatory soil sampling events that were completed prior to shutdown of each Phase of the ISTR system.

## **5.6 USEPA Oversight**

USEPA and CT DEEP were provided with all draft documents associated with the planning, operation, and demobilization of the ISTR system for review and comment. Comments received from regulators were addressed and incorporated into these documents as necessary. Following revision, USEPA and CT DEEP were provided with updated copies of the documents for approval or further comment if necessary. Final

approved documents were incorporated into the record and used as standards for that stage of the process as well as for guidance for IQAT oversight. Final shutdown of the ISTR system was also approved by USEPA upon satisfactory achievement of the target soil data identified in the SOW.

In addition to submission of all documentation to regulatory agencies, weekly progress meetings were held during construction and operation of the ISTR remedy. The weekly meetings occurred via teleconference and included representatives of USEPA, CT DEEP, *de maximis*, ARCADIS, and TerraTherm. The weekly calls were intended to provide a weekly update of the progress of the remediation to USEPA as required in the ROD. During the calls, USEPA was provided the current status of the remedy and were able to provide guidance or request additional information when needed. The meetings were held weekly until final shutdown of the ISTR system, then monthly during demobilization until the final inspection. Copies of the agenda and minutes from the weekly meetings are provided in Attachment I.

In addition to weekly progress calls, TerraTherm generated weekly reports summarizing the operational and monitoring information associated with the ISTR system. These reports were provided for review and comment by the USEPA and CT DEEP. Copies of the weekly ISTR summary reports are provided in Attachment D.

## **6. Final Inspection**

### **6.1 Results of pre-final and final RA inspections**

The final USEPA inspection for the ISTR phase of work was held on-site on July 13, 2015. Representatives of USEPA, CT DEEP, and *de maximis* attended the meeting. USEPA inspected the condition of the TTZ and general Site condition in order to insure that no environmental concerns remained following demobilization. The Site was concluded to be in acceptable condition and no follow-up punch list items were noted.

### **6.2 Adherence to H&S and Perimeter Air Monitoring**

Prior to commencement of the on-site activities, a health and safety plan (HASP) was completed for each stage of the project (PIPP construction, ISTR system construction, system operation). These HASPs were provided to USEPA for review and approval as part of the PIPP Plan, Project Operations Plan, and Remedial Action Work Plan. Each HASP provided a detailed description of the expected hazards present on the Site, appropriate personal protective equipment and tools, and procedures to follow to avoid incidents. Each HASP also provided a sequence of events to be followed in the event of an incident to minimize the injury. All staff and contractors were required to review the HASPs and sign the acknowledgement page to ensure that they understood the contents of the HASP and agreed to follow the plan.

The HASPs were strictly adhered to by all on-site personnel and daily health and safety meetings were held prior to initiation of work on every field day. IQAT personnel provided general oversight to ensure that all on-site personnel were performing their duties within the scope of the HASP.

Perimeter air monitoring was performed in accordance with the monitoring plan described in the TWISP. No exceedances of action levels occurred through the course of construction and operation that could not be clearly attributed to equipment exhaust or other innocuous sources. Complaints of objectionable odors were made by the Southington Police Department (SPD) starting in December 2014. The SPD headquarters is located approximately 700 feet north of the ISTR treatment area. Beginning in December 2014, one of the perimeter air monitoring locations was moved onto the police station property in an effort to further investigate the potential for site-related air quality impacts in that area. This monitoring station did not detect VOCs at the new location, nor were VOCs detected in a TO-15 air sample collected from the thermal oxidizer discharge on January 5, 2015. In addition, the CT DEEP deployed an inspector from the Air Bureau on January 12, 2015 to investigate the complaints. The inspector did not note any unusual or unexpected odors that would trigger the need for further action by the Bureau. The source of the odors was not conclusively determined. In reaction to the complaints, the thermal oxidizer was taken offline on January 10, 2015. After January 10, 2015, extracted vapors were treated using vapor-phase granular activated carbon.



## **7. Future Activities and Schedule**

### **7.1 Operations and Maintenance Activities**

Section VI.H of the SOW requires that Construction Completion Reports summarize the O&M activities associated with the subject component of the remedy. Specific to the ISTR component of the remedy discussed herein, the system components have been shut off and demobilized from the site such that there are no continuing ISTR-related operation or maintenance activities. Notwithstanding the completion of work, the following short-term maintenance activities are anticipated within the ISTR-treatment area until such time that the next phase of the remedial approach (i.e., excavation of Cianci Property soil areas and construction of the RCRA cap) is initiated:

- Periodic inspections of the re-vegetated areas (e.g., material staging and support areas) until such time that sufficient growth is established.
- Periodic inspections of re-vegetated areas and site drainage pathways to ensure that excessive erosion and/or sedimentation are not occurring.
- Maintenance of erosion and sedimentation controls until vegetative growth is sufficiently established.
- Placement of additional controls as needed to prevent erosion of site soils in areas such as drip lines adjacent to the ISTR surface cover, perimeter drainage swales, access roads, etc.

### **7.2 Post-ISTR Activities and Schedule**

Having completed the ISTR component of the remedy, the SRSNE Site Group will continue implementing ongoing and remaining components of the approved remedial approach. Specific to the ISTR area, this includes implementing the additional investigation and delineation sampling proposed in the Soil Investigation Plan (Attachment I to the RDWP) and as modified in a memorandum dated August 24, 2015 (with CT DEEP concurrence provided that same date). It also includes conducting the Vapor Control System Evaluation (Attachment J to the RDWP). These items will support the subsequent design and implementation of the remedial activities associated with remediation of the Cianci property soil areas and construction of the RCRA C cap in the former SRSNE Operations Area. It is anticipated that the design activities will be performed in the winter of 2015-16, and that construction activities will be performed during the 2016 field season.

## 8. Contact Information

Project contact information, consistent with Exhibit 2-5 of USEPA's 2011 "Close Out Procedures for National Priorities List Sites," is summarized below.

<b>Firm/Agency</b>	<b>Role</b>	<b>Name</b>	<b>Position/Title</b>	<b>Address/Telephone</b>
USEPA	Federal Regulatory Agency	Karen Lumino	Remedial Project Manager	USEPA Region 1 ME/VT/CT Superfund Section 5 Post Office Square Suite 100 Mail Code OSRR07-4 Boston, MA 02109 617-918-1348
CT DEEP	State Regulatory Agency	Shannon Pociu	Project Manager	CT DEEP Bureau of Water Protection and Land Reuse 79 Elm Street Hartford, CT 06106 860-424-3546
SRSNE Group	PRP	Robert Kirsch, Esq.	Co-Chair of Executive Committee	Wilmer Hale 60 State Street Boston, MA 02109 617-526-6779
<i>de maximis, inc.</i>	Supervising Contractor	Bruce Thompson	Project Coordinator	200 Day Hill Road Suite 200 Windsor, CT 06095 860-298-0541
TerraTherm, Inc.	In-Situ Remediation Contractor	Robin Swift	Project Manager	151 Suffolk Lane Gardner, MA 01440 978-730-1200
ARCADIS	Remedial Design Contractor	Jeff Holden	Project Manager	160 Chapel Road Suite 201 Manchester, CT 06042 860-645-1084

## 9. References

ARCADIS. 2010a. Remedial Design Work Plan (RDWP).

ARCADIS. 2010b. Quality Assurance Project Plan (QAPP) (Attachment C to the Remedial Design Project Operations Plan).

ARCADIS. 2013a. Pre-ISTR Site Preparation Completion Report.

ARCADIS. 2013b. Thermal Wellfield Implementation Support Plan (TWISP).

ARCADIS. 2014. ISTR Confirmatory Soil Sampling Plan – Revised. November 7, 2014.

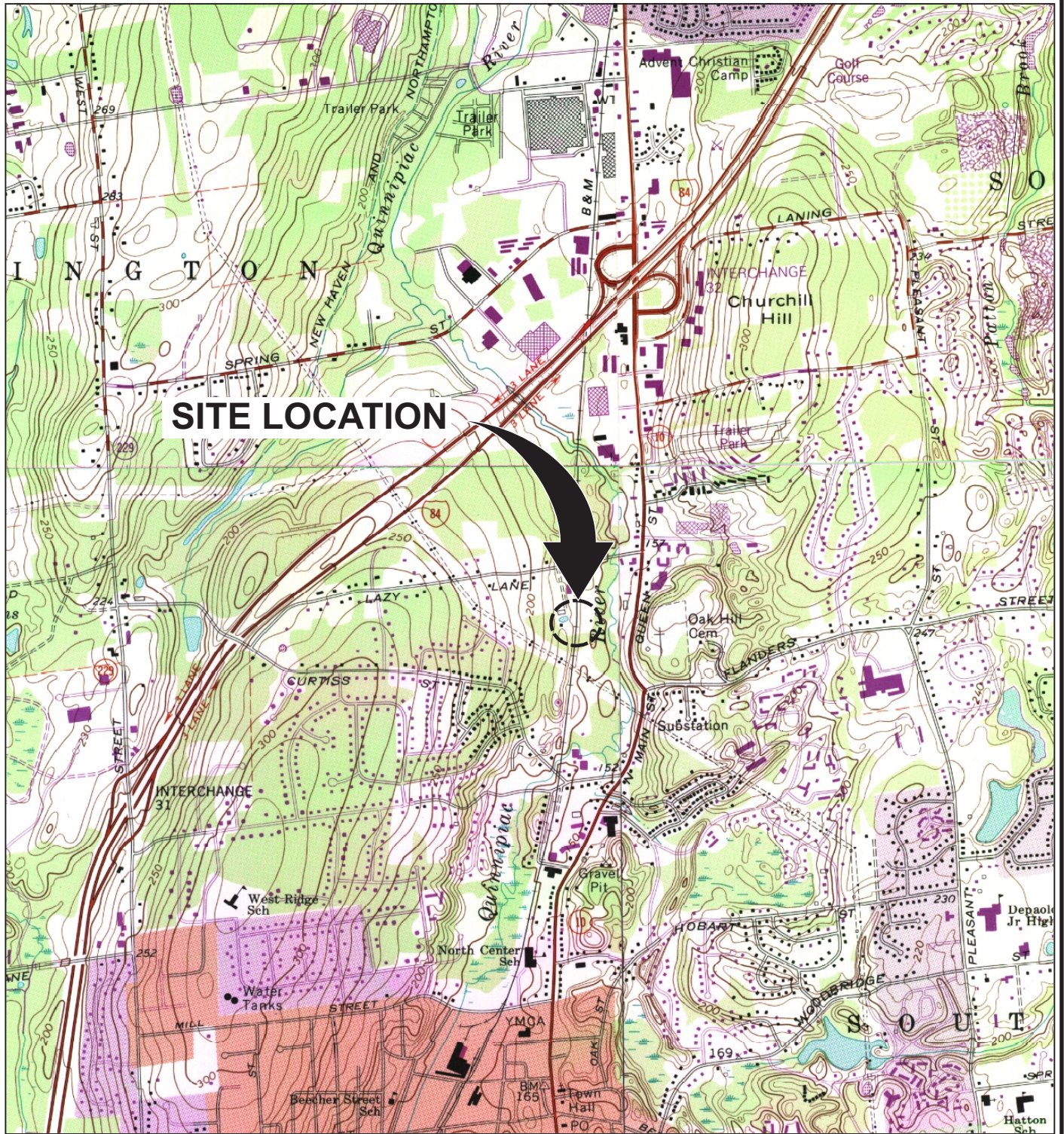
***de maximis, inc.***, 2015. ISTR Demonstration of Attainment of Interim NAPL Cleanup Levels, April 6, 2015

TerraTherm. 2014. In-Situ Thermal Remediation Remedial Action Work Plan and Project Operations Plan (100% Design).

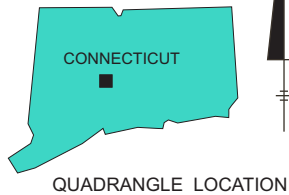
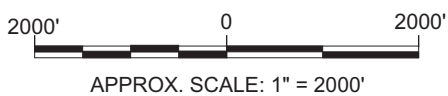
United States Environmental Protection Agency (USEPA). 2005. Record of Decision (ROD).

USEPA. May 2011. Closeout Procedures for National Priority List Sites.

**FIGURES**



REFERENCE: SOUTHTON, CONN. USGS QUAD. 1968 PR 1992, MERIDEN, CONN. USGS QUAD. 1966 PR 1984, NEW BRITAIN, CONN. USGS QUAD. 1966 PR 1984, & BRISTOL, CONN. USGS QUAD 1967 PR 1984.



SRNE SUPERFUND SITE  
SOUTHTON, CONNECTICUT  
ISTR COMPLETION REPORT

**SITE LOCATION MAP**



FIGURE  
**1**



**ATTACHMENT A**

**Summary of Wellfield Boring Depths**

SRSNE Site  
 Southington, CT  
 2013 Thermal Treatment System - Well Installation

Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details		
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount
HO-001	4/27/2013	12.0	none	12.0	16.0	16.0	no	NA	none	weighted bailer	none
HO-002	4/26/2013	11.5	none	11.5	16.0	16.0	no	NA	none	weighted bailer	none
HO-003	4/26/2013	13.0	none	13.0	17.0	17.0	no	NA	none	weighted bailer	none
HO-004	4/25/2013	13.5	none	13.5	17.0	17.0	no	NA	none	weighted bailer	none
HO-005	4/24/2013	12.5	none	12.5	16.5	16.5	no	NA	none	weighted bailer	none
HO-006	4/24/2013	12.5	none	12.5	16.0	16.0	no	NA	none	weighted bailer	none
HO-007	4/23/2013	13.0	13.0	13.5	16.0	16.0	no	NA	none	weighted bailer	none
HO-008	4/27/2013	11.0	none	11.0	16.0	16.0	no	NA	none	weighted bailer	none
HO-009	4/27/2013	13.5	none	13.5	18.0	18.0	no	NA	none	weighted bailer	none
HO-010	4/26/2013	12.0	none	12.0	16.0	16.0	no	NA	none	weighted bailer	none
HO-011	4/26/2013	12.0	none	12.0	16.0	16.0	no	NA	none	weighted bailer	none
HO-012	4/26/2013	12.5	none	12.5	16.0	16.0	no	NA	none	weighted bailer	none
HO-013	4/25/2013	14.0	none	14.0	18.0	18.0	no	NA	none	weighted bailer	none
HO-014	4/25/2013	14.5	none	14.5	19.0	19.0	no	NA	none	weighted bailer	none
HO-015	4/23/2013	15.0	none	15.0	19.0	19.0	no	NA	none	weighted bailer	none
HO-016	5/1/2013	16.0	none	16.0	20.0	20.0	yes	weighted bailer	odor	weighted bailer	none
HO-017	4/30/2013	15.5	none	15.5	20.0	19.0	no	NA	none	weighted bailer	none
HO-018	4/30/2013	16.0	none	16.0	20.0	20.0	no	NA	none	weighted bailer	none
HO-019	4/29/2013	16.0	none	16.0	20.0	20.0	no	NA	none	weighted bailer	none
HO-020	4/29/2013	15.0	none	15.0	19.0	19.0	no	NA	none	weighted bailer	none
HO-021	4/29/2013	13.0	none	13.0	17.0	17.0	no	NA	none	weighted bailer	none
HO-022	4/27/2013	13.0	none	13.0	18.0	18.0	no	NA	none	weighted bailer	none
HO-023	5/13/2013	12.0	none	12.0	16.0	16.0	no	NA	none	weighted bailer	none
HO-024	5/13/2013	13.0	none	13.0	17.0	17.0	no	NA	none	weighted bailer	none
HO-025	5/11/2013	12.0	none	12.0	16.0	16.0	no	NA	none	weighted bailer	none
HO-026	5/10/2013	12.0	none	12.0	16.0	16.0	no	NA	none	weighted bailer	none
HO-027	5/10/2013	12.0	none	12.0	16.0	16.0	no	NA	none	weighted bailer	none
HO-028	5/10/2013	12.0	none	12.0	16.0	16.0	no	NA	none	weighted bailer	none
HO-029	5/30/2013	20.0	20.0	20.5	24.0	24.0	no	NA	none	weighted bailer	none
HO-030	5/1/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none
HO-031	5/1/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-032	4/30/2013	17.5	none	17.5	22.0	22.0	no	NA	none	weighted bailer	none
HO-033	4/30/2013	16.0	none	16.0	20.0	20.0	no	NA	none	weighted bailer	none
HO-034	5/15/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-035	4/29/2013	15.0	none	15.0	19.0	19.0	no	NA	none	weighted bailer	none
HO-036	5/13/2013	14.0	none	14.0	19.0	19.0	no	NA	none	weighted bailer	none
HO-037	5/29/2013	13.0	none	13.0	17.0	17.0	no	NA	none	weighted bailer	none
HO-038	5/13/2013	13.0	none	13.0	17.0	17.0	no	NA	none	weighted bailer	none
HO-039	5/13/2013	12.0	none	12.0	16.0	16.0	no	NA	none	weighted bailer	none
HO-040	5/11/2013	13.0	none	13.0	17.0	17.0	no	NA	none	weighted bailer	none
HO-041	5/11/2013	13.0	none	13.0	17.0	17.0	no	NA	none	weighted bailer	none
HO-042	5/11/2013	13.0	none	13.0	17.0	17.0	no	NA	none	weighted bailer	none
HO-043	5/10/2013	13.0	none	13.0	17.0	17.0	no	NA	none	weighted bailer	none

SRSNE Site  
 Southington, CT  
 2013 Thermal Treatment System - Well Installation

Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details			
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount	
HO-044	5/29/2013	17.5	17.5	18.5	21.0	21.0	no	NA	none	weighted bailer	none	
HO-045	5/30/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-046	5/29/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none	
HO-047	5/7/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-048	5/7/2013	20.0	none	20.0	25.0	25.0	yes	weighted bailer	sheen in water	weighted bailer	none	
HO-049	5/7/2013	18.5	none	18.5	23.0	23.0	no	NA	none	weighted bailer	none	
HO-050	5/2/2013	17.5	17.5	18.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-051	5/7/2013	18.5	none	18.5	23.0	23.0	no	NA	none	weighted bailer	none	
HO-052	5/2/2013	17.5	none	17.5	21.0	21.0	no	NA	none	weighted bailer	none	
HO-053	5/1/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none	
HO-054	5/2/2013	17.5	17.5	19.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-055	5/1/2013	19.5	none	19.5	23.0	23.0	no	NA	none	weighted bailer	none	
HO-056	5/16/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-057	5/15/2013	18.5	none	18.5	22.0	22.0	no	NA	none	weighted bailer	none	
HO-058	5/15/2013	18.5	none	18.5	22.0	22.0	no	NA	none	weighted bailer	none	
HO-059	5/14/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-060	5/14/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-061	6/12/2013	15.0	none	15.0	19.0	19.0	no	NA	none	weighted bailer	none	
HO-062	6/14/2013	13.0	none	13.0	17.0	17.0	no	NA	none	weighted bailer	none	
HO-063	6/15/2013	12.5	12.5	13.0	16.0	16.0	no	NA	sheen in water	weighted bailer	none	
HO-064	6/15/2013	13.5	none	13.5	17.0	17.0	no	NA	sheen in water	weighted bailer	none	
HO-065	6/15/2013	12.0	none	12.0	16.0	16.0	no	NA	none	weighted bailer	none	
HO-066	6/17/2013	12.0	none	12.0	16.0	16.0	no	NA	none	weighted bailer	none	
HO-067	6/17/2013	13.0	none	13.0	17.0	17.0	no	NA	none	weighted bailer	none	
HO-068	5/31/2013	18.0	18.0	18.2	22.0	22.0	no	NA	none	weighted bailer	none	
HO-069	5/30/2013	18.0	18.0	19.0	22.0	22.0	no	NA	none	weighted bailer	none	
HO-070	5/29/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-071	5/9/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-072	5/8/2013	22.5	none	22.5	26.0	26.0	no	NA	none	weighted bailer	none	
HO-073	5/8/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-074	5/8/2013	19.0	19.0	20.0	23.0	23.0	yes	weighted bailer	none	weighted bailer	none	
HO-075	5/17/2013	16.0	16.0	17.5	20.0	20.0	no	NA	none	weighted bailer	none	
HO-076	5/16/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none	
HO-077	5/16/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none	
HO-078	5/16/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none	
HO-079	5/15/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-080	5/14/2013	18.5	none	18.5	22.0	22.0	no	NA	none	weighted bailer	none	
HO-081	6/12/2013	17.0	17.0	18.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-082	6/12/2013	18.0	18.0	19.0	22.0	22.0	no	NA	sheen in water	weighted bailer	none	
HO-083	6/13/2013	17.0	none	17.0	21.0	21.0	no	NA	odor	weighted bailer	none	
HO-084	6/19/2013	16.0	none	16.0	20.0	20.0	no	NA	NAPL Blebs	weighted bailer	trace blebs	
HO-085	6/18/2013	16.0	none	16.0	20.0	20.0	no	NA	none	weighted bailer	none	
HO-086	6/18/2013	16.0	none	16.0	20.0	20.0	no	NA	sheen in water	weighted bailer	none	



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Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details		
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount
HO-087	6/18/2013	22.0	none	22.0	26.0	26.0	no	NA	sheen in water	weighted bailer	none
HO-088	6/17/2013	16.5	none	16.5	20.0	20.0	no	NA	sheen in water	weighted bailer	none
HO-089	6/17/2013	12.0	none	12.0	16.0	16.0	no	NA	none	weighted bailer	none
HO-090	5/31/2013	17.5	none	17.5	21.0	21.0	no	NA	none	weighted bailer	none
HO-091	5/30/2013	21.0	21.0	21.5	25.0	25.0	no	NA	none	weighted bailer	none
HO-092	5/9/2013	17.0	17.0	17.5	21.0	21.0	no	NA	none	weighted bailer	none
HO-093	5/21/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none
HO-094	5/21/2013	22.0	22.0	23.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-095	5/17/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none
HO-096	5/18/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none
HO-097	5/17/2013	15.5	15.5	18.0	19.0	19.0	no	NA	none	weighted bailer	none
HO-098	5/17/2013	20.5	none	20.5	24.0	24.0	no	NA	none	weighted bailer	none
HO-099	6/5/2013	18.0	18.0	18.5	22.0	22.0	no	NA	none	weighted bailer	none
HO-100	6/5/2013	17.5	17.5	20.5	22.0	22.0	no	NA	none	weighted bailer	none
HO-101	6/5/2013	16.0	16.0	19.0	20.0	20.0	no	NA	none	weighted bailer	none
HO-102	6/6/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-103	6/12/2013	16.0	16.0	19.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-104	6/13/2013	17.5	17.5	18.0	21.0	21.0	yes	weighted bailer	sheen in water	weighted bailer	none
HO-105	6/19/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-106	6/19/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none
HO-107	6/19/2013	18.5	none	18.5	22.0	22.0	no	NA	NAPL Blebs	weighted bailer	none
HO-108	6/20/2013	18.0	none	18.0	22.0	22.0	no	NA	NAPL Blebs	weighted bailer	none
HO-109	6/20/2013	18.0	18.0	18.5	22.0	22.0	no	NA	none	weighted bailer	none
HO-110	6/21/2013	15.0	15.0	15.5	19.0	19.0	no	NA	sheen in water	weighted bailer	none
HO-111	6/21/2013	15.5	15.5	16.0	19.0	19.0	no	NA	sheen in water	weighted bailer	none
HO-112	5/31/2013	17.0	17.0	17.5	21.0	21.0	no	NA	none	weighted bailer	none
HO-113	5/31/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none
HO-114	4/24/2013	14.0	14.0	17.5	19.0	19.0	no	NA	none	weighted bailer	none
HO-115	5/20/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none
HO-116	5/21/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-117	5/21/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none
HO-118	5/18/2013	22.5	none	22.5	26.0	26.0	no	NA	none	weighted bailer	none
HO-119	5/23/2013	17.0	17.0	18.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-120	6/3/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-121	6/4/2013	21.0	none	21.0	25.0	25.0	yes	bailer/peristaltic	none	weighted bailer	none
HO-122	6/4/2013	18.0	18.0	20.0	22.0	22.0	no	NA	sheen in water	weighted bailer	none
HO-123	6/5/2013	18.0	18.0	20.0	22.0	22.0	no	NA	none	weighted bailer	none
HO-124	6/6/2013	16.0	none	16.0	20.0	20.0	no	NA	none	weighted bailer	none
HO-125	6/11/2013	19.0	19.0	21.5	23.0	23.0	no	NA	none	weighted bailer	none
HO-126	6/12/2013	19.0	19.0	22.0	23.0	23.0	no	NA	NAPL blebs	weighted bailer	none
HO-127	6/14/2013	18.0	18.0	18.5	22.0	22.0	no	NA	none	weighted bailer	none
HO-128	6/22/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none
HO-129	6/24/2013	20.0	none	20.0	24.0	24.0	no	NA	NAPL blebs in water	weighted bailer	none

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Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details		
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount
HO-130	7/12/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-131	7/12/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none
HO-132	7/12/2013	17.5	none	17.5	21.0	21.0	no	NA	none	weighted bailer	none
HO-133	6/21/2013	16.0	16.0	16.5	20.0	20.0	no	NA	NAPL blebs in water	weighted bailer	none
HO-134	6/21/2013	15.0	15.0	16.5	19.0	19.0	no	NA	none	weighted bailer	none
HO-135	7/16/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-136	4/25/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-137	5/18/2013	22.0	none	22.0	26.0	26.0	no	NA	sheen in water	weighted bailer	none
HO-138	5/22/2013	22.0	none	22.0	26.0	26.0	no	NA	sheen in water	weighted bailer	none
HO-139	5/22/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-140	5/22/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none
HO-141	5/23/2013	18.0	18.0	20.0	24.0	24.0	no	NA	slight sheen	weighted bailer	none
HO-142	6/3/2013	19.0	19.0	21.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-143	6/4/2013	19.5	19.5	22.5	23.0	23.0	no	NA	none	weighted bailer	none
HO-144	6/4/2013	16.0	16.0	19.0	21.0	21.0	no	NA	sheen in water	weighted bailer	none
HO-145	6/4/2013	18.0	18.0	19.0	22.0	22.0	no	NA	sheen in water	weighted bailer	none
HO-146	6/6/2013	17.0	17.0	19.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-147	5/7/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-148	6/11/2013	21.0	21.0	24.0	25.0	25.0	no	NA	NAPL bleb	weighted bailer	none
HO-149	6/14/2013	22.0	22.0	23.0	26.0	26.0	no	NA	sheen in water	weighted bailer	none
HO-150	6/22/2013	22.0	22.0	23.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-151	6/22/2013	21.0	21.0	23.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-152	6/24/2013	23.0	23.0	24.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-153	7/15/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-154	7/15/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-155	7/15/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-156	7/15/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-157	7/15/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-158	7/16/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-159	5/7/2013	17.0	17.0	19.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-160	5/7/2013	18.0	18.0	19.5	23.0	23.0	no	NA	none	weighted bailer	none
HO-161	5/7/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-162	5/7/2013	21.0	21.0	23.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-163	5/22/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-164	5/23/2013	16.0	16.0	17.0	20.0	20.0	no	NA	none	weighted bailer	none
HO-165	6/26/2013	21.0	21.0	22.0	25.0	25.0	no	NA	sheen in water	weighted bailer	none
HO-166	6/27/2013	23.0	23.0	25.0	27.0	27.0	no	NA	sheen in water	weighted bailer	none
HO-167	6/27/2013	24.0	none	24.0	28.0	28.0	no	NA	sheen in water	weighted bailer	none
HO-168	6/27/2013	21.0	21.0	22.0	25.0	25.0	no	NA	NAPL blebs in water	weighted bailer/Peristaltic	trace blebs
HO-169	7/9/2013	21.0	21.0	21.5	25.0	25.0	no	NA	none	weighted bailer	none
HO-170	7/9/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none
HO-171	7/10/2013	25.0	none	25.0	29.0	29.0	no	NA	NAPL blebs, sheen in water	Whale pump	trace NAPL film
HO-172	7/10/2013	24.0	none	24.0	28.0	28.0	no	NA	NAPL smears on bailer	weighted bailer	none

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Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details		
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HO-173	7/11/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-174	7/11/2013	24.5	none	24.5	28.0	28.0	yes	weighted bailer	NAPL on bailer	weighted bailer	none
HO-175	7/12/2013	23.0	23.0	23.5	27.0	27.0	no	NA	none	weighted bailer	none
HO-176	7/16/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-177	7/16/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-178	7/17/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-179	7/17/2013	21.0	none	21.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-180	7/17/2013	19.0	none	19.0	24.0	24.0	no	NA	none	weighted bailer	none
HO-181	7/18/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none
HO-182	7/18/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none
HO-183	5/7/2013	18.0	18.0	22.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-184	5/8/2013	18.0	18.0	20.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-185	5/8/2013	18.0	none	18.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-186	5/8/2013	18.0	none	18.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-187	5/8/2013	18.0	18.0	20.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-188	6/25/2013	21.0	21.0	25.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-189	6/25/2013	21.0	21.0	21.5	25.0	25.0	no	NA	none	weighted bailer	none
HO-190	6/26/2013	20.0	20.0	21.0	24.0	24.0	no	NA	none	weighted bailer	none
HO-191	4/29/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-192	4/29/2013	15.0	15.0	15.5	19.0	19.0	no	NA	none	weighted bailer	none
HO-193	4/29/2013	16.0	none	16.0	20.0	20.0	no	NA	none	weighted bailer	none
HO-194	4/29/2013	19.0	19.0	19.5	23.0	23.0	no	NA	none	weighted bailer	none
HO-195	4/27/2013	17.0	17.0	18.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-196	4/27/2013	19.0	19.0	21.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-197	4/27/2013	17.0	17.0	17.5	21.0	21.0	no	NA	none	weighted bailer	none
HO-198	4/26/2013	16.0	none	16.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-199	4/26/2013	15.0	none	15.0	19.0	19.0	no	NA	none	weighted bailer	none
HO-200	4/26/2013	17.0	17.0	18.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-201	7/23/2013	24.0	24.0	26.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-202	7/23/2013	24.0	none	24.0	28.0	28.0	no	NA	sheen in water	weighted bailer	none
HO-203	7/24/2013	23.0	23.0	24.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-204	7/24/2013	21.0	21.0	22.5	25.0	25.0	no	NA	sheen in water	weighted bailer	none
HO-205	7/24/2013	20.0	none	20.0	24.0	24.0	no	NA	sheen in water	weighted bailer	none
HO-206	7/24/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-207	7/25/2013	23.0	23.0	24.5	27.0	27.0	no	NA	none	weighted bailer	none
HO-208	5/9/2013	17.0	17.0	19.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-209	5/9/2013	17.0	17.0	18.0	21.0	21.0	no	NA	none	weighted bailer	none
HO-210	5/9/2013	18.0	18.0	21.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-211	5/9/2013	18.0	18.0	21.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-212	5/9/2013	18.0	18.0	20.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-213	6/26/2013	21.0	21.0	23.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-214	6/26/2013	19.0	19.0	21.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-215	4/30/2013	14.0	14.0	15.0	19.0	19.0	no	NA	none	weighted bailer	none

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Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details			
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HO-216	4/30/2013	15.0	none	15.0	19.0	19.0	no	NA	none	weighted bailer	none	
HO-217	4/30/2013	15.0	15.0	18.0	19.0	19.0	no	NA	none	weighted bailer	none	
HO-218	5/1/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-219	5/1/2013	15.0	15.0	17.0	19.0	19.0	no	NA	none	weighted bailer	none	
HO-220	5/1/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-221	5/1/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-222	5/1/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-223	5/2/2013	20.5	20.5	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-224	5/2/2013	19.0	19.0	23.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-225	7/25/2013	21.0	21.0	22.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-226	7/25/2013	24.0	24.0	25.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-227	7/26/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-228	7/26/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-229	7/26/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-230	7/27/2013	23.0	none	23.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-231	7/27/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-232	7/27/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-233	1/27/2011	See Note 1				19.0	See Note 1					
HO-234	1/27/2011	See Note 1				19.0	See Note 1					
HO-235	5/10/2013	18.0	18.0	22.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-236	5/10/2013	18.0	none	18.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-237	5/10/2013	18.0	none	18.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-238	5/10/2013	18.0	none	18.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-239	5/10/2013	18.0	none	18.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-240	7/25/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-241	7/25/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none	
HO-242	6/22/2013	16.0	16.0	18.0	20.0	20.0	no	NA	none	weighted bailer	none	
HO-243	6/22/2013	15.0	15.0	17.0	19.0	19.0	no	NA	none	weighted bailer	none	
HO-244	6/24/2013	16.0	16.0	17.5	20.0	20.0	no	NA	none	weighted bailer	none	
HO-245	6/24/2013	17.0	17.0	18.5	21.0	21.0	no	NA	none	weighted bailer	none	
HO-246	6/24/2013	19.0	19.0	20.5	23.0	23.0	no	NA	none	weighted bailer	none	
HO-247	7/27/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none	
HO-248	7/30/2013	21.0	none	21.0	25.0	25.0	no	NA	NAPL in Corehole	whale pump	2 liters	
HO-249	7/30/2013	26.0	none	26.0	30.0	30.0	yes	weighted bailer	NAPL in Corehole	whale pump	2 liters	
HO-250	7/30/2013	21.0	21.0	24.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-251	7/30/2013	27.0	none	27.0	31.0	31.0	no	NA	none	weighted bailer	none	
HO-252	7/31/2013	27.0	none	27.0	31.0	31.0	no	NA	none	weighted bailer	none	
HO-253	7/31/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-254	7/31/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-255	8/1/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-256	8/1/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-257	8/6/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-258	8/6/2013	25.5	none	25.5	29.0	29.0	no	NA	none	weighted bailer	none	

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Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details			
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount	
HO-259	8/6/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-260	5/11/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-261	5/11/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-262	5/11/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-263	5/11/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-264	1/27/2011	See Note 1				19.0	See Note 1					
HO-265	5/13/2013	17.0	17.0	18.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-266	5/13/2013	18.0	18.0	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-267	5/13/2013	18.0	18.0	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-268	5/14/2013	18.0	18.0	19.5	23.0	23.0	no	NA	none	weighted bailer	none	
HO-269	5/14/2013	16.0	16.0	19.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-270	5/14/2013	17.0	17.0	19.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-271	7/26/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none	
HO-272	7/26/2013	18.0	none	18.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-273	8/6/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-274	8/7/2013	17.0	none	17.0	21.0	21.0	no	NA	sheen in water	weighted bailer	none	
HO-275	8/7/2013	16.0	none	16.0	20.0	20.0	yes	weighted bailer	none	weighted bailer	none	
HO-276	8/8/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none	
HO-277	8/8/2013	18.0	none	18.0	22.0	22.0	yes	weighted bailer	sheen in water	weighted bailer	none	
HO-278	8/9/2013	19.5	none	19.5	23.0	23.0	no	NA	NAPL on bailer	weighted bailer	none	
HO-279	8/10/2013	21.0	none	21.0	25.0	25.0	no	NA	sheen in water	weighted bailer	none	
HO-280	8/10/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-281	8/10/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-282	8/12/2013	24.5	none	24.5	29.0	29.0	no	NA	none	weighted bailer	none	
HO-283	8/22/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-284	8/22/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-285	8/23/2013	28.0	none	28.0	32.0	32.0	no	NA	NAPL in bedrock cuttings	weighted bailer/whale pump	1 liter	
HO-286	8/24/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-287	8/24/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-288	8/27/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-289	8/27/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-290	8/27/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-291	5/14/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-292	5/15/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-293	5/15/2013	19.0	19.0	20.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-294	5/15/2013	19.0	none	19.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-295	5/15/2013	19.0	19.0	20.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-296	5/15/2013	17.0	17.0	19.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-297	5/16/2013	18.0	none	18.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-298	5/16/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none	
HO-299	5/16/2013	18.0	none	18.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-300	5/16/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-301	5/16/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none	

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Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details			
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount	
HO-302	7/26/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-303	7/26/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-304	8/12/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none	
HO-305	8/12/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-306	8/13/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none	
HO-307	8/13/2013	18.0	none	18.0	22.0	22.0	no	NA	none	weighted bailer	none	
HO-308	8/13/2013	16.0	none	16.0	20.0	20.0	no	NA	none	weighted bailer	none	
HO-309	8/13/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-310	8/14/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none	
HO-311	8/14/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-312	8/14/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-313	8/15/2013	24.0	none	24.0	28.0	28.0	no	NA	Trace NAPL on bailer	weighted bailer	none	
HO-314	8/23/2013	25.0	none	25.0	29.0	29.0	no	NA	Trace NAPL on bailer	weighted bailer/whale pump	trace blebs	
HO-315	8/23/2013	27.0	none	27.0	31.0	31.0	no	NA	NAPL in bedrock cuttings	weighted bailer/whale pump	2 liters	
HO-316	8/23/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-317	8/24/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-318	8/26/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-319	8/26/2013	22.0	none	22.0	26.0	26.0	no	NA	sheen on water	weighted bailer	none	
HO-320	8/28/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-321	8/28/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-322	8/28/2013	26.0	none	26.0	30.0	30.0	no	NA	Slight sheen in water	weighted bailer	none	
HO-323	8/6/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-324	8/6/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-325	8/1/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-326	7/31/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-327	7/30/2013	19.0	none	19.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-328	7/30/2013	19.0	none	19.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-329	7/30/2013	18.0	none	18.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-330	7/30/2013	18.0	none	18.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-331	7/29/2013	19.0	none	19.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-332	7/29/2013	20.0	none	20.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-333	7/27/2013	18.0	none	18.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-334	7/27/2013	18.0	none	18.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-335	7/27/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-336	8/15/2013	20.0	none	20.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-337	8/15/2013	17.0	none	17.0	21.0	21.0	no	NA	none	weighted bailer	none	
HO-338	8/20/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none	
HO-339	8/20/2013	19.0	none	19.0	23.0	23.0	no	NA	sheen in water	weighted bailer	none	
HO-340	8/20/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-341	8/21/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-342	8/21/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none	
HO-343	8/21/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-344	8/21/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	

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Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details		
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount
HO-345	8/22/2013	25.0	none	25.0	29.0	29.0	no	NA	NAPL film in water	weighted bailer	none
HO-346	8/29/2013	26.0	none	26.0	30.0	30.0	yes	weighted bailer	none	weighted bailer	none
HO-347	8/29/2013	27.0	none	27.0	31.0	31.0	yes	weighted bailer	none	weighted bailer	none
HO-348	9/4/2013	27.5	none	27.5	31.0	31.0	no	NA	NAPL film in water	weighted bailer	trace
HO-349	9/4/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-350	9/4/2013	21.5	none	21.5	25.0	25.0	no	NA	none	weighted bailer	none
HO-351	9/4/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-352	9/5/2013	19.5	none	19.5	23.0	23.0	no	NA	none	weighted bailer	none
HO-353	9/5/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-354	9/5/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none
HO-355	9/5/2013	26.5	none	26.5	30.0	30.0	no	NA	none	weighted bailer	none
HO-356	8/10/2013	22.0	none	22.0	26.0	25.3	no	NA	none	weighted bailer	none
HO-357	8/10/2013	22.0	none	22.0	26.0	25.3	no	NA	none	weighted bailer	none
HO-358	8/10/2013	19.0	none	19.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-359	8/9/2013	20.0	none	20.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-360	8/8/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-361	8/8/2013	20.0	none	20.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-362	8/8/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-363	8/8/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-364	8/7/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-365	8/6/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-366	8/6/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-367	7/27/2013	19.0	none	19.0	23.0	23.0	no	NA	none	weighted bailer	none
HO-368	8/22/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-369	8/23/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-370	8/23/2013	22.0	none	22.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-371	8/24/2013	20.0	none	20.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-372	8/24/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-373	8/24/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-374	8/26/2013	20.0	none	20.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-375	8/26/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-376	8/26/2013	21.0	21.0	22.5	25.0	25.0	no	NA	none	weighted bailer	none
HO-377	8/27/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-378	9/6/2013	23.0	none	23.0	26.5	26.5	no	NA	NAPL Observed	whale pump	none
HO-379	9/6/2013	23.5	none	23.5	27.0	27.0	no	NA	none	weighted bailer	none
HO-380	9/6/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-381	9/6/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-382	9/9/2013	22.5	none	22.5	26.0	26.0	no	NA	none	weighted bailer	none
HO-383	9/9/2013	20.0	20.0	21.0	24.0	24.0	no	NA	none	weighted bailer	none
HO-384	9/9/2013	19.5	none	19.5	23.0	23.0	no	NA	none	weighted bailer	none
HO-385	9/9/2013	20.5	none	20.5	24.0	24.0	no	NA	none	weighted bailer	none
HO-386	9/9/2013	20.0	20.0	21.0	24.0	24.0	no	NA	none	weighted bailer	none
HO-387	9/9/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none

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Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details			
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount	
HO-388	9/19/2013	28.0	none	28.0	31.5	31.5	no	NA	none	weighted bailer	none	
HO-389	7/25/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-390	7/24/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-391	7/24/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-392	7/24/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-393	7/24/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-394	7/23/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-395	4/24/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-396	7/23/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-397	7/18/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-398	7/18/2013	24.0	none	24.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-399	4/24/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-400	7/17/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-401	7/17/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-402	7/17/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-403	7/16/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-404	4/23/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-405	7/16/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-406	7/16/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-407	7/16/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-408	7/16/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-409	7/15/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-410	7/15/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-411	7/15/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-412	7/15/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-413	9/11/2013	18.0	18.0	20.0	25.0	25.0	no	NA	NAPL on bailer	weighted bailer	none	
HO-414	9/11/2013	18.0	18.0	19.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-415	9/12/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-416	9/17/2013	22.0	22.0	23.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-417	9/17/2013	19.0	none	19.0	25.0	25.0	no	NA	sheen on water	weighted bailer	none	
HO-418	9/17/2013	19.0	none	19.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-419	9/18/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-420	9/18/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-421	9/19/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-422	7/13/2013	24.0	24.0	25.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-423	7/13/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-424	1/26/2011	See Note 1				25.0	See Note 1					
HO-425	1/26/2011	See Note 1				25.0	See Note 1					
HO-426	7/13/2013	24.0	24.0	24.5	28.0	28.0	no	NA	none	weighted bailer	none	
HO-427	7/9/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-428	7/9/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-429	6/27/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-430	6/27/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	



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Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details		
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount
HO-431	6/21/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-432	6/21/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-433	6/21/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-434	6/21/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-435	6/21/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-436	6/20/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-437	6/20/2013	24.0	24.0	24.5	28.0	28.0	yes	weighted bailer	none	weighted bailer	none
HO-438	6/20/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-439	6/20/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none
HO-440	6/19/2013	25.0	25.0	25.5	29.0	29.0	no	NA	none	weighted bailer	none
HO-441	6/19/2013	24.0	24.0	24.5	28.0	28.0	no	NA	none	weighted bailer	none
HO-442	6/19/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-443	6/19/2013	24.0	24.0	25.5	28.0	28.0	no	NA	none	weighted bailer	none
HO-444	6/18/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-445	4/26/2013	20.5	none	20.5	25.0	25.0	no	NA	none	weighted bailer	none
HO-446	8/13/2013	21.0	21.0	23.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-447	8/13/2013	21.0	21.0	24.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-448	8/12/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-449	8/12/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-450	8/12/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-451	8/12/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-452	8/12/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-453	9/18/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-454	9/18/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-455	5/25/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-456	5/23/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-457	5/23/2013	25.0	25.0	26.0	26.0	30.0	no	NA	none	weighted bailer	none
HO-458	5/22/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-459	5/22/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-460	5/22/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none
HO-461	5/21/2013	27.0	none	27.0	31.0	31.0	no	NA	none	weighted bailer	none
HO-462	5/21/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-463	5/21/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-464	5/21/2013	25.0	25.0	26.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-465	5/20/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-466	4/25/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-467	5/20/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-468	5/20/2013	23.0	23.0	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-469	5/20/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-470	5/18/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none
HO-471	4/25/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-472	5/18/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-473	5/18/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none

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Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details		
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount
HO-474	5/18/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-475	5/17/2013	26.5	none	26.5	30.0	30.0	no	NA	none	weighted bailer	none
HO-476	4/25/2013	25.5	none	25.5	29.0	29.0	no	NA	none	weighted bailer	none
HO-477	5/17/2013	26.0	26.0	27.0	30.0	30.0	no	NA	none	weighted bailer	none
HO-478	5/17/2013	26.0	26.0	27.0	30.0	30.0	no	NA	none	weighted bailer	none
HO-479	5/17/2013	23.0	none	23.0	27.0	27.0	no	NA	yes	weighted bailer	trace
HO-480	8/13/2013	21.0	21.0	22.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-481	8/14/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-482	8/14/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-483	8/14/2013	23.0	23.0	24.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-484	8/14/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-485	8/13/2013	20.0	none	20.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-486	9/5/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-487	9/5/2013	24.0	24.0	25.5	28.0	28.0	no	NA	none	weighted bailer	none
HO-488	5/30/2013	24.0	24.0	24.5	28.0	28.0	no	NA	none	weighted bailer	none
HO-489	5/30/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-490	5/30/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-491	5/31/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-492	5/31/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-493	5/31/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-494	5/31/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-495	6/1/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-496	6/1/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-497	6/1/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-498	6/3/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-499	6/3/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-500	6/3/2013	24.0	24.0	25.0	28.0	28.0	no	NA	sheen	weighted bailer	none
HO-501	6/4/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-502	6/4/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-503	6/4/2013	25.0	25.0	25.5	29.0	29.0	no	NA	none	weighted bailer	none
HO-504	6/4/2013	25.0	25.0	25.5	29.0	29.0	no	NA	none	weighted bailer	none
HO-505	6/5/2013	24.0	24.0	24.5	28.0	28.0	no	NA	none	weighted bailer	none
HO-506	6/5/2013	24.0	24.0	24.5	28.0	28.0	no	NA	none	weighted bailer	none
HO-507	6/5/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-508	6/5/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-509	6/6/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none
HO-510	6/11/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-511	6/11/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-512	8/15/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none
HO-513	8/15/2013	21.0	21.0	22.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-514	8/20/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-515	8/20/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none
HO-516	8/21/2013	22.0	22.0	23.0	26.0	26.0	no	NA	none	weighted bailer	none

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Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details			
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount	
HO-517	8/21/2013	21.0	21.0	22.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-518	8/21/2013	20.0	20.0	20.5	25.0	25.0	no	NA	none	weighted bailer	none	
HO-519	9/7/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-520	6/18/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-521	6/18/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-522	6/17/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-523	6/17/2013	27.0	none	27.0	31.0	31.0	no	NA	none	weighted bailer	none	
HO-524	6/17/2013	27.0	none	27.0	31.0	31.0	no	NA	none	weighted bailer	none	
HO-525	6/17/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none	
HO-526	6/15/2013	27.0	none	27.0	31.0	31.0	no	NA	none	weighted bailer	none	
HO-527	6/15/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none	
HO-528	6/11/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-529	6/11/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-530	6/12/2013	25.0	25.0	25.5	29.0	29.0	yes	weighted bailer	odor	weighted bailer	none	
HO-531	6/12/2013	24.0	24.0	25.0	28.0	28.0	no	NA	sheen	weighted bailer	none	
HO-532	6/12/2013	25.0	25.0	25.5	29.0	29.0	no	NA	none	weighted bailer	none	
HO-533	6/12/2013	25.0	25.0	25.5	29.0	29.0	no	NA	none	weighted bailer	none	
HO-534	6/12/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none	
HO-535	6/13/2013	27.0	none	27.0	31.0	31.0	no	NA	none	weighted bailer	none	
HO-536	6/13/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-537	6/14/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-538	6/14/2013	24.0	24.0	24.5	28.0	28.0	no	NA	none	weighted bailer	none	
HO-539	6/14/2013	23.0	23.0	24.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-540	6/14/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-541	6/15/2013	25.0	25.0	25.5	27.0	27.0	no	NA	none	weighted bailer	none	
HO-542	6/26/2013	28.0	none	28.0	32.0	32.0	no	NA	none	weighted bailer	none	
HO-543	8/21/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none	
HO-544	8/22/2013	25.0	none	25.0	29.0	29.0	yes	weighted bailer	none	weighted bailer	none	
HO-545	8/22/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-546	8/27/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-547	8/28/2013	20.0	none	20.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-548	8/28/2013	19.0	none	19.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-549	9/4/2013	20.0	none	20.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-550	9/4/2013	22.0	22.0	22.5	26.0	26.0	no	NA	none	weighted bailer	none	
HO-551	6/26/2013	25.0	none	25.0	29.0	29.0	no	NA	NAPL Blebs	Whale Pump	Trace NAPL	
HO-552	8/28/2013	21.0	21.0	21.5	25.0	25.0	no	NA	none	weighted bailer	none	
HO-553	8/29/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-554	8/29/2013	22.0	none	22.0	26.0	26.0	no	NA	strong odor	weighted bailer	none	
HO-555	9/4/2013	22.0	none	22.0	26.0	26.0	no	NA	strong odor	weighted bailer	none	
HO-556	9/4/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-557	9/4/2013	20.0	none	20.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-558	9/4/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-559	6/26/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	

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Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details			
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount	
HO-560	9/6/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-561	9/6/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-562	9/6/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-563	9/6/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-564	9/7/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-565	9/5/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-566	6/26/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-567	9/9/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none	
HO-568	9/19/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-569	9/19/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-570	9/19/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-571	9/5/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-572	9/5/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-573	6/25/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-574	9/20/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-575	9/20/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-576	9/20/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-577	9/20/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none	
HO-578	9/20/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-579	6/25/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-580	9/20/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none	
HO-581	9/23/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-582	9/23/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none	
HO-583	9/23/2013	26.0	26.0	26.5	30.0	30.0	no	NA	none	weighted bailer	none	
HO-584	6/25/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none	
HO-585	9/11/2013	27.5	none	27.5	31.0	31.0	no	NA	none	weighted bailer	none	
HO-586	9/21/2013	24.0	none	24.0	28.0	28.0	no	NA	none	weighted bailer	none	
HO-587	9/23/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none	
HO-588	6/25/2013	27.0	none	27.0	31.0	31.0	no	NA	none	weighted bailer	none	
HO-589	9/11/2013	28.0	none	28.0	32.0	32.0	no	NA	none	weighted bailer	none	
HO-590	9/21/2013	26.0	none	26.0	30.0	30.0	no	NA	none	weighted bailer	none	
HO-591	9/23/2013	25.0	none	25.0	29.0	29.0	no	NA	none	weighted bailer	none	
HO-592	9/11/2013	28.0	none	28.0	32.0	32.0	no	NA	none	weighted bailer	none	
HO-593	9/21/2013	28.0	none	28.0	32.0	32.0	no	NA	none	weighted bailer	none	
HO-594	7/10/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-595	7/10/2013	21.0	none	21.0	27.0	27.0	no	NA	none	weighted bailer	none	
HO-596	7/10/2013	26.0	none	26.0	30.0	30.0	yes	weighted bailer	NAPL film on bailer	weighted bailer	none	
HO-597	7/11/2013	23.7	none	23.7	28.0	28.0	no	NA	none	weighted bailer	none	
HO-598	7/11/2013	22.6	none	22.6	27.0	27.0	no	NA	none	weighted bailer	none	
HO-599	7/11/2013	23.4	23.4	24.0	28.0	28.0	no	NA	NAPL blebs in water	weighted bailer	none	
HO-600	9/10/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-601	9/10/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none	
HO-602	9/9/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none	

Heater Wells

SRSNE Site  
 Southington, CT  
 2013 Thermal Treatment System - Well Installation

Borehole Details							Top of Bedrock NAPL Assessment		Bottom of Boring NAPL Assessment Details		
Heater Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Corehole (ft bgs)	Heater Can Installation Depth (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	NAPL Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount
HO-603	9/9/2013	23.0	none	23.0	27.0	27.0	no	NA	none	weighted bailer	none
HO-604	9/9/2013	22.0	none	22.0	26.0	26.0	no	NA	none	weighted bailer	none
HO-605	9/10/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none
HO-606	9/10/2013	20.0	none	20.0	24.0	24.0	no	NA	none	weighted bailer	none
HO-607	9/10/2013	21.0	none	21.0	25.0	25.0	no	NA	none	weighted bailer	none

**Note:**

1. Data Not Available (these borings were installed as part of TerraTherm's initial pilot test before installation of the remaining wellfield)

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Monitoring Wells

Borehole Details						Top of Bedrock NAPL Assessment			Bottom of Boring NAPL Assessment Details		
Monitoring Well ID	Installation Date	Interpreted Top of Bedrock (ft bgs)	Top of Weathered Bedrock (ft bgs)	Top of Competent Bedrock (ft bgs)	Total Depth of Boring (ft bgs)	NAPL Assessment at Bedrock Interface (yes/no)	Bedrock Interface NAPL Assessment Method	Bedrock Interface NAPL Removal Amount	Impacts Observed In Bedrock	Bottom of Corehole NAPL Assessment Method	Bottom of Corehole NAPL Removal Amount
ISTR-1	7/10/2013	20	none	20	20	no	none	none	none	weighted bailer	none
ISTR-2	8/9/2013	20	none	22	22	no	none	none	none	weighted bailer	none
ISTR-3	8/7/2013	23	none	23	25	no	none	none	none	weighted bailer	none
ISTR-4	8/23/2013	23	none	23	25	no	none	none	none	weighted bailer	none
ISTR-5	8/7/2013	23	none	23	25	no	none	none	none	weighted bailer	none
ISTR-6	9/12/2013	20	20	21.5	22	no	none	none	none	weighted bailer	none
ISTR-7	9/23/2013	26	none	26	28	no	none	none	none	weighted bailer	none

SRSNE Site  
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2013 Thermal Treatment System - Well Installation

Vapor Extraction Well ID	Installation Date	Installation Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Bedrock (ft bgs)
VEW-001	4/27/2013	7.0	2.0	7.0	12.0
VEW-002	4/26/2013	7.0	2.0	7.0	11.5
VEW-003	4/26/2013	7.0	2.0	7.0	13.0
VEW-004	4/25/2013	7.0	2.0	7.0	13.5
VEW-005	4/25/2013	12.0	2.0	12.0	12.5
VEW-006	4/24/2013	7.0	2.0	7.0	12.5
VEW-007	4/23/2013	7.0	2.0	7.0	13.0
VEW-008	4/27/2013	7.0	2.0	7.0	11.0
VEW-009	4/27/2013	7.0	2.0	7.0	13.5
VEW-010	4/26/2013	7.0	2.0	7.0	12.0
VEW-011	4/26/2013	7.0	2.0	7.0	12.0
VEW-012	4/26/2013	7.0	2.0	7.0	12.5
VEW-013	4/25/2013	7.0	2.0	7.0	14.0
VEW-014	4/25/2013	7.0	2.0	7.0	14.5
VEW-015	4/24/2013	7.0	2.0	7.0	15.0
VEW-017	4/30/2013	7.0	2.0	7.0	15.5
VEW-019	4/29/2013	7.0	2.0	7.0	16.0
VEW-020	4/29/2013	7.0	2.0	7.0	15.0
VEW-021	4/29/2013	7.0	2.0	7.0	13.0
VEW-022	4/29/2013	7.0	2.0	7.0	13.0
VEW-023	5/13/2013	7.0	2.0	7.0	12.0
VEW-024	5/11/2013	7.0	2.0	7.0	13.0
VEW-025	5/10/2013	7.0	2.0	7.0	12.0
VEW-026	5/10/2013	7.0	2.0	7.0	12.0
VEW-027	5/10/2013	7.0	2.0	7.0	12.0
VEW-028	5/10/2013	7.0	2.0	7.0	12.0
VEW-029	5/30/2013	7.0	2.0	7.0	20.0
VEW-030	5/1/2013	7.0	2.0	7.0	18.0
VEW-031	5/1/2013	7.0	2.0	7.0	19.0
VEW-033	4/30/2013	7.0	2.0	7.0	16.0
VEW-034	5/15/2013	7.0	2.0	7.0	17.0
VEW-035	4/29/2013	7.0	2.0	7.0	15.0
VEW-036	5/13/2013	7.0	2.0	7.0	14.0
VEW-037	5/29/2013	7.0	2.0	7.0	13.0
VEW-038	5/13/2013	7.0	2.0	7.0	13.0
VEW-039	5/13/2013	7.0	2.0	7.0	12.0
VEW-040	5/11/2013	7.0	2.0	7.0	13.0
VEW-041	5/11/2013	7.0	2.0	7.0	13.0
VEW-042	5/11/2013	7.0	2.0	7.0	13.0
VEW-043	5/10/2013	7.0	2.0	7.0	13.0
VEW-044	5/29/2013	7.0	2.0	7.0	17.5
VEW-045	5/30/2013	7.0	2.0	7.0	19.0
VEW-046	5/29/2013	7.0	2.0	7.0	20.0
VEW-047	5/8/2013	8.0	3.0	8.0	19.0
VEW-048	5/7/2013	8.0	3.0	8.0	20.0
VEW-049	5/7/2013	8.0	3.0	8.0	18.5
VEW-050	5/2/2013	7.0	2.0	7.0	17.5
VEW-051	5/7/2013	8.0	3.0	8.0	18.5
VEW-053	5/2/2013	7.0	2.0	7.0	18.0
VEW-054	5/2/2013	7.0	2.0	7.0	17.5
VEW-055	5/1/2013	7.0	2.0	7.0	19.5
VEW-056	5/16/2013	7.0	2.0	7.0	17.0
VEW-057	5/15/2013	7.0	2.0	7.0	18.5
VEW-059	5/14/2013	7.0	2.0	7.0	19.0
VEW-060	5/14/2013	7.0	2.0	7.0	17.0
VEW-061	6/12/2013	7.0	2.0	7.0	15.0
VEW-062	6/14/2013	7.0	2.0	7.0	13.0
VEW-063	6/15/2013	7.0	2.0	7.0	12.5
VEW-064	6/15/2013	7.0	2.0	7.0	13.5
VEW-065	6/15/2013	7.0	2.0	7.0	12.0
VEW-066	6/15/2013	7.0	2.0	7.0	12.0
VEW-067	6/17/2013	7.0	2.0	7.0	13.0
VEW-068	5/31/2013	7.0	2.0	7.0	18.0
VEW-069	5/30/2013	7.0	2.0	7.0	18.0
VEW-070	5/29/2013	7.0	2.0	7.0	21.0
VEW-071	5/9/2013	8.0	3.0	8.0	19.0
VEW-072	5/9/2013	8.0	3.0	8.0	22.5
VEW-073	5/8/2013	8.0	3.0	8.0	21.0
VEW-074	5/8/2013	8.0	3.0	8.0	19.0

SRSNE Site  
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 2013 Thermal Treatment System - Well Installation

Vapor Extraction Well ID	Installation Date	Installation Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Bedrock (ft bgs)
VEW-075	5/17/2013	7.0	2.0	7.0	16.0
VEW-076	5/16/2013	7.0	2.0	7.0	18.0
VEW-077	5/16/2013	7.0	2.0	7.0	18.0
VEW-078	5/16/2013	7.0	2.0	7.0	18.0
VEW-079	5/15/2013	7.0	2.0	7.0	17.0
VEW-080	5/14/2013	7.0	2.0	7.0	18.5
VEW-081	6/12/2013	7.0	2.0	7.0	18.5
VEW-082	6/12/2013	7.0	2.0	7.0	18.0
VEW-083	6/13/2013	7.0	2.0	7.0	17.0
VEW-084	6/19/2013	8.0	3.0	8.0	16.0
VEW-085	6/18/2013	7.0	2.0	7.0	16.0
VEW-086	6/18/2013	7.0	2.0	7.0	16.0
VEW-087	6/17/2013	7.0	2.0	7.0	22.0
VEW-088	6/17/2013	7.0	2.0	7.0	16.5
VEW-089	6/17/2013	7.0	2.0	7.0	12.0
VEW-090	5/31/2013	7.0	2.0	7.0	17.5
VEW-091	5/30/2013	7.0	2.0	7.0	21.0
VEW-092	5/10/2013	8.0	3.0	8.0	17.0
VEW-093	5/21/2013	8.0	3.0	8.0	18.0
VEW-094	5/21/2013	8.0	3.0	8.0	22.0
VEW-095	5/17/2013	8.0	3.0	8.0	20.0
VEW-096	5/18/2013	8.0	3.0	8.0	18.0
VEW-097	5/17/2013	8.0	3.0	8.0	15.5
VEW-098	5/17/2013	8.0	3.0	8.0	20.5
VEW-099	6/5/2013	8.0	3.0	8.0	18.0
VEW-100	6/5/2013	8.0	3.0	8.0	17.5
VEW-101	6/5/2013	8.0	3.0	8.0	16.0
VEW-102	6/11/2013	8.0	3.0	8.0	19.0
VEW-103	6/12/2013	8.0	3.0	8.0	16.0
VEW-104	6/13/2013	8.0	3.0	8.0	17.5
VEW-105	6/19/2013	8.0	3.0	8.0	19.0
VEW-106	6/19/2013	8.0	3.0	8.0	18.0
VEW-107	6/19/2013	8.0	3.0	8.0	18.5
VEW-108	6/19/2013	8.0	3.0	8.0	18.0
VEW-109	6/20/2013	8.0	3.0	8.0	18.0
VEW-110	6/21/2013	8.0	3.0	8.0	15.0
VEW-111	6/21/2013	8.0	3.0	8.0	15.5
VEW-112	5/31/2013	8.0	3.0	8.0	17.0
VEW-113	5/31/2013	8.0	3.0	8.0	20.0
VEW-114	4/24/2013	8.0	3.0	8.0	14.0
VEW-115	5/20/2013	8.0	3.0	8.0	18.0
VEW-116	5/21/2013	8.0	3.0	8.0	19.0
VEW-117	5/21/2013	8.0	3.0	8.0	22.5
VEW-118	5/18/2013	8.0	3.0	8.0	22.5
VEW-119	5/23/2013	8.0	3.0	8.0	17.0
VEW-120	6/3/2013	8.0	3.0	8.0	19.0
VEW-121	6/4/2013	8.0	3.0	8.0	21.0
VEW-122	6/4/2013	8.0	3.0	8.0	21.0
VEW-123	6/4/2013	8.0	3.0	8.0	18.0
VEW-124	6/6/2013	8.0	3.0	8.0	16.0
VEW-125	6/11/2013	8.0	3.0	8.0	19.0
VEW-126	6/11/2013	8.0	3.0	8.0	19.0
VEW-127	6/14/2013	8.0	3.0	8.0	18.0
VEW-128	6/22/2013	8.0	3.0	8.0	20.0
VEW-129	6/24/2013	8.0	3.0	8.0	20.0
VEW-130	7/12/2013	8.0	3.0	8.0	21.0
VEW-131	7/12/2013	8.0	3.0	8.0	18.0
VEW-132	7/12/2013	8.0	3.0	8.0	17.5
VEW-133	6/22/2013	8.0	3.0	8.0	16.0
VEW-134	6/21/2013	8.0	3.0	8.0	15.0
VEW-136	4/25/2013	8.0	3.0	8.0	17.0
VEW-137	5/18/2013	8.0	3.0	8.0	22.0
VEW-138	5/22/2013	8.0	3.0	8.0	22.0
VEW-139	5/22/2013	8.0	3.0	8.0	21.0
VEW-140	5/22/2013	8.0	3.0	8.0	18.0
VEW-141	5/23/2013	8.0	3.0	8.0	20.0
VEW-142	6/3/2013	8.0	3.0	8.0	19.0
VEW-143	6/3/2013	8.0	3.0	8.0	19.5
VEW-144	6/4/2013	8.0	3.0	8.0	16.0



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Vapor Extraction Well ID	Installation Date	Installation Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Bedrock (ft bgs)
VEW-145	6/4/2013	8.0	3.0	8.0	18.0
VEW-146	6/5/2013	8.0	3.0	8.0	17.0
VEW-147	6/6/2013	8.0	3.0	8.0	18.0
VEW-148	6/11/2013	8.0	3.0	8.0	21.0
VEW-149	6/14/2013	8.0	3.0	8.0	22.0
VEW-150	6/24/2013	8.0	3.0	8.0	22.0
VEW-151	6/22/2013	8.0	3.0	8.0	21.0
VEW-152	6/24/2013	8.0	3.0	8.0	23.0
VEW-153	7/15/2013	8.0	3.0	8.0	21.0
VEW-154	7/13/2013	8.0	3.0	8.0	25.0
VEW-155	7/15/2013	8.0	3.0	8.0	17.0
VEW-156	7/15/2013	8.0	3.0	8.0	19.0
VEW-157	7/15/2013	8.0	3.0	8.0	19.0
VEW-158	7/16/2013	8.0	3.0	8.0	17.0
VEW-159	5/7/2013	8.0	3.0	8.0	17.0
VEW-160	5/7/2013	8.0	3.0	8.0	18.0
VEW-161	5/7/2013	8.0	3.0	8.0	19.0
VEW-162	5/7/2013	8.0	3.0	8.0	21.0
VEW-163	5/22/2013	8.0	3.0	8.0	17.0
VEW-164	5/23/2013	8.0	3.0	8.0	16.0
VEW-165	6/26/2013	8.0	3.0	8.0	21.0
VEW-166	6/27/2013	8.0	3.0	8.0	23.0
VEW-167	6/27/2013	8.0	3.0	8.0	24.0
VEW-168	6/27/2013	8.0	3.0	8.0	21.0
VEW-169	7/9/2013	8.0	3.0	8.0	21.0
VEW-170	7/9/2013	8.0	3.0	8.0	20.0
VEW-171	7/10/2013	8.0	3.0	8.0	25.0
VEW-172	7/10/2013	8.0	3.0	8.0	24.0
VEW-173	7/11/2013	8.0	3.0	8.0	21.0
VEW-174	7/11/2013	8.0	3.0	8.0	24.5
VEW-175	7/12/2013	8.0	3.0	8.0	23.0
VEW-176	7/16/2013	8.0	3.0	8.0	23.0
VEW-177	7/16/2013	8.0	3.0	8.0	23.0
VEW-178	7/17/2013	8.0	3.0	8.0	21.0
VEW-179	7/17/2013	8.0	3.0	8.0	21.0
VEW-180	7/17/2013	8.0	3.0	8.0	19.0
VEW-181	7/18/2013	8.0	3.0	8.0	20.0
VEW-183	5/7/2013	8.0	3.0	8.0	18.0
VEW-184	5/8/2013	8.0	3.0	8.0	18.0
VEW-185	5/8/1943	8.0	3.0	8.0	18.0
VEW-186	5/8/2013	8.0	3.0	8.0	18.0
VEW-187	5/8/2013	8.0	3.0	8.0	18.0
VEW-188	6/25/2013	8.0	3.0	8.0	21.0
VEW-189	6/25/2013	8.0	3.0	8.0	21.0
VEW-190	6/26/2013	8.0	3.0	8.0	20.0
VEW-191	4/29/2013	8.0	3.0	8.0	17.0
VEW-192	4/29/2013	8.0	3.0	8.0	15.0
VEW-193	4/29/2013	8.0	3.0	8.0	16.0
VEW-194	4/29/2013	8.0	3.0	8.0	19.0
VEW-195	4/29/2013	8.0	3.0	8.0	17.0
VEW-196	4/27/2013	8.0	3.0	8.0	19.0
VEW-197	4/27/2013	8.0	3.0	8.0	17.0
VEW-198	4/26/2013	8.0	3.0	8.0	16.0
VEW-199	4/26/2013	8.0	3.0	8.0	15.0
VEW-200	4/26/2013	8.0	3.0	8.0	17.0
VEW-201	7/23/2013	8.0	3.0	8.0	24.0
VEW-202	7/23/2013	8.0	3.0	8.0	24.0
VEW-203	7/23/2013	8.0	3.0	8.0	23.0
VEW-204	7/24/2013	8.0	3.0	8.0	21.0
VEW-205	7/24/2013	8.0	3.0	8.0	20.0
VEW-206	7/24/2013	8.0	3.0	8.0	22.0
VEW-207	7/24/2013	8.0	3.0	8.0	23.0
VEW-208	5/9/2013	8.0	3.0	8.0	17.0
VEW-209	5/9/2013	8.0	3.0	8.0	17.0
VEW-210	5/9/2013	8.0	3.0	8.0	18.0
VEW-211	5/9/2013	8.0	3.0	8.0	18.0
VEW-212	5/9/2013	8.0	3.0	8.0	18.0
VEW-213	6/25/2013	8.0	3.0	8.0	21.0
VEW-214	6/25/2013	8.0	3.0	8.0	19.0

SRSNE Site  
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Vapor Extraction Well ID	Installation Date	Installation Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Bedrock (ft bgs)
VEW-215	4/30/2013	8.0	3.0	8.0	14.0
VEW-216	4/30/2013	8.0	3.0	8.0	15.0
VEW-217	4/30/2013	8.0	3.0	8.0	15.0
VEW-218	5/1/2013	8.0	3.0	8.0	17.0
VEW-219	5/1/2013	8.0	3.0	8.0	15.0
VEW-220	5/1/2013	8.0	3.0	8.0	21.0
VEW-221	5/1/2013	8.0	3.0	8.0	21.0
VEW-222	5/1/2013	8.0	3.0	8.0	21.0
VEW-223	5/2/2013	8.0	3.0	8.0	20.5
VEW-224	5/2/2013	8.0	3.0	8.0	19.0
VEW-225	7/25/2013	8.0	3.0	8.0	21.0
VEW-226	7/25/2013	8.0	3.0	8.0	24.0
VEW-227	7/26/2013	8.0	3.0	8.0	21.0
VEW-228	7/26/2013	8.0	3.0	8.0	22.0
VEW-229	7/26/2013	8.0	3.0	8.0	24.0
VEW-230	7/26/2013	8.0	3.0	8.0	23.0
VEW-231	7/27/2013	8.0	3.0	8.0	24.0
VEW-232	7/27/2013	8.0	3.0	8.0	24.0
VEW-233s	5/11/2013	8.0	3.0	8.0	NA
VEW-235	5/10/2013	8.0	3.0	8.0	18.0
VEW-236	5/10/2013	8.0	3.0	8.0	18.0
VEW-237	5/10/2013	8.0	3.0	8.0	18.0
VEW-238	5/10/2013	8.0	3.0	8.0	18.0
VEW-239	5/10/2013	8.0	3.0	8.0	18.0
VEW-240	7/25/2013	8.0	3.0	8.0	17.0
VEW-241	7/25/2013	8.0	3.0	8.0	18.0
VEW-242	5/22/2013	8.0	3.0	8.0	16.0
VEW-243	6/22/2013	8.0	3.0	8.0	15.0
VEW-244	6/24/2013	8.0	3.0	8.0	16.0
VEW-245	6/24/2013	8.0	3.0	8.0	17.0
VEW-246	6/24/2013	8.0	3.0	8.0	19.0
VEW-247	7/27/2013	8.0	3.0	8.0	20.0
VEW-248	7/29/2013	8.0	3.0	8.0	21.0
VEW-249	7/30/2013	8.0	3.0	8.0	26.0
VEW-250	7/30/2013	8.0	3.0	8.0	21.0
VEW-251	7/30/2013	8.0	3.0	8.0	27.0
VEW-252	7/31/2013	8.0	3.0	8.0	27.0
VEW-253	7/31/2013	8.0	3.0	8.0	21.0
VEW-254	7/31/2013	8.0	3.0	8.0	21.0
VEW-255	8/1/2013	8.0	3.0	8.0	23.0
VEW-256	8/1/2013	8.0	3.0	8.0	23.0
VEW-257	8/1/2013	8.0	3.0	8.0	25.0
VEW-258	8/6/2013	8.0	3.0	8.0	25.5
VEW-259	8/6/2013	8.0	3.0	8.0	25.0
VEW-260s	5/11/2013	8.0	3.0	8.0	19.0
VEW-262s	5/11/2013	8.0	3.0	8.0	19.0
VEW-264	5/13/2013	8.0	3.0	8.0	NA
VEW-265	5/13/2013	8.0	3.0	8.0	17.0
VEW-266	5/13/2013	8.0	3.0	8.0	18.0
VEW-267	5/13/2013	8.0	3.0	8.0	18.0
VEW-268	5/14/2013	8.0	3.0	8.0	18.0
VEW-269	5/14/2013	8.0	3.0	8.0	16.0
VEW-270	5/14/2013	8.0	3.0	8.0	17.0
VEW-271	7/26/2013	8.0	3.0	8.0	18.0
VEW-272	7/26/2013	8.0	3.0	8.0	18.0
VEW-273	8/6/2013	8.0	3.0	8.0	19.0
VEW-274	8/7/2013	8.0	3.0	8.0	17.0
VEW-275	8/7/2013	8.0	3.0	8.0	16.0
VEW-276	8/7/2013	8.0	3.0	8.0	18.0
VEW-277	8/8/2013	8.0	3.0	8.0	18.0
VEW-278	8/9/2013	8.0	3.0	8.0	19.5
VEW-279	8/10/2013	8.0	3.0	8.0	21.0
VEW-280	8/10/2013	8.0	3.0	8.0	22.0
VEW-281	8/10/2013	8.0	3.0	8.0	22.0
VEW-282	8/10/2013	8.0	3.0	8.0	24.5
VEW-283	8/22/2013	8.0	3.0	8.0	23.0
VEW-284	8/22/2013	8.0	3.0	8.0	22.0
VEW-285	8/23/2013	8.0	3.0	8.0	28.0
VEW-286	8/24/2013	8.0	3.0	8.0	23.0

SRSNE Site  
 Southington, CT  
 2013 Thermal Treatment System - Well Installation

Vapor Extraction Well ID	Installation Date	Installation Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Bedrock (ft bgs)
VEW-287	8/24/2013	8.0	3.0	8.0	21.0
VEW-288	8/27/2013	8.0	3.0	8.0	24.0
VEW-289	8/27/2013	8.0	3.0	8.0	24.0
VEW-290	8/27/2013	8.0	3.0	8.0	24.0
VEW-291	5/14/2013	8.0	3.0	8.0	23.0
VEW-292	5/15/2013	8.0	3.0	8.0	21.0
VEW-293	5/15/2013	8.0	3.0	8.0	19.0
VEW-294	5/15/2013	8.0	3.0	8.0	19.0
VEW-295	5/15/2013	8.0	3.0	8.0	19.0
VEW-296	5/15/2013	8.0	3.0	8.0	17.0
VEW-297	5/16/2013	8.0	3.0	8.0	18.0
VEW-298	5/16/2013	8.0	3.0	8.0	18.0
VEW-299	5/16/2013	8.0	3.0	8.0	18.0
VEW-300	5/16/2013	8.0	3.0	8.0	17.0
VEW-301	5/16/2013	8.0	3.0	8.0	17.0
VEW-302	7/26/2013	8.0	3.0	8.0	19.0
VEW-303	7/26/2013	8.0	3.0	8.0	21.0
VEW-304	8/12/2013	8.0	3.0	8.0	18.0
VEW-305	8/12/2013	8.0	3.0	8.0	22.0
VEW-306	8/12/2013	8.0	3.0	8.0	18.0
VEW-307	8/13/2013	8.0	3.0	8.0	18.0
VEW-308	8/13/2013	8.0	3.0	8.0	16.0
VEW-309	8/13/2013	8.0	3.0	8.0	19.0
VEW-310	8/13/2013	8.0	3.0	8.0	20.0
VEW-311	8/14/2013	8.0	3.0	8.0	21.0
VEW-312	8/14/2013	8.0	3.0	8.0	23.0
VEW-313	8/15/2013	8.0	3.0	8.0	24.0
VEW-314	8/22/2013	8.0	3.0	8.0	25.0
VEW-315	8/23/2013	8.0	3.0	8.0	27.0
VEW-316	8/23/2013	8.0	3.0	8.0	22.0
VEW-317	8/24/2013	8.0	3.0	8.0	21.0
VEW-318	8/26/2013	8.0	3.0	8.0	22.0
VEW-319	8/26/2013	8.0	3.0	8.0	22.0
VEW-320	8/27/2013	8.0	3.0	8.0	23.0
VEW-321	8/28/2013	8.0	3.0	8.0	24.0
VEW-322	8/28/2013	8.0	3.0	8.0	26.0
VEW-323	8/6/2013	8.0	3.0	8.0	22.0
VEW-324	8/6/2013	8.0	3.0	8.0	21.0
VEW-325	8/1/2013	8.0	3.0	8.0	22.0
VEW-326	8/1/2013	8.0	3.0	8.0	21.0
VEW-327	7/30/2013	8.0	3.0	8.0	19.0
VEW-328	7/30/2013	8.0	3.0	8.0	19.0
VEW-329	7/30/2013	8.0	3.0	8.0	18.0
VEW-330	7/30/2013	8.0	3.0	8.0	18.0
VEW-331	7/29/2013	8.0	3.0	8.0	19.0
VEW-332	7/29/2013	8.0	3.0	8.0	20.0
VEW-333	7/27/2013	8.0	3.0	8.0	18.0
VEW-334	7/27/2013	8.0	3.0	8.0	18.0
VEW-335	7/27/2013	8.0	3.0	8.0	19.0
VEW-336	8/15/2013	8.0	3.0	8.0	20.0
VEW-337	8/15/2013	8.0	3.0	8.0	17.0
VEW-338	8/20/2013	8.0	3.0	8.0	20.0
VEW-339	8/20/2013	8.0	3.0	8.0	19.0
VEW-340	8/20/2013	8.0	3.0	8.0	19.0
VEW-341	8/20/2013	8.0	3.0	8.0	19.0
VEW-342	8/21/2013	8.0	3.0	8.0	19.0
VEW-343	8/21/2013	8.0	3.0	8.0	21.0
VEW-344	8/21/2013	8.0	3.0	8.0	23.0
VEW-345	8/22/2013	8.0	3.0	8.0	25.0
VEW-346	8/28/2013	8.0	3.0	8.0	26.0
VEW-347	8/29/2013	8.0	3.0	8.0	27.0
VEW-348	9/4/2013	8.0	3.0	8.0	27.5
VEW-349	9/4/2013	8.0	3.0	8.0	21.0
VEW-350	9/4/2013	8.0	3.0	8.0	21.5
VEW-351	9/4/2013	8.0	3.0	8.0	19.0
VEW-352	9/5/2013	8.0	3.0	8.0	19.5
VEW-353	9/5/2013	8.0	3.0	8.0	19.0
VEW-354	9/5/2013	8.0	3.0	8.0	26.0
VEW-355	9/5/2013	8.0	3.0	8.0	26.5

SRSNE Site  
Southington, CT  
2013 Thermal Treatment System - Well Installation

Vapor Extraction Well ID	Installation Date	Installation Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Bedrock (ft bgs)
VEW-356	8/10/2013	8.0	3.0	8.0	22.0
VEW-357	8/10/2013	8.0	3.0	8.0	22.0
VEW-358	8/10/2013	8.0	3.0	8.0	19.0
VEW-359	8/9/2013	8.0	3.0	8.0	19.5
VEW-360	8/8/2013	8.0	3.0	8.0	21.0
VEW-361	8/8/2013	8.0	3.0	8.0	20.0
VEW-362	8/8/2013	8.0	3.0	8.0	21.0
VEW-363	8/8/2013	8.0	3.0	8.0	21.0
VEW-364	8/7/2013	8.0	3.0	8.0	22.0
VEW-365	8/6/2013	8.0	3.0	8.0	21.0
VEW-366	8/6/2013	8.0	3.0	8.0	21.0
VEW-367	7/27/2013	8.0	3.0	8.0	19.0
VEW-368	8/22/2013	8.0	3.0	8.0	22.0
VEW-369	8/23/2013	8.0	3.0	8.0	22.0
VEW-370	8/24/2013	8.0	3.0	8.0	22.0
VEW-371	8/24/2013	8.0	3.0	8.0	20.0
VEW-372	8/24/2013	8.0	3.0	8.0	21.0
VEW-373	8/24/2013	8.0	3.0	8.0	21.0
VEW-374	8/26/2013	8.0	3.0	8.0	20.0
VEW-375	8/26/2013	8.0	3.0	8.0	21.0
VEW-376	8/26/2013	8.0	3.0	8.0	21.0
VEW-377	8/27/2013	8.0	3.0	8.0	23.0
VEW-378	9/6/2013	8.0	3.0	8.0	23.0
VEW-379	9/6/2013	8.0	3.0	8.0	23.5
VEW-380	9/6/2013	8.0	3.0	8.0	21.0
VEW-381	9/6/2013	8.0	3.0	8.0	22.0
VEW-382	9/9/2013	8.0	3.0	8.0	22.5
VEW-383	9/9/2013	8.0	3.0	8.0	20.0
VEW-384	9/9/2013	8.0	3.0	8.0	19.5
VEW-385	9/9/2013	8.0	3.0	8.0	20.5
VEW-386	9/9/2013	8.0	3.0	8.0	20.0
VEW-387	9/9/2013	8.0	3.0	8.0	24.0
VEW-388	9/19/2013	8.0	3.0	8.0	28.0
VEW-389	7/25/2013	8.0	3.0	8.0	21.0
VEW-390	7/24/2013	8.0	3.0	8.0	22.0
VEW-391	7/24/2013	8.0	3.0	8.0	21.0
VEW-392	7/24/2013	8.0	3.0	8.0	21.0
VEW-393	7/24/2013	8.0	3.0	8.0	21.0
VEW-394	7/23/2013	8.0	3.0	8.0	22.0
VEW-395	4/24/2013	8.0	3.0	8.0	21.0
VEW-396	4/23/2013	8.0	3.0	8.0	22.0
VEW-397	7/18/2013	8.0	3.0	8.0	22.0
VEW-398	7/18/2013	8.0	3.0	8.0	24.0
VEW-399	4/24/2013	8.0	3.0	8.0	21.0
VEW-400	7/17/2013	8.0	3.0	8.0	21.0
VEW-401	7/17/2013	8.0	3.0	8.0	21.0
VEW-402	7/17/2013	8.0	3.0	8.0	21.0
VEW-403	7/16/2013	8.0	3.0	8.0	23.0
VEW-404	4/24/2013	8.0	3.0	8.0	23.0
VEW-405	7/16/2013	8.0	3.0	8.0	22.0
VEW-406	7/16/2013	8.0	3.0	8.0	22.0
VEW-407	7/16/2013	8.0	3.0	8.0	22.0
VEW-408	7/16/2013	8.0	3.0	8.0	23.0
VEW-409	7/15/2013	8.0	3.0	8.0	22.0
VEW-410	7/15/2013	8.0	3.0	8.0	22.0
VEW-411	7/15/2013	8.0	3.0	8.0	23.0
VEW-412	7/15/2013	8.0	3.0	8.0	23.0
VEW-413	9/11/2013	8.0	3.0	8.0	18.0
VEW-414	9/11/2013	8.0	3.0	8.0	18.0
VEW-415	9/12/2013	8.0	3.0	8.0	22.0
VEW-416	9/17/2013	8.0	3.0	8.0	22.0
VEW-417	9/17/2013	8.0	3.0	8.0	19.0
VEW-418	9/17/2013	8.0	3.0	8.0	19.0
VEW-419	9/18/2013	8.0	3.0	8.0	22.0
VEW-420	9/18/2013	8.0	3.0	8.0	23.0
VEW-422	7/13/2013	8.0	3.0	8.0	22.0
VEW-423	7/13/2013	8.0	3.0	8.0	24.0
VEW-424	5/23/2013	8.0	3.0	8.0	NA
VEW-425	5/23/2013	8.0	3.0	8.0	NA

SRSNE Site  
Southington, CT  
2013 Thermal Treatment System - Well Installation

Vapor Extraction Well ID	Installation Date	Installation Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Bedrock (ft bgs)
VEW-426	7/13/2013	8.0	3.0	8.0	24.0
VEW-427	7/9/2013	8.0	3.0	8.0	24.0
VEW-428	7/9/2013	8.0	3.0	8.0	23.0
VEW-429	6/27/2013	8.0	3.0	8.0	24.0
VEW-430	6/27/2013	8.0	3.0	8.0	25.0
VEW-431	6/21/2013	8.0	3.0	8.0	25.0
VEW-432	6/21/2013	8.0	3.0	8.0	24.0
VEW-433	6/21/2013	8.0	3.0	8.0	24.0
VEW-434	6/21/2013	8.0	3.0	8.0	22.0
VEW-435	6/21/2013	8.0	3.0	8.0	22.0
VEW-436	6/20/2013	8.0	3.0	8.0	24.0
VEW-437	6/20/2013	8.0	3.0	8.0	24.0
VEW-438	6/20/2013	8.0	3.0	8.0	24.0
VEW-439	6/20/2013	8.0	3.0	8.0	26.0
VEW-440	6/19/2013	8.0	3.0	8.0	25.0
VEW-441	6/19/2013	8.0	3.0	8.0	24.0
VEW-442	6/19/2013	8.0	3.0	8.0	23.0
VEW-443	6/19/2013	8.0	3.0	8.0	24.0
VEW-444	6/18/2013	8.0	3.0	8.0	24.0
VEW-445	4/26/2013	8.0	3.0	8.0	20.5
VEW-446	8/13/2013	8.0	3.0	8.0	21.0
VEW-447	8/13/2013	8.0	3.0	8.0	21.0
VEW-448	8/13/2013	8.0	3.0	8.0	22.0
VEW-449	8/12/2013	8.0	3.0	8.0	25.0
VEW-450	8/12/2013	8.0	3.0	8.0	24.0
VEW-451	8/12/2013	8.0	3.0	8.0	23.0
VEW-452	8/12/2013	8.0	3.0	8.0	25.0
VEW-453	9/18/2013	8.0	3.0	8.0	23.0
VEW-454	9/18/2013	8.0	3.0	8.0	22.0
VEW-455	7/25/2013	8.0	3.0	8.0	24.0
VEW-456	5/23/2013	8.0	3.0	8.0	25.0
VEW-457	5/23/2013	8.0	3.0	8.0	26.0
VEW-458	5/22/2013	8.0	3.0	8.0	25.0
VEW-459	5/22/2013	8.0	3.0	8.0	25.0
VEW-460	5/22/2013	8.0	3.0	8.0	26.0
VEW-461	5/21/2013	8.0	3.0	8.0	27.0
VEW-462	5/21/2013	8.0	3.0	8.0	25.0
VEW-463	5/21/2013	8.0	3.0	8.0	25.0
VEW-464	5/21/2013	8.0	3.0	8.0	25.0
VEW-465	5/20/2013	8.0	3.0	8.0	25.0
VEW-466	4/25/2013	8.0	3.0	8.0	23.0
VEW-467	5/21/2013	8.0	3.0	8.0	25.0
VEW-468	5/20/2013	8.0	3.0	8.0	23.0
VEW-469	5/20/2013	8.0	3.0	8.0	25.0
VEW-470	5/18/2013	8.0	3.0	8.0	26.0
VEW-471	4/25/2013	8.0	3.0	8.0	25.0
VEW-472	5/18/2013	8.0	3.0	8.0	25.0
VEW-473	5/18/2013	8.0	3.0	8.0	24.0
VEW-474	5/18/2013	8.0	3.0	8.0	22.0
VEW-475	5/17/2013	8.0	3.0	8.0	26.5
VEW-476	4/25/2013	8.0	3.0	8.0	25.5
VEW-477	5/17/2013	8.0	3.0	8.0	26.0
VEW-478	5/17/2013	8.0	3.0	8.0	26.0
VEW-479	5/17/2013	8.0	3.0	8.0	23.0
VEW-480	8/13/2013	8.0	3.0	8.0	21.0
VEW-481	8/14/2013	8.0	3.0	8.0	21.0
VEW-482	8/14/2013	8.0	3.0	8.0	23.0
VEW-483	8/14/2013	8.0	3.0	8.0	23.0
VEW-484	8/14/2013	8.0	3.0	8.0	22.0
VEW-485	8/13/2013	8.0	3.0	8.0	20.0
VEW-486	9/5/2013	8.0	3.0	8.0	21.0
VEW-487	9/5/2013	8.0	3.0	8.0	24.0
VEW-488s	5/30/2013	8.0	3.0	8.0	24.0
VEW-490	5/31/2013	8.0	3.0	8.0	23.0
VEW-491	5/31/2013	8.0	3.0	8.0	23.0
VEW-492	5/31/2013	8.0	3.0	8.0	24.0
VEW-493	5/31/2013	8.0	3.0	8.0	24.0
VEW-494	6/1/2013	8.0	3.0	8.0	25.0
VEW-495	6/1/2013	8.0	3.0	8.0	25.0

SRSNE Site  
 Southington, CT  
 2013 Thermal Treatment System - Well Installation

Vapor Extraction Well ID	Installation Date	Installation Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Bedrock (ft bgs)
VEW-496	6/1/2013	8.0	3.0	8.0	25.0
VEW-497	6/1/2013	8.0	3.0	8.0	25.0
VEW-498	6/3/2013	8.0	3.0	8.0	24.0
VEW-499	6/3/2013	8.0	3.0	8.0	23.0
VEW-500	6/3/2013	8.0	3.0	8.0	24.0
VEW-501	6/4/2013	8.0	3.0	8.0	25.0
VEW-502	6/4/2013	8.0	3.0	8.0	25.0
VEW-503	6/4/2013	8.0	3.0	8.0	25.0
VEW-504	6/4/2013	8.0	3.0	8.0	25.0
VEW-505	6/5/2013	8.0	3.0	8.0	24.0
VEW-506	6/5/2013	8.0	3.0	8.0	24.0
VEW-507	6/5/2013	8.0	3.0	8.0	23.0
VEW-508	6/5/2013	8.0	3.0	8.0	25.0
VEW-509	6/6/2013	8.0	3.0	8.0	24.0
VEW-510	6/11/2013	8.0	3.0	8.0	25.0
VEW-511	6/11/2013	8.0	3.0	8.0	25.0
VEW-512	8/15/2013	8.0	3.0	8.0	25.0
VEW-513	8/15/2013	8.0	3.0	8.0	21.0
VEW-514	8/20/2013	8.0	3.0	8.0	23.0
VEW-515	8/20/2013	8.0	3.0	8.0	21.0
VEW-516	8/21/2013	8.0	3.0	8.0	22.0
VEW-517	8/21/2013	8.0	3.0	8.0	21.0
VEW-518	8/21/2013	8.0	3.0	8.0	20.0
VEW-519	9/9/2013	8.0	3.0	8.0	22.0
VEW-520	6/18/2013	8.0	3.0	8.0	25.0
VEW-521	6/18/2013	8.0	3.0	8.0	25.0
VEW-522	6/17/2013	8.0	3.0	8.0	25.0
VEW-523	6/17/2013	8.0	3.0	8.0	27.0
VEW-524	6/17/2013	8.0	3.0	8.0	27.0
VEW-525	6/17/2013	8.0	3.0	8.0	26.0
VEW-526	6/15/2013	8.0	3.0	8.0	25.0
VEW-527	6/15/2013	8.0	3.0	8.0	26.0
VEW-528	6/11/2013	8.0	3.0	8.0	25.0
VEW-529	6/11/2013	8.0	3.0	8.0	24.0
VEW-530	6/12/2013	8.0	3.0	8.0	25.0
VEW-531	6/12/2013	8.0	3.0	8.0	24.0
VEW-532	6/12/2013	8.0	3.0	8.0	24.0
VEW-533	6/12/2013	8.0	3.0	8.0	25.0
VEW-534	6/12/2013	8.0	3.0	8.0	26.0
VEW-535	6/13/2013	8.0	3.0	8.0	27.0
VEW-536	6/13/2013	8.0	3.0	8.0	25.0
VEW-537	6/14/2013	8.0	3.0	8.0	24.0
VEW-538	6/14/2013	8.0	3.0	8.0	24.0
VEW-539	6/14/2013	8.0	3.0	8.0	23.0
VEW-540	6/14/2013	8.0	3.0	8.0	24.0
VEW-541	6/15/2013	8.0	3.0	8.0	25.0
VEW-542	6/26/2013	8.0	3.0	8.0	28.0
VEW-543	8/22/2013	8.0	3.0	8.0	26.0
VEW-544	8/22/2013	8.0	3.0	8.0	25.0
VEW-545	8/22/2013	8.0	3.0	8.0	24.0
VEW-546	8/27/2013	8.0	3.0	8.0	21.0
VEW-547	8/28/2013	8.0	3.0	8.0	20.0
VEW-548	8/28/2013	8.0	3.0	8.0	19.0
VEW-549s	9/5/2013	8.0	3.0	8.0	20.0
VEW-594	7/10/2013	8.0	3.0	8.0	23.0
VEW-595	7/10/2013	8.0	3.0	8.0	22.0
VEW-596	9/10/2013	8.0	3.0	8.0	26.0
VEW-598	7/11/2013	8.0	3.0	8.0	23.0
VEW-599	7/11/2013	8.0	3.0	8.0	24.0
VEW-600	9/10/2013	8.0	3.0	8.0	21.0
VEW-601	9/10/2013	8.0	3.0	8.0	21.0
VEW-602	9/9/2013	8.0	3.0	8.0	20.0
VEW-603	9/9/2013	8.0	3.0	8.0	23.0
VEW-604	9/9/2013	8.0	3.0	8.0	22.0
VEW-605	9/10/2013	8.0	3.0	8.0	20.0
VEW-606	9/10/2013	8.0	3.0	8.0	20.0
VEW-607	9/10/2013	8.0	3.0	8.0	21.0

Temperature  
Monitoring Points

SRSNE Site  
Southington, CT  
2013 Thermal Treatment System - Well Installation

Temperature Monitoring Point ID	Installation Date	Installation Depth (ft bgs)	Interpreted Top of Bedrock (ft bgs)
TMP-001	4/24/2013	18.0	16.0
TMP-002	5/11/2013	18.0	11.5
TMP-003	5/29/2013	15.0	13.0
TMP-004	5/15/2013	20.0	18.0
TMP-005	5/14/2013	19.0	17.5
TMP-006	6/15/2013	14.0	12.0
TMP-007	6/3/2013	17.0	15.0
TMP-008	5/16/2013	20.0	18.0
TMP-009	6/11/2013	21.0	19.0
TMP-010	6/14/2013	20.0	18.0
TMP-011	6/24/2013	22.0	20.0
TMP-012	6/20/2013	17.0	15.0
TMP-013	6/20/2013	17.0	14.0
TMP-014	5/20/2013	24.0	22.0
TMP-015	5/20/2013	20.0	18.0
TMP-016	5/21/2013	21.0	18.5
TMP-017	6/3/2013	21.0	19.0
TMP-018	7/10/2013	23.0	21.0
TMP-019	7/9/2013	25.0	23.0
TMP-020	7/11/2013	25.0	23.0
TMP-021	6/24/2013	24.0	22.0
TMP-022	7/17/2013	22.0	20.0
TMP-023	7/23/2013	21.0	19.0
TMP-024	5/9/2013	20.0	18.0
TMP-025	6/25/2013	22.0	20.0
TMP-026	6/25/2013	21.0	19.0
TMP-027	4/30/2013	19.0	15.0
TMP-028	4/30/2013	21.0	19.0
TMP-030	4/27/2013	19.0	17.0
TMP-031	7/25/2013	26.0	24.0
TMP-032	7/26/2013	25.0	23.0
TMP-033	5/13/2013	20.0	18.0
TMP-034	5/13/2013	19.0	17.0
TMP-035	5/14/2013	21.0	19.0
TMP-036	7/26/2013	19.0	17.0
TMP-037	8/7/2013	17.0	15.0
TMP-038	6/24/2013	21.0	19.0
TMP-039	7/29/2013	23.0	21.0
TMP-040	8/10/2013	27.0	25.0

Temperature  
Monitoring Points

SRSNE Site  
Southington, CT  
2013 Thermal Treatment System - Well Installation

Temperature Monitoring Point ID	Installation Date	Installation Depth (ft bgs)	Interpreted Top of Bedrock (ft bgs)
TMP-041	7/31/2013	24.0	22.0
TMP-042	8/27/2013	25.0	23.0
TMP-043	8/1/2013	25.0	23.0
TMP-044	7/31/2013	21.0	19.0
TMP-045	7/30/2013	21.0	19.0
TMP-046	7/29/2013	21.0	19.0
TMP-047	7/27/2013	21.0	19.0
TMP-048	8/20/2013	20.0	18.0
TMP-049	8/13/2013	19.0	17.0
TMP-050	8/21/2013	21.0	19.0
TMP-051	8/14/2013	23.0	21.0
TMP-052	8/22/2013	26.0	24.0
TMP-053	8/29/2013	29.0	26.5
TMP-054	8/24/2013	30.0	28.0
TMP-055	9/4/2013	23.5	21.5
TMP-056	9/5/2013	21.5	19.5
TMP-057	8/10/2013	22.0	20.0
TMP-058	8/8/2013	22.0	20.0
TMP-059	8/7/2013	25.0	23.0
TMP-060	8/23/2013	25.0	23.0
TMP-061	8/26/2013	22.0	20.0
TMP-062	8/27/2013	24.0	22.0
TMP-063	9/11/2013	23.0	21.0
TMP-064	9/11/2013	23.0	19.0
TMP-065	9/17/2013	22.0	20.0
TMP-066	9/18/2013	23.0	21.0
TMP-068	6/27/2013	28.0	24.0
TMP-069	7/17/2013	25.0	23.0
TMP-067	7/12/2013	27.0	25.0
TMP-070	6/22/2013	25.0	23.0
TMP-071	6/22/2013	26.0	24.0
TMP-072	6/19/2013	25.0	23.0
TMP-073	6/22/2013	25.0	23.0
TMP-074	5/22/2013	27.0	25.0
TMP-075	6/3/2013	28.0	26.0
TMP-076	5/29/2013	25.0	23.0
TMP-077	5/29/2013	29.0	27.0
TMP-078	5/29/2013	25.0	23.0
TMP-079	5/29/2013	25.0	23.0



Temperature  
Monitoring Points

SRSNE Site  
Southington, CT  
2013 Thermal Treatment System - Well Installation

Temperature Monitoring Point ID	Installation Date	Installation Depth (ft bgs)	Interpreted Top of Bedrock (ft bgs)
TMP-080	8/20/2013	28.0	26.0
TMP-081	8/15/2013	25.0	23.0
TMP-082	8/14/2013	26.0	24.0
TMP-083	8/13/2013	23.0	21.0
TMP-084	9/19/2013	23.0	21.0
TMP-085	8/28/2013	25.0	21.0
TMP-086	9/5/2013	21.0	19.0
TMP-087	9/10/2013	27.5	25.5
TMP-088	9/10/2013	25.0	23.0
TMP-089	9/10/2013	24.5	22.5
TMP-090	9/10/2013	28.5	26.5
TMP-091	9/10/2013	29.5	27.5
TMP-092	9/9/2013	26.0	24.0
TMP-093	9/6/2013	29.0	25.0
TMP-094	9/20/2013	26.0	24.0
TMP-095	9/24/2013	26.0	24.0
TMP-096	9/10/2013	29.5	27.5
TMP-097	9/21/2013	30.0	26.0
TMP-098	9/23/2013	28.0	26.0
TMP-099	9/10/2013	23.0	21.0
TMP-196	4/29/2013	20.0	18.0
TMP-198	4/27/2013	19.0	16.5

Pressure  
Monitoring Points

SRSNE Site  
Southington, CT  
2013 Thermal Treatment System - Well Installation

Pressure Monitoring Point ID	Installation Date	Installation Depth (ft bgs)
PMP-001	4/24/2013	7.0
PMP-006	6/15/2013	7.0
PMP-008	5/16/2013	12.0
PMP-011	6/20/2013	12.0
PMP-013	6/20/2013	12.0
PMP-014	5/20/2013	12.0
PMP-015	5/20/2013	12.0
PMP-019	7/9/2013	12.0
PMP-023	7/23/2013	12.0
PMP-025	6/25/2013	12.0
PMP-028	4/30/2013	12.0
PMP-030	4/27/2013	12.0
PMP-031	7/25/2013	12.0
PMP-033	5/11/2013	12.0
PMP-034	5/13/2013	12.0
PMP-035	5/14/2013	12.0
PMP-039	7/29/2013	12.0
PMP-042	8/26/2013	12.0
PMP-043	8/1/2013	12.0
PMP-044	7/30/2013	12.0
PMP-049	8/13/2013	12.0
PMP-051	8/14/2013	8.0
PMP-052	8/21/2013	12.0
PMP-053	8/29/2013	12.0
PMP-054	8/24/2013	12.0
PMP-056	9/5/2013	12.0
PMP-058	8/8/2013	12.0
PMP-060	8/22/2013	12.0
PMP-061	8/24/2013	12.0
PMP-064	9/12/2013	12.0
PMP-065	9/17/2013	12.0
PMP-067	7/15/2013	12.0
PMP-069	7/17/2013	12.0
PMP-071	6/22/2013	12.0
PMP-073	6/22/2013	12.0
PMP-078	5/30/2013	12.0
PMP-080	8/20/2013	12.0
PMP-083	8/14/2013	12.0
PMP-085	8/29/2013	12.0

Pressure  
Monitoring Points

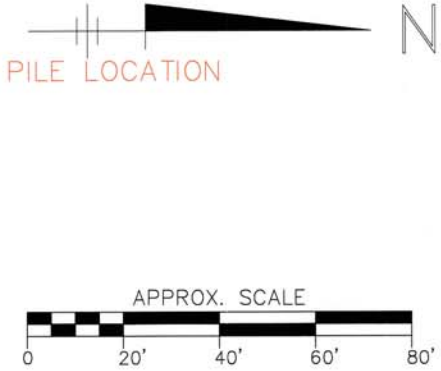
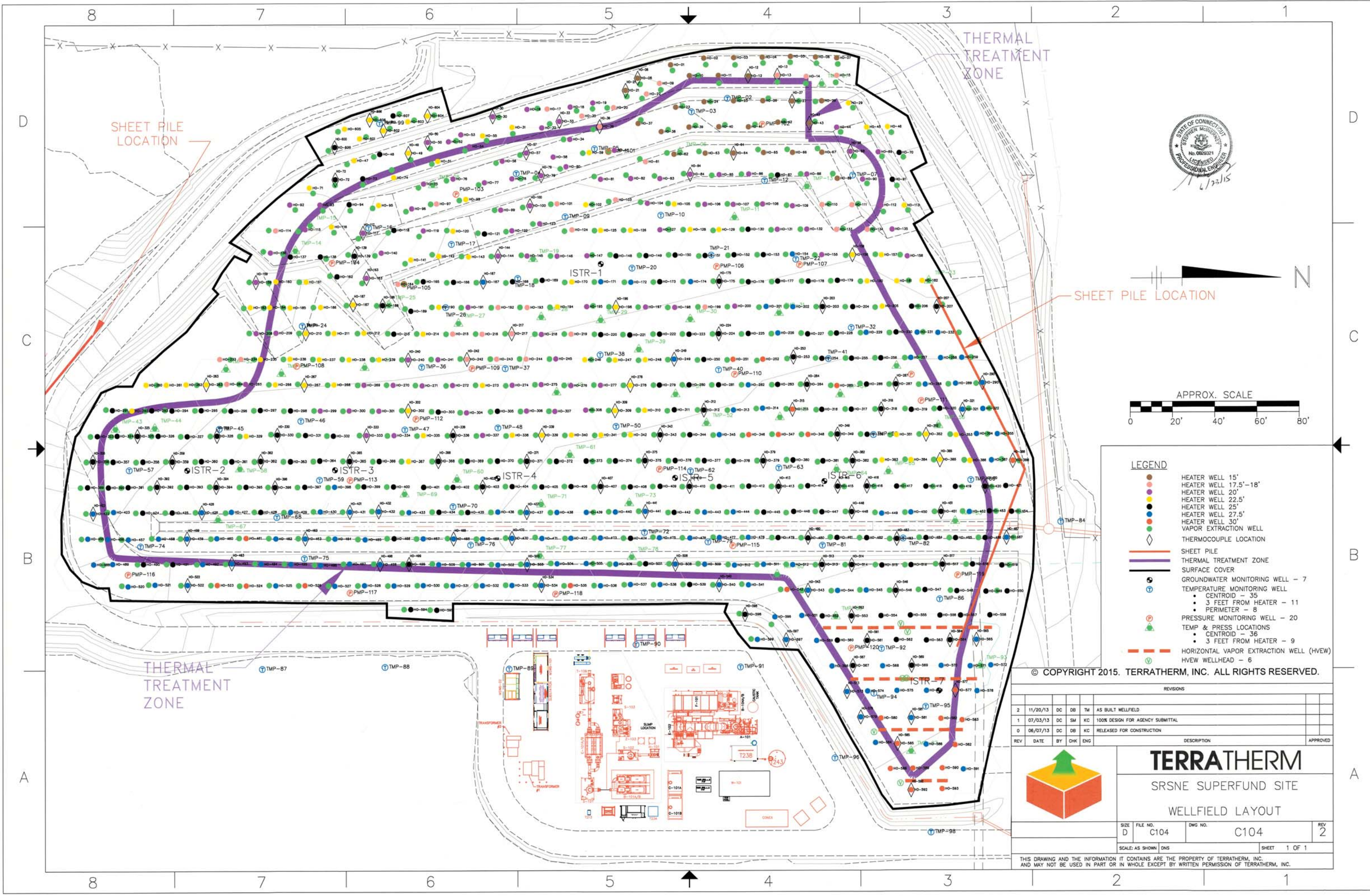
SRSNE Site  
Southington, CT  
2013 Thermal Treatment System - Well Installation

Pressure Monitoring Point ID	Installation Date	Installation Depth (ft bgs)
PMP-093	9/20/2013	12.0
PMP-097	9/21/2013	12.0
PMP-101	5/14/2013	7.0
PMP-102	5/11/2013	7.0
PMP-103	5/17/2013	12.0
PMP-104	5/22/2013	12.0
PMP-105	5/23/2013	12.0
PMP-107	7/17/2013	12.0
PMP-108	7/11/2013	12.0
PMP-109	8/7/2013	8.0
PMP-110	8/10/2013	12.0
PMP-111	8/28/2013	12.0
PMP-112	7/26/2013	12.0
PMP-113	8/6/2013	12.0
PMP-114	8/26/2013	12.0
PMP-115	5/23/2013	12.0
PMP-116	8/20/2013	12.0
PMP-117	6/15/2013	12.0
PMP-118	6/13/2013	12.0
PMP-119	8/28/2013	12.0
PMP-120	9/9/2013	12.0
PMP-196	4/29/2013	12.0
PMP-198	4/27/2013	12.0



**ATTACHMENT B**

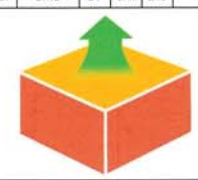
**As-Built Drawings**



- LEGEND**
- HEATER WELL 15'
  - HEATER WELL 17.5'-18'
  - HEATER WELL 20'
  - HEATER WELL 22.5'
  - HEATER WELL 25'
  - HEATER WELL 27.5'
  - HEATER WELL 30'
  - VAPOR EXTRACTION WELL
  - ◇ THERMOCOUPLE LOCATION
  - SHEET PILE
  - THERMAL TREATMENT ZONE
  - SURFACE COVER
  - GROUNDWATER MONITORING WELL - 7
  - TEMPERATURE MONITORING WELL
    - CENTROID - 35
    - 3 FEET FROM HEATER - 11
    - PERIMETER - 8
  - PRESSURE MONITORING WELL - 20
  - TEMP & PRESS LOCATIONS
    - CENTROID - 36
    - 3 FEET FROM HEATER - 9
  - HORIZONTAL VAPOR EXTRACTION WELL (HVEW)
  - HVEW WELLHEAD - 6

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REV	DATE	BY	CHK	ENG	DESCRIPTION	APPROVED
2	11/20/13	DC	DB	TM	AS BUILT WELLFIELD	
1	07/03/13	DC	SM	KC	100% DESIGN FOR AGENCY SUBMITTAL	
0	06/07/13	DC	DB	KC	RELEASED FOR CONSTRUCTION	



# TERRATHERM

SRSNE SUPERFUND SITE  
WELLFIELD LAYOUT

SIZE	FILE NO.	DWG NO.	REV
D	C104	C104	2
SCALE: AS SHOWN DWS			SHEET 1 OF 1

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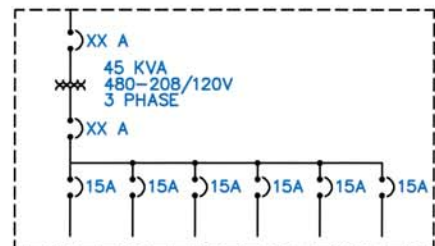
ELECTRICAL ONELINE LEGEND (SMART SYMBOL)

TERRATHERM FREQUENTLY USED TERMS AND SYMBOLS

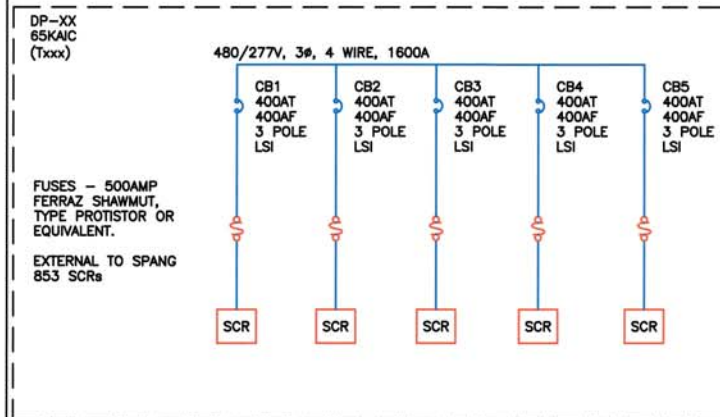
- A - AMPERE
- AMP - AMPERE
- ATS - AUTOMATIC TRANSFER SWITCH
- C.S. - CARBON STEEL
- DP - DISTRIBUTION PANEL
- FLA - FULL LOAD AMPS. MOTOR FLA ARE SPECIFIED PER NEC 430.250
- GFCI - GROUND FAULT CIRCUIT INTERRUPTER
- KVA - KILOVOLT-AMPERE
- KW - KILOWATTS
- KWHR - KILOWATT-HOUR
- LC - LOAD CENTER
- LCP - LOCAL CONTROL PANEL
- MSWB - MAIN SWITCHBOARD
- OWS - OIL WATER SEPARATOR
- SCR - SILICON CONTROLLED RECTIFIER
- T(XXX) - TERRATHERM EQUIPMENT IDENTIFICATION NUMBER
- V - VOLTS
- VFD - VARIABLE FREQUENCY DRIVE
- XX/XXX - PLACE HOLDER - INFORMATION TO BE ADDED FOR SPECIFIC PROJECT
- WIRE TERMINATION / CONNECTION POINT
- ELECTRICAL CONDUCTOR / WIRE
- ⊃ SEMI-CONDUCTOR FUSE
- HEATER ELEMENT AS REPRESENTED IN ONELINE. LETTER IN HEXAGON DENOTES HEATER TYPE.
- HEAT TRACE FOR PIPING
- VFD XX HP VARIABLE FREQUENCY DRIVE(VFD) WITH DISCONNECT SWITCH AT PANEL. VFD RATING AS NOTED
- XX FLA XXX MOTOR. HORSEPOWER AS INDICATED IN CIRCLE. FULL LOAD AMPS (FLA) AS NOTED PER APPLICABLE NEC TABLE.
- XX KW STANDBY GENERATOR. KW RATING AS NOTED.
- XXX : XXX V VOLTAGE TRANSFORMER, TYPICALLY USED FOR METERING. VOLTAGE RATIO AS NOTED.
- XXX : 5 A CURRENT TRANSFORMER, TYPICALLY USED FOR METERING. CURRENT TRANSFORMER RATIO AND POLARITY AS NOTED.
- ENERGY METER (KWHR) MODEL AS NOTED
- KVA PRI\_VOLT:480/277V AND % IMPEDANCE AS NOTED
- EQUIPMENT SKID BOUNDARY
- ATS-1 XXX A AUTOMATIC TRANSFER SWITCH. SWITCH AMP RATING AS NOTED
- RATED HP @460V FLA X - X XX AMPS MAX UL COMBINATION STARTER TYPE E, SELF-PROTECTED OR TYPE F. FULL LOAD AMP RATING ADJUSTABLE IN SPECIFIED RANGE.

ELECTRICAL ONELINE LEGEND (SMART SYMBOL - INTEGRATED EQUIPMENT)

- CB # AMP 3 POLES LOW VOLTAGE AIR CIRCUIT BREAKER WITH RATING AND NUMBER OF POLES AS NOTED. NON-ADJUSTABLE TYPE.
- CB # XX AT XX AF 3 POLES LOW VOLTAGE AIR CIRCUIT BREAKER WITH RATING AND NUMBER OF POLES AS NOTED. TRIP RATING ADJUSTABLE TYPE.
- CB # XX AT XX AF 3 POLES LSI LOW VOLTAGE AIR CIRCUIT BREAKER WITH RATING AND NUMBER OF POLES AS NOTED. TRIP RATING ADJUSTABLE TYPE. PROTECTION TO BE SPECIFIED AS REQUIRED.
- CB # XX AT XX AF 3 POLES LSI LOW VOLTAGE AIR CIRCUIT BREAKER WITH RATING AND NUMBER OF POLES AS NOTED. TRIP RATING ADJUSTABLE TYPE. PROTECTION TO BE SPECIFIED AS REQUIRED. DRAWOUT TYPE.
- CB # XX AT XX AF 3 POLES LSI MEDIUM VOLTAGE VACUUM CIRCUIT BREAKER WITH RATING AND NUMBER OF POLES AS NOTED. TRIP RATING ADJUSTABLE. PROTECTION TO BE SPECIFIED AS REQUIRED. DRAWOUT TYPE.
- XXX AMP FUSE TYPE FUSE RATING AND TYPE AS NOTED.
- XXX A - SWITCH XXX AMP FUSE FUSE\_TYPE FUSED DISCONNECT SWITCH WITH SWITCH RATING, FUSE RATING AND TYPE AS NOTED.



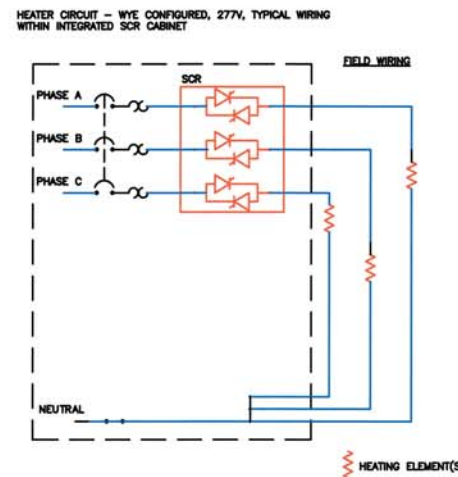
INTEGRATED PANEL WITH TRANSFORMER ASSEMBLY. PRIMARY AND SECONDARY BREAKERS AS NOTED. DISTRIBUTION PANEL CONTAINS BREAKERS AS NOTED.



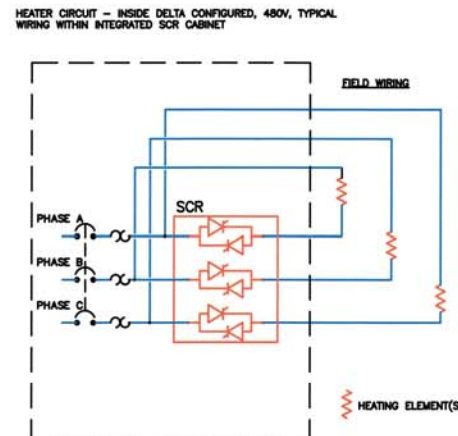
INTEGRATED DISTRIBUTION PANEL WITH BUILT-IN SCR CABINETS / ZONES. EACH ZONE HAS CUSTOMIZABLE PROTECTION FOR THE HEATER CIRCUIT AND THE SCR.

SCR POWER WIRING SCHEMATICS

HEATER CIRCUIT - WYE CONFIGURED, 277V



HEATER CIRCUIT - INSIDE DELTA CONFIGURED, 480V



- GFCI WP GROUND FAULT CIRCUIT INTERRUPTER DUPLEX OUTLET WITH WEATHERPROOF COVER.
- EMERGENCY STOP - PUSHBUTTON STATION
- LIGHT POLE WITH GFCI DUPLEX RECEPTACLE

GENERAL NOTES

THE FOLLOWING NOTES ARE APPLICABLE TO ALL ELECTRICAL DRAWINGS, OR E-SERIES, UNLESS SPECIFICALLY STATED OTHERWISE ON THE SPECIFIC DRAWING. THE FOLLOWING IS NOT AN ALL-INCLUSIVE LIST OF RELEVANT CODE APPLICABLE TO THIS PROJECT BUT IS INTENDED TO HIGHLIGHT THE MAJOR SECTIONS ONLY.

GENERAL NOTES:

- TERRATHERM WILL PROVIDE ALL FLEXIBLE CORDS AND CONNECTORS FOR EQUIPMENT SHOWN ON DRAWING. CONTRACTOR MAY BE REQUESTED TO PROVIDE ADDITIONAL MATERIAL ON A T&M BASIS AS SITE CONDITION CHANGES.
- TERRATHERM'S ELECTRICAL DESIGNS ARE BASED ON ARTICLE 590, TEMPORARY INSTALLATION, OF THE NATIONAL ELECTRIC CODE, 2011. ALL TEMPORARY WIRING AND EQUIPMENT WILL BE REMOVED AT THE CONCLUSION OF THE PROJECT. ALL CABLE SHALL BE LISTED FOR HARD OR EXTRA-HARD USAGE PER ARTICLE REQUIREMENT.
- TYPE "W" AND TYPE "G-GC" ARE CLASSIFIED FOR EXTRA HARD USAGE PER NEC TABLE 400-4. TYPE "W" AND TYPE "G-GC" CABLE AMPACITY ARE SPECIFIED PER NEC ARTICLE 400-5(A)(2) USING 75 DEGREE C COLUMN F3 FOR THREE-CONDUCTOR (3/C) CABLES. COLUMN D1 IS USED FOR SINGLE-CONDUCTOR (1/C) WHERE THE CONDUCTOR IS NOT IN PHYSICAL CONTACT WITH EACH OTHER.
- ALL CABLE SHALL BE BOTTOM ENTRY WHEREVER PRACTICAL. PER NEC 110.14, ALL TERMINALS OF EQUIPMENT >100A ARE ASSUMED TO BE 75C RATED UNLESS OTHERWISE NOTED.
- GROUNDING SHALL BE INSTALLED PER NEC ARTICLE 250 - "GROUNDING AND BONDING FOR ALL EQUIPMENT". ROUTE ALL HEATER CIRCUIT EQUIPMENT GROUNDS WITH THE HEATER CIRCUIT CONDUCTORS TO EACH WELLHEAD. REFERENCE TYPICAL GROUNDING DETAILS FOR ADDITIONAL INFORMATION.
- THE GROUNDING ELECTRODE CONDUCTOR FOR A SEPARATELY DERIVED SYSTEM (TRANSFORMER) SHALL BE INSTALLED AT THE FIRST DISCONNECTING MEAN PER NEC ARTICLE 250.30.
- GENERATOR SHALL BE WIRED PER NEC ARTICLE 702, OPTIONAL STANDBY SYSTEMS. THE GENERATOR WILL BE WIRED TO A THREE (3) POLE TYPE AUTOMATIC TRANSFER SWITCH (ATS) AND SHOULD BE WIRED AS A NON-SEPARATELY DERIVED SYSTEM, I.E. DO NOT BOND NEUTRAL AT GENERATOR. WIRE EMERGENCY STOP SIGNAL TO PREVENT GENERATOR START DURING AN EMERGENCY. EMERGENCY STOP SIGNAL SHALL ALSO BE WIRED TO SHUNT TRIP THE MAIN BREAKER(S).
- MAINTAIN WORKING CLEARANCE PER NEC ARTICLE 110.26 - "SPACES ABOUT ELECTRICAL EQUIPMENT".
- ALL POWER DISTRIBUTION EQUIPMENT SHALL BE UL LISTED OR CERTIFIED BY A 3RD PARTY NRTL.
- ALL PROCESS EQUIPMENT CONTROL PANELS SHALL BE BUILT TO APPLICABLE UL STANDARDS SUCH AS UL 508, UL 698. EQUIPMENT MAY BE FIELD EVALUATED BY A NRTL IF THE ABOVE STANDARD IS NOT AVAILABLE.
- EQUIPMENT WITH "A" AND "B" TAG SUCH AS P-101A AND P-101B ARE NON-COINCIDENTAL LOADS.
- USE THE FOLLOWING COLOR CODES FOR CONDUCTOR IDENTIFICATION:
 

	208Y / 120 VOLT	480 / 277 VOLT
PHASE A	BLACK	BROWN
PHASE B	RED	ORANGE
PHASE C	BLUE	YELLOW
NEUTRAL	WHITE	GRAY
- ALL WORK SHALL CONFORM TO THE LATEST LOCAL, STATE AND FEDERAL REQUIREMENTS AS INTERPRETED BY THE AUTHORITY HAVING JURISDICTION

SITE SPECIFIC NOTES:

- AMPACITIES OF CABLE ARE CORRECTED FOR A MAX AMBIENT TEMPERATURE OF 91 DEGREE F
- THE AVAILABLE FAULT CURRENT IS ASSUMED TO BE BELOW 65KAIC. EXACT FIGURE TO BE PROVIDED BY UTILITY.

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REVISIONS				
REV	DATE	BY	CHK	ENG
0	8/22/2015	RH	WL	WL

DESCRIPTION APPROVED

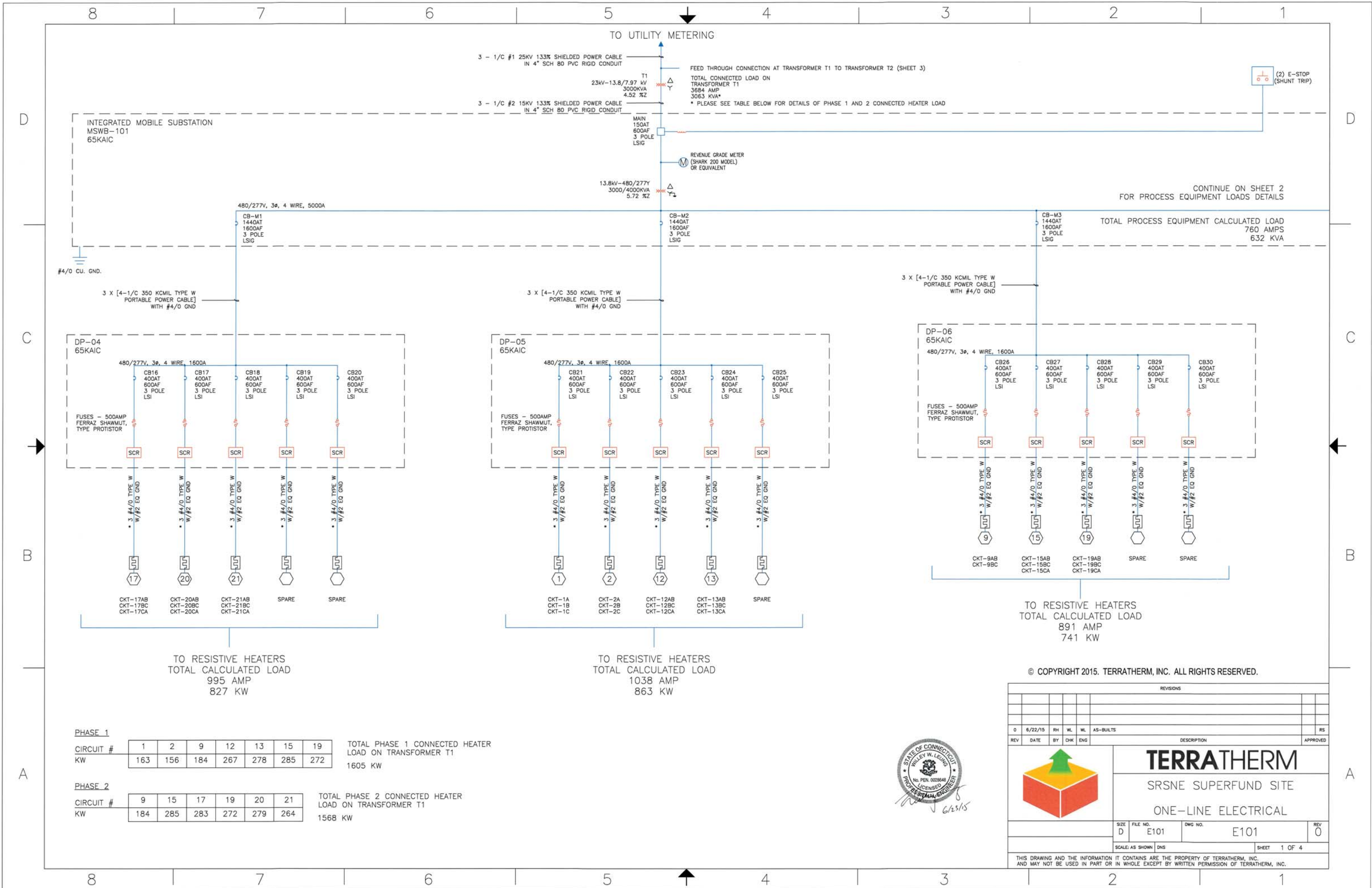
SRSNE SUPERFUND SITE  
ELECTRICAL LEGEND

SIZE D FILE NO. E100 DWG NO. E100 REV 0

SCALE: NTS DNS SHEET 1 OF 1

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TO UTILITY METERING

3 - 1/C #1 25KV 133% SHIELDED POWER CABLE IN 4" SCH 80 PVC RIGID CONDUIT  
 23KV-13.8/7.97 KV 3000KVA 4.52 %Z  
 T1  
 FEED THROUGH CONNECTION AT TRANSFORMER T1 TO TRANSFORMER T2 (SHEET 3)  
 TOTAL CONNECTED LOAD ON TRANSFORMER T1  
 3684 AMP  
 3063 KVA\*  
 \* PLEASE SEE TABLE BELOW FOR DETAILS OF PHASE 1 AND 2 CONNECTED HEATER LOAD

(2) E-STOP (SHUNT TRIP)

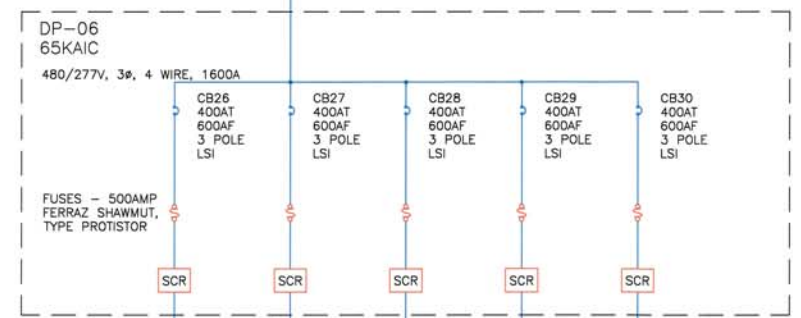
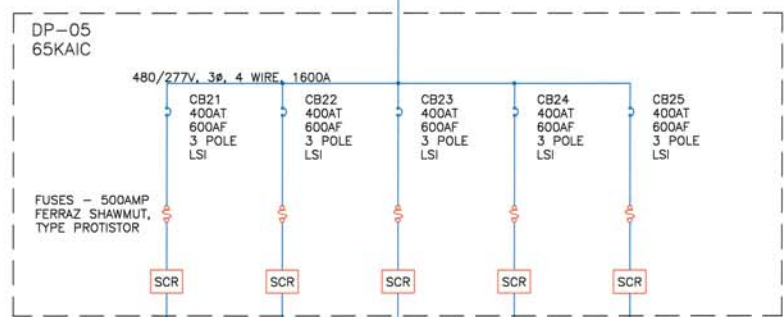
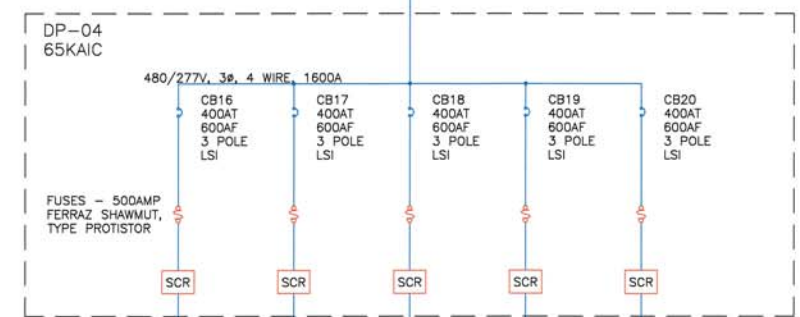
INTEGRATED MOBILE SUBSTATION MSWB-101 65KAIC

MAIN 150AT 600AF 3 POLE LSI  
 REVENUE GRADE METER (SHARK 200 MODEL) OR EQUIVALENT  
 13.8KV-480/277Y 3000/4000KVA 5.72 %Z

CONTINUE ON SHEET 2 FOR PROCESS EQUIPMENT LOADS DETAILS

TOTAL PROCESS EQUIPMENT CALCULATED LOAD 760 AMPS 632 KVA

#4/0 CU. GND.



TO RESISTIVE HEATERS  
 TOTAL CALCULATED LOAD  
 995 AMP  
 827 KW

TO RESISTIVE HEATERS  
 TOTAL CALCULATED LOAD  
 1038 AMP  
 863 KW

TO RESISTIVE HEATERS  
 TOTAL CALCULATED LOAD  
 891 AMP  
 741 KW

PHASE 1

CIRCUIT #	1	2	9	12	13	15	19
KW	163	156	184	267	278	285	272

TOTAL PHASE 1 CONNECTED HEATER LOAD ON TRANSFORMER T1  
 1605 KW

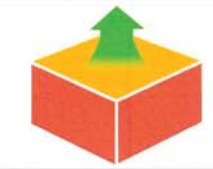
PHASE 2

CIRCUIT #	9	15	17	19	20	21
KW	184	285	283	272	279	264

TOTAL PHASE 2 CONNECTED HEATER LOAD ON TRANSFORMER T1  
 1568 KW

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REVISIONS						
REV	DATE	BY	CHK	ENG	DESCRIPTION	APPROVED
0	6/22/15	RH	WL	WL	AS-BUILTS	RS



**TERRATHERM**  
 SRSNE SUPERFUND SITE  
 ONE-LINE ELECTRICAL

SIZE	D	FILE NO.	E101	DWG NO.	E101	REV	0
SCALE:	AS SHOWN	DNS	SHEET		1 OF 4		

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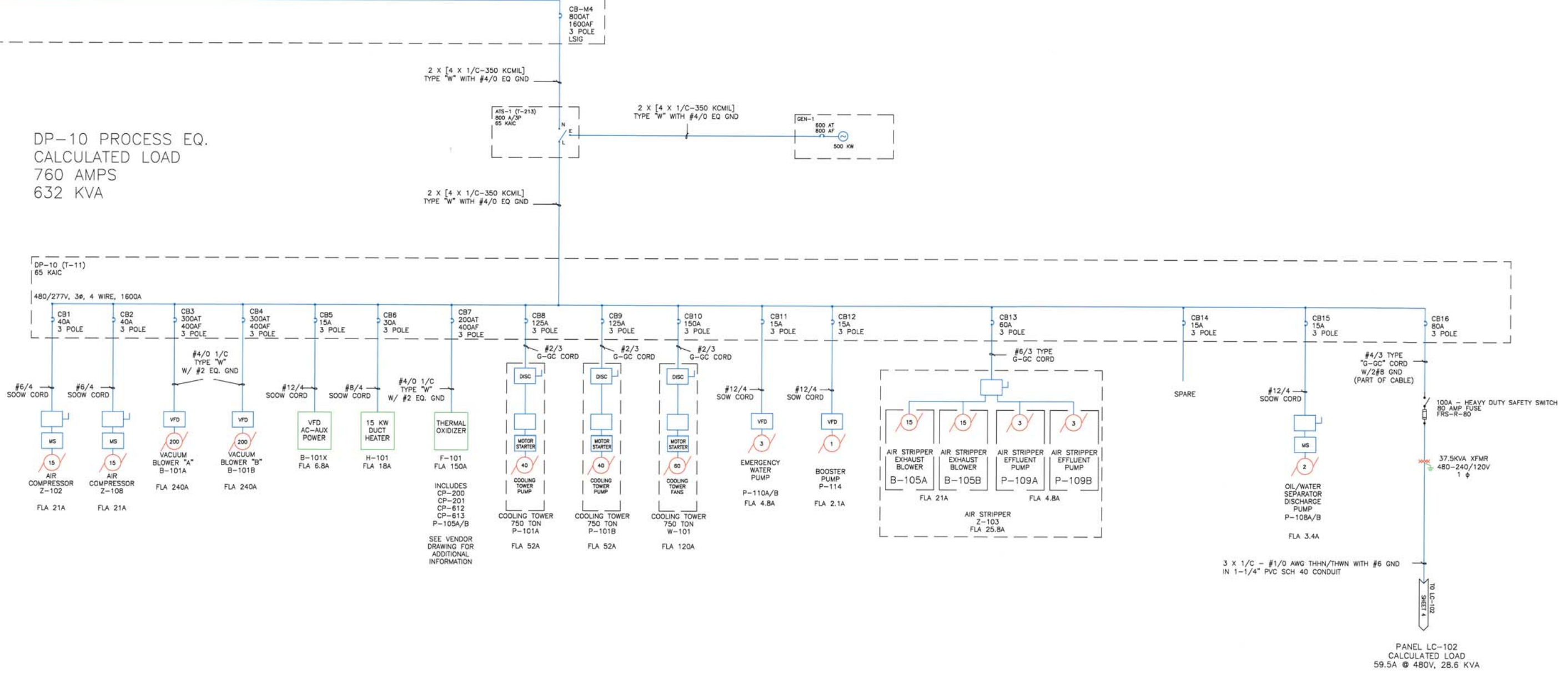
INTEGRATED MOBILE SUBSTATION  
MSWB-101  
65KAIC

SEE E101 SHEET 1  
FOR ADDITIONAL DETAILS

DP-10 PROCESS EQ.  
CALCULATED LOAD  
760 AMPS  
632 KVA

DP-10 (T-11)  
65 KAIC

480/277V, 3Ø, 4 WIRE, 1600A



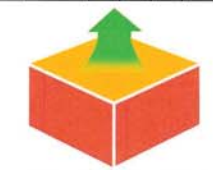
PANEL LC-102  
CALCULATED LOAD  
59.5A @ 480V, 28.6 KVA

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REVISIONS					
REV	DATE	BY	CHK	ENG	DESCRIPTION
0	6/22/15	RH	WL	WL	AS-BUILTS

APPROVED	<b>TERRATHERM</b>			
	SRSNE SUPERFUND SITE			
	ONE-LINE ELECTRICAL			
SIZE	FILE NO.	DWG NO.	REV	
D	E101	E101	0	
SCALE: AS SHOWN DNS			SHEET 2 OF 4	



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TO FEED THROUGH FROM TRANSFORMER T1 (SHEET 1)

3 - 1/C #1 25KV 133% SHIELDED POWER CABLE  
IN 4" SCH 80 PVC RIGID CONDUIT

T2  
23KV-480 / 277V  
2500KVA  
5.55 %Z

TOTAL CONNECTED LOAD ON  
TRANSFORMER T2  
3932 AMPS  
3269 KVA\*  
\* PLEASE SEE TABLE BELOW FOR DETAILS OF PHASE 1 AND 2 CONNECTED HEATER LOAD

8 X [4-1/C 500 KCMIL THWN W/ #4/0 AWG GND]  
4" SCH 40 PVC RIGID CONDUIT

(2) E-STOP  
(SHUNT TRIP)

MSWB-02  
65KAIC

480/277V, 3 $\phi$ , 4 WIRE, 5000A

CB-SM1  
3000AT  
5000AF  
3 POLE  
LSIG

#4/0 CU. GND.

3 X [4-1/C 350 KCMIL TYPE W  
PORTABLE POWER CABLE]  
WITH #4/0 GND

3 X [4-1/C 350 KCMIL TYPE W  
PORTABLE POWER CABLE]  
WITH #4/0 GND

3 X [4-1/C 350 KCMIL TYPE W  
PORTABLE POWER CABLE]  
WITH #4/0 GND

DP-01  
65KAIC

480/277V, 3 $\phi$ , 4 WIRE, 1600A

DP-02  
65KAIC

480/277V, 3 $\phi$ , 4 WIRE, 1600A

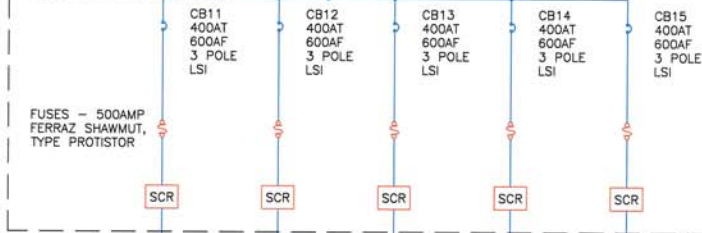
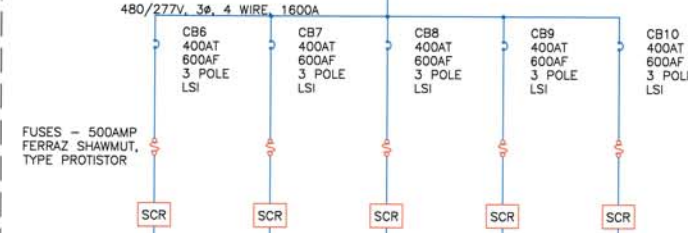
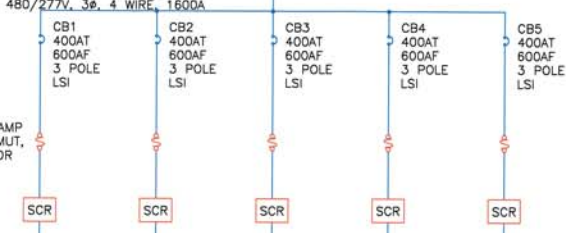
DP-03  
65KAIC

480/277V, 3 $\phi$ , 4 WIRE, 1600A

FUSES - 500AMP  
FERRAZ SHAWMUT,  
TYPE PROTISTOR

FUSES - 500AMP  
FERRAZ SHAWMUT,  
TYPE PROTISTOR

FUSES - 500AMP  
FERRAZ SHAWMUT,  
TYPE PROTISTOR



TO RESISTIVE HEATERS  
TOTAL CALCULATED LOAD  
1202 AMP  
999 KW

TO RESISTIVE HEATERS  
TOTAL CALCULATED LOAD  
1358 AMP  
1129 KW

TO RESISTIVE HEATERS  
TOTAL CALCULATED LOAD  
1372 AMP  
1141 KW

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PHASE 1

CIRCUIT #	3	4	5	6	7	8	10	14
KW	164	279	285	273	283	287	286	283

TOTAL PHASE 1 CONNECTED HEATER  
LOAD ON TRANSFORMER T2  
2140 KW

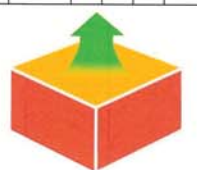
PHASE 2

CIRCUIT #	6	8	10	11	14	16	18	22
KW	273	287	286	282	283	281	284	282

TOTAL PHASE 2 CONNECTED HEATER  
LOAD ON TRANSFORMER T2  
2258 KW



REVISIONS		DATE	BY	CHK	ENG	DESCRIPTION	APPROVED
0	6/22/15	RH	WL	WL	AS-BUILTS		RS



# TERRATHERM

SRSNE SUPERFUND SITE  
ONE-LINE ELECTRICAL

SIZE D	FILE NO. E101	DWG NO. E101	REV 0
SCALE: AS SHOWN DNS		SHEET 3 OF 4	

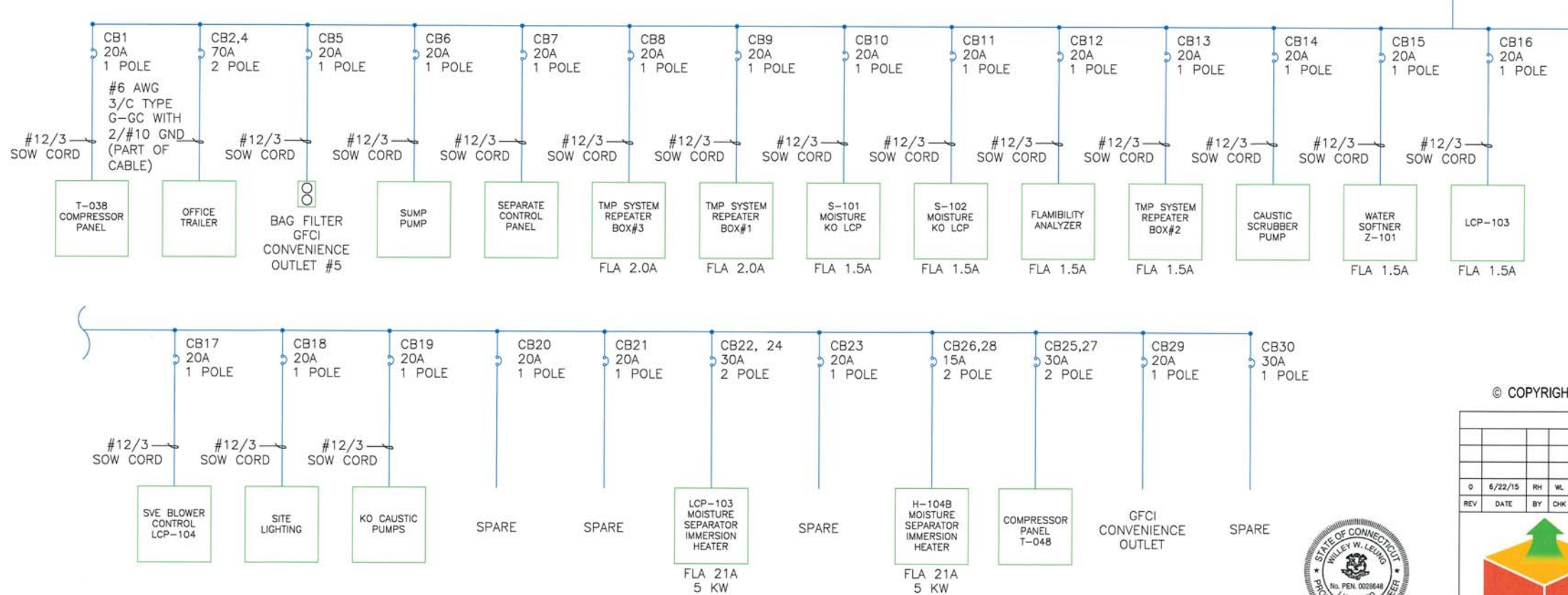
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**PANEL LC-102**

TYPE: NEMA 3R      MAIN CB 150 A      PANEL LOCATION: LC-102  
 SERVICE: 240/120 V, 1 Ph, 3 W      LOCATION: BOTTOM      SOURCE: DP-10  
 MFR: SQUARE D, QO      BUS RATING: 150 A      FEEDER: CB-16

PANEL LC-102  
 CALCULATED LOAD  
 59.5A @ 480V, 28.6 KVA

DESCRIPTION	CKT NO	TRIP	LOADS (W)			TRIP	CKT NO	DESCRIPTION
			A	B	C			
T-038 COMPRESSOR PANEL	1	20	180	6000		70	2	OFFICE TRAILER
SPARE	3	20		180	6000	70	4	
BAG FILTER GFCI #5	5	20	180	900		20	6	SUMP PUMP
SEPARATOR CONTROL PANEL	7	20		180	240	20	8	TMP SYSTEM REPEATER BOX#3
TMP SYSTEM REPEATER BOX#1	9	20	240	180		20	10	S-101 MOISTURE KO
S-102 MOISTURE KO	11	20		180	180	20	12	FLAMMABILITY ANALYZER
TMP SYSTEM REPEATER BOX#2	13	20	240	180		20	14	CAUSTIC SCRUBBER PUMP
WATER SOFTNER Z-101	15	20		180	180	20	16	LCP-103
SVE BLOWER CONTROL LCP-104	17	20	180	1200		20	18	SITE LIGHTING
KO CAUSTIC PUMPS	19	20		180		20	20	SPARE
SPARE	21	20		2500		30	22	LCP-103 5KW HEATER
SPARE	23	20			2500	30	24	
H-104B 5KW HEATER	25	15	2500	180		15	26	COMPRESSOR PANEL T-048
	27	15		2500	180	15	28	
GFCI CONVENIENCE	29	20	180			30	30	SPARE
TOTALS			14840	12500		* HANDLE LOCK-ON DEVICE		



FROM DP-10  
SHEET 2

150A MAIN  
2 POLE

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REVISIONS					
NO.	DATE	BY	CHK	ENG	DESCRIPTION
0	6/22/15	RH	WL	WL	AS-BUILTS

TERRATHERM

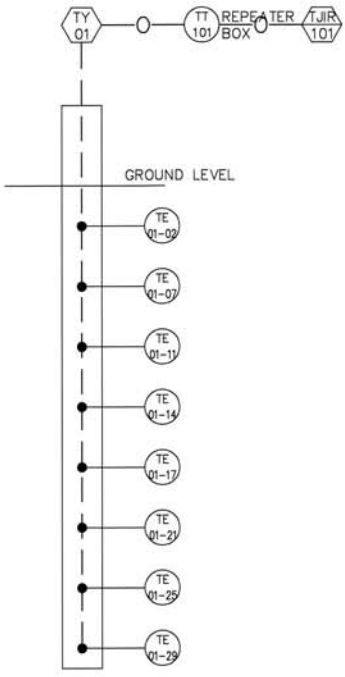
SRSNE SUPERFUND SITE

ONE-LINE ELECTRICAL

SIZE: D	FILE NO.: E101	DWG NO.: E101	REV: 0
SCALE: AS SHOWN DNS		SHEET 4 OF 4	

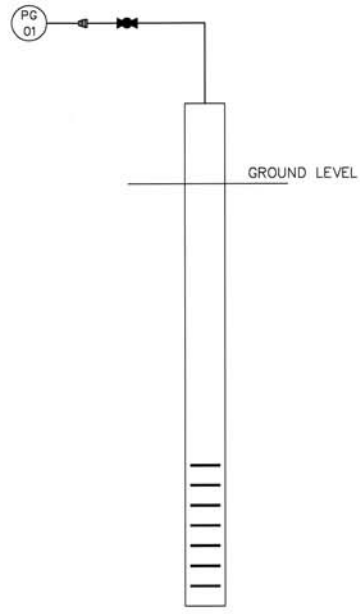
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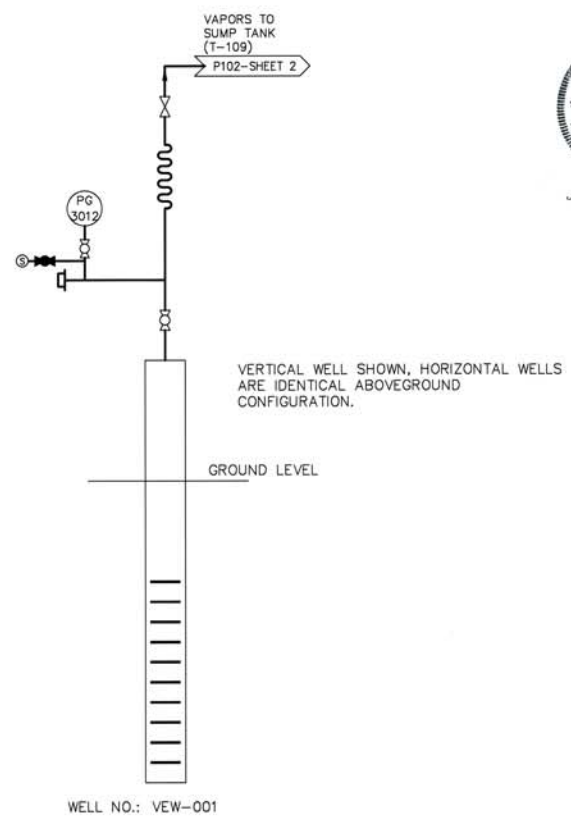
WELL NO.: TMP-01

TYPICAL OF 98 TEMPERATURE MONITORING WELLS	
WELL NUMBER TAGS:	TMP-01 THRU TMP-98
REMOTE TERMINAL UNIT TAGS:	TY-01 THRU TY-98



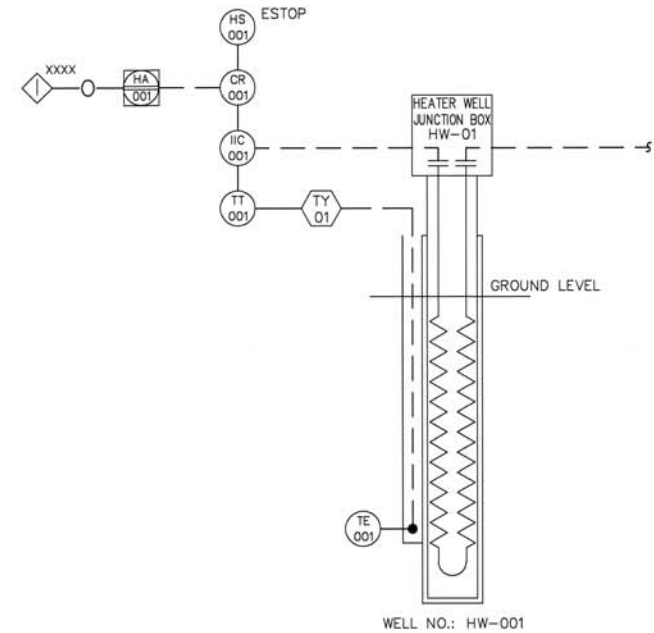
WELL NO.: PMP-01

TYPICAL OF 20 PRESSURE MONITORING WELLS	
WELL NUMBER TAGS:	PMP-01 THRU PMP-20
NOTE: PG-01 REPRESENTS A HAND-HELD, PRESSURE READING DEVICE. EACH PRESSURE MONITORING POINT INCORPORATES A BARBED HOSE CONNECTION FOR ATTACHMENT ALLOWING PRESSURE VALUES TO BE MANUALLY COLLECTED AND RECORDED.	



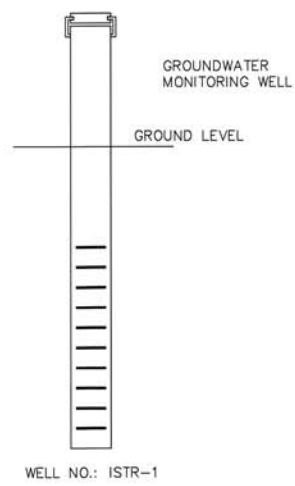
WELL NO.: VEW-001

TYPICAL OF 534 VAPOR EXTRACTION WELLS	
WELL NUMBER TAGS:	VEW-001 THRU VEW-534



WELL NO.: HW-001

TYPICAL OF 593 HEATER WELLS	
WELL NUMBER TAGS:	HW-001 THRU HW-593

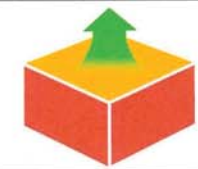


WELL NO.: ISTR-1

TYPICAL OF 7 GROUNDWATER MONITORING WELLS	
WELL NUMBER TAGS:	ISTR-1 THRU ISTR-7

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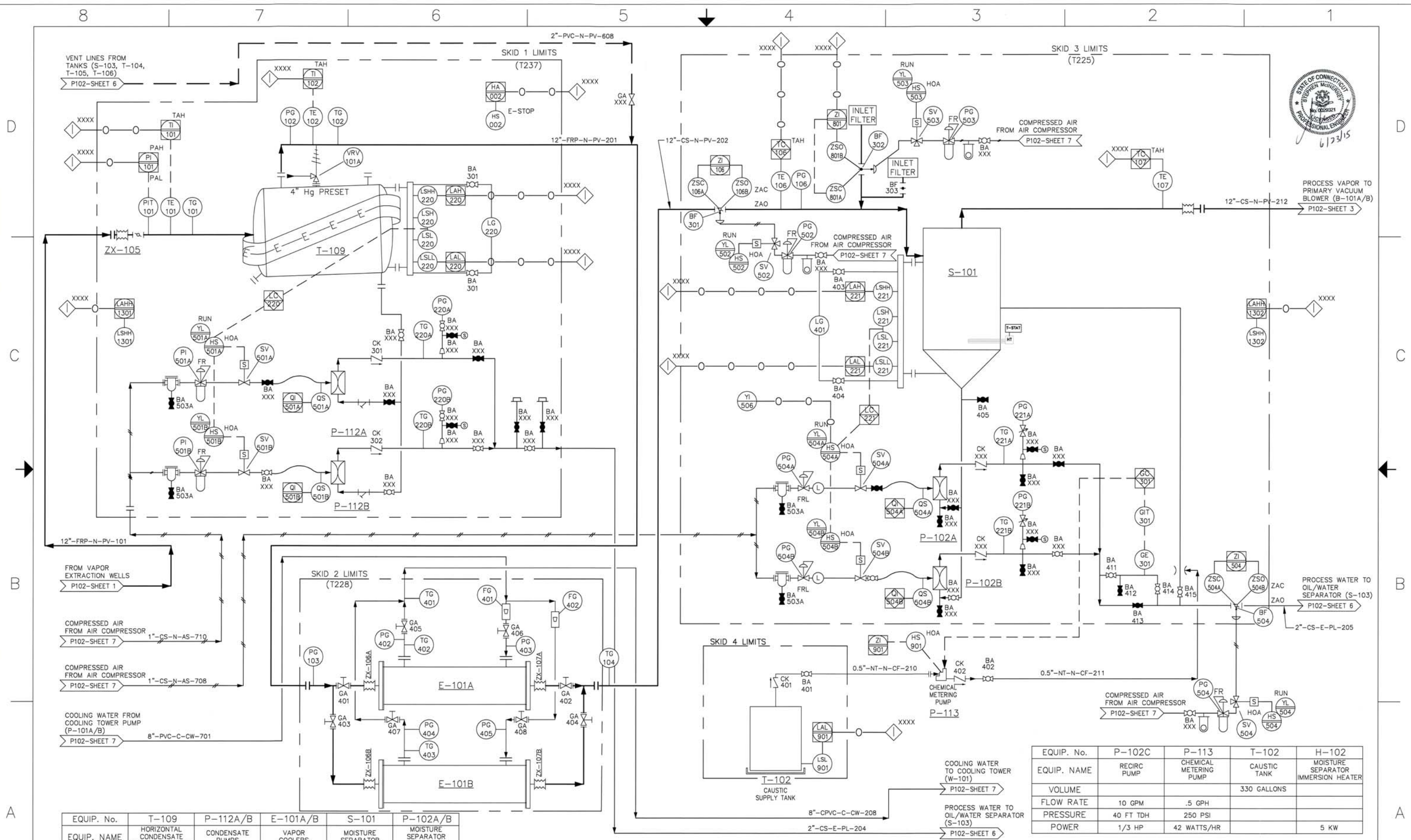
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REV	DATE	BY	CHK	ENG	DESCRIPTION	APPROVED
1	05/13/14	DC		TM	AS BUILT UPDATE	
0	04/29/14	DC	TJM	TM	AS BUILT	



**TERRATHERM**  
 SRSNE SUPERFUND SITE  
 PIPING & INSTRUMENTATION DIAGRAM  
 GAS CONDITIONING SYSTEM 1

SIZE	FILE NO.	DWG NO.	REV
D	P102	P102	1
SCALE: AS SHOWN DNS			SHEET 1 OF 8

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EQUIP. No.	T-109	P-112A/B	E-101A/B	S-101	P-102A/B
EQUIP. NAME	HORIZONTAL CONDENSATE SEPARATOR TANK	CONDENSATE PUMPS	VAPOR COOLERS	MOISTURE SEPARATOR	MOISTURE SEPARATOR PUMPS
VOLUME	52" DIA		1082 SQ.FT.(TTL)	36" DIA	
FLOW RATE	4000 SCFM	20 GPM	4000 SCFM	2610 SCFM	20 GPM
PRESSURE	200" W.C. (VAC)	40 PSI		54" W.C. (VAC)	40 PSI
POWER					

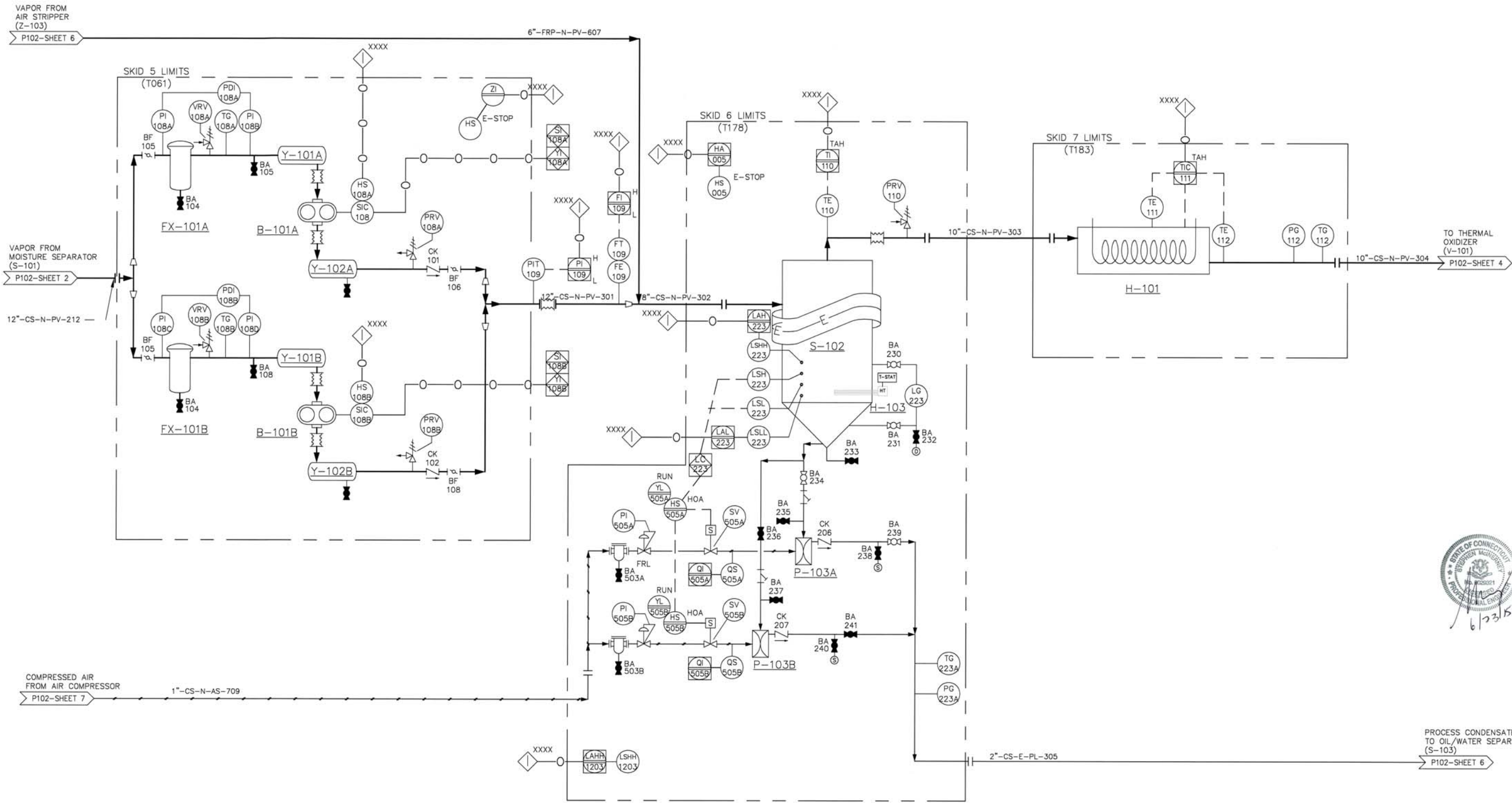
EQUIP. No.	P-102C	P-113	T-102	H-102
EQUIP. NAME	RECIRC PUMP	CHEMICAL METERING PUMP	CAUSTIC TANK	MOISTURE SEPARATOR IMMERSION HEATER
VOLUME			330 GALLONS	
FLOW RATE	10 GPM	.5 GPH		
PRESSURE	40 FT TDH	250 PSI		
POWER	1/3 HP	42 WATTS/HR		5 KW



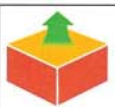
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SRNE SUPERFUND SITE  
 PIPING & INSTRUMENTATION DIAGRAM  
 GAS CONDITIONING SYSTEM 1

SIZE	DWG NO.	REV
D	P102	1
SCALE:	NONE	SHEET 2 OF 8



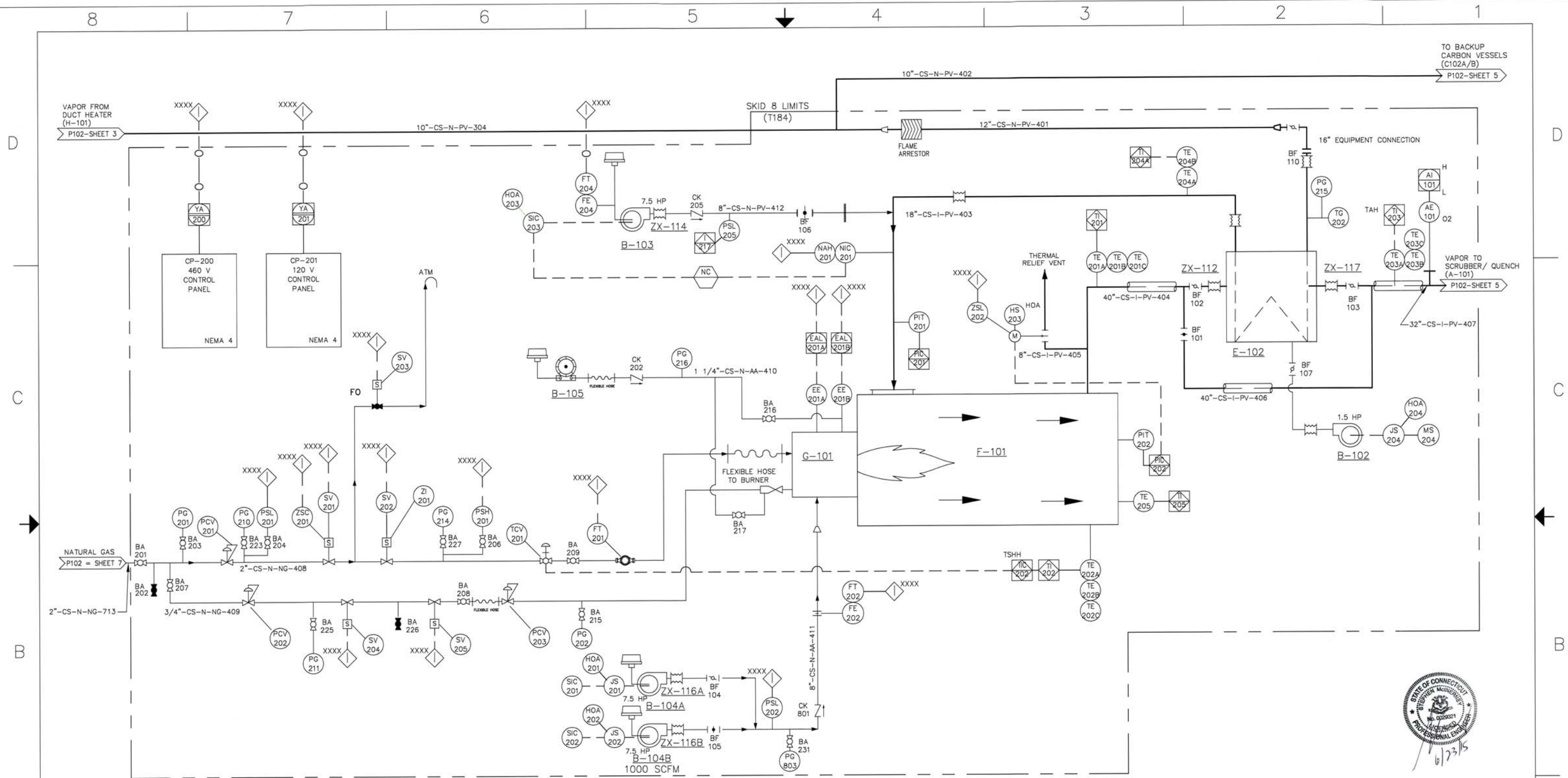
EQUIP. No.	FX-101A/B	B-101A/B	Y-101A/B	Y-102A/B	S-102	P-103A/B	H-101	H-103
EQUIP. NAME	FILTERS	VACUUM BLOWERS	VACUUM BLOWER INLET SILENCERS	VACUUM BLOWER DISCHARGE SILENCERS	MOISTURE SEPARATOR	MOISTURE SEPARATOR PUMPS	DUCT HEATER	MOISTURE SEPARATOR IMMERSION HEATER
VOLUME					36" DIA			
FLOW RATE	4675 CFM	2400 SCFM	2400 SCFM	2400 SCFM	3000 SCFM	20 GPM		
PRESSURE		48" W.C. (VAC)			54" W.C. (VAC)	40 PSI		
POWER		200 H.P.					15 KW	5 KW



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SRSNE SUPERFUND SITE  
 PIPING & INSTRUMENTATION DIAGRAM  
 GAS CONDITIONING SYSTEM 2

SIZE	DWG NO.	REV
D	P102	1
SCALE:	NONE	SHEET 3 OF 8



EQUIP. No.	B-103	B-104A/B	G-101	V-101	E-102	B-102
EQUIP. NAME	DILUTION AIR BLOWER	COMBUSTION AIR BLOWERS	OXIDIZER BURNER	THERMAL OXIDIZER	HEAT EXCHANGER	AIR SEAL BLOWER
VOLUME			4 MMBTU			
FLOW RATE	750 SCFM	1000 SCFM		3000 SCFM	3000 SCFM	
PRESSURE						
POWER	7.5 HP	7.5 HP				1.5 HP



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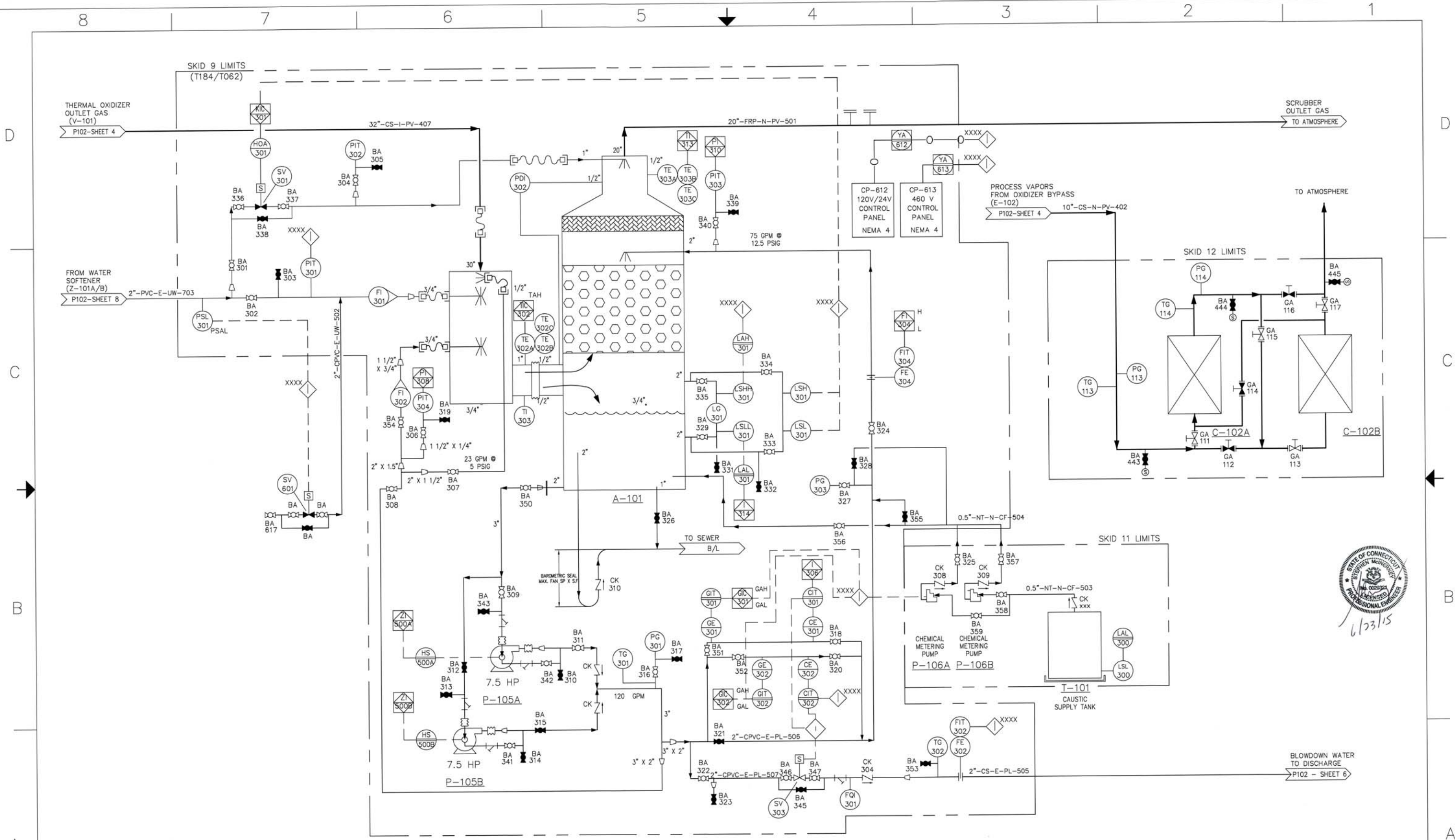
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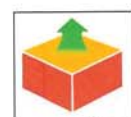
SRSNE SUPERFUND SITE  
 PIPING & INSTRUMENTATION DIAGRAM  
 THERMAL OXIDIZER

SIZE	DWG NO.	REV
D	P102	1
SCALE: NONE	SHEET	4 OF 8





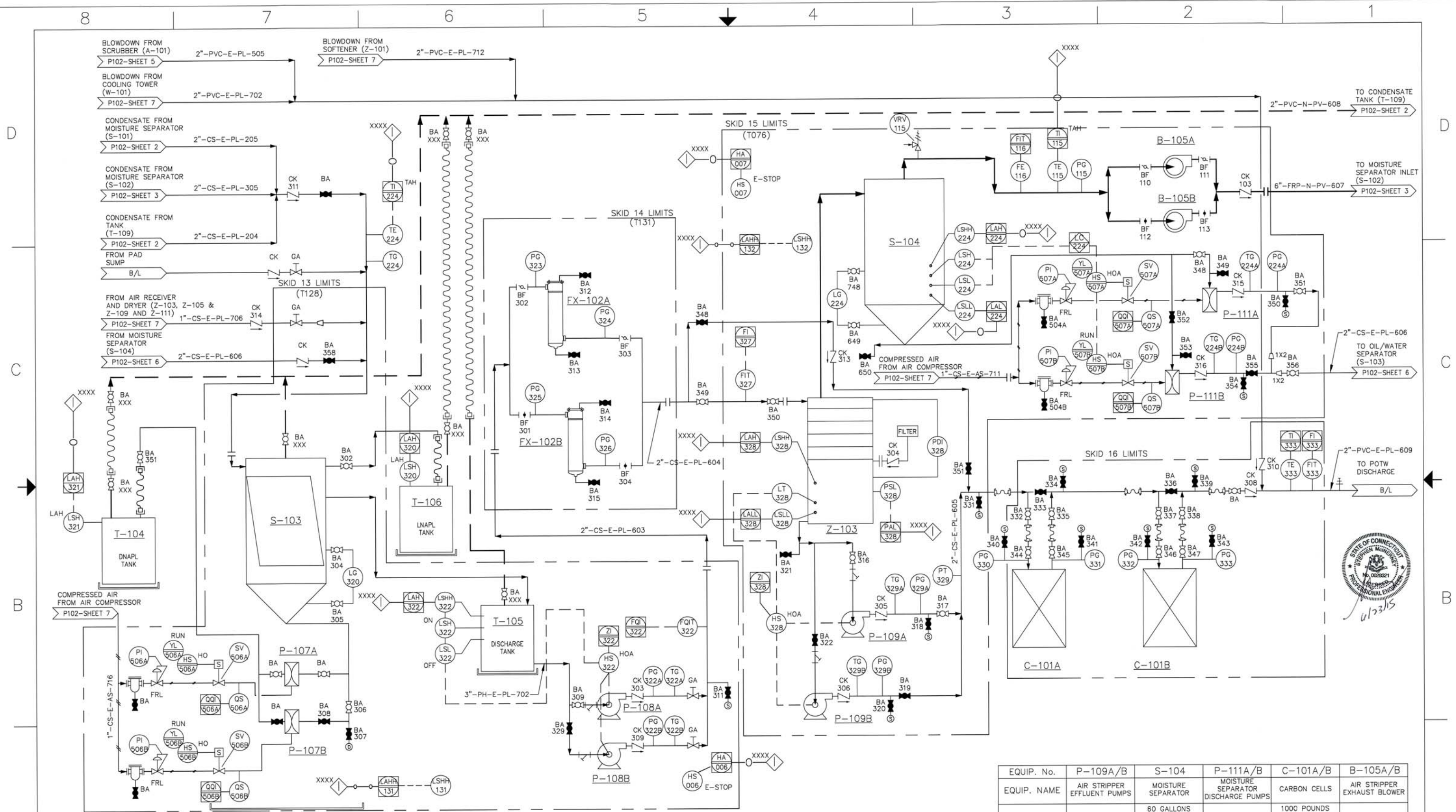
EQUIP. No.	P-105A/B	A-101	P-106A/B	T-101	C-102A/B
EQUIP. NAME	SCRUBBER RECIRC. PUMPS	QUENCH/SCRUBBER	CAUSTIC SUPPLY PUMPS	CAUSTIC SUPPLY TANK	CARBON VESSELS
VOLUME				5000 GALLONS	3000 POUNDS
FLOW RATE	220 GPM	3000 SCFM	.5 GPH		
PRESSURE			250 PSI		
POWER	7.5 HP		42 WATTS/HR		



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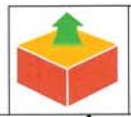
SRSNE SUPERFUND SITE  
 PIPING & INSTRUMENTATION DIAGRAM  
 QUENCH/SCRUBBER/STACK

SIZE	D	DWG NO.	P102	REV	1
SCALE	NONE	SHEET	5 OF 8		



EQUIP. No.	T-104	P-107A/B	S-103	T-105	T-106	P-108A/B	FX-102A/B	Z-103
EQUIP. NAME	DNAPL TANK	DNAPL PUMPS	OIL/WATER SEPARATOR	DISCHARGE TANK	LNAPL TANK	DISCHARGE PUMPS	BAG FILTER	AIR STRIPPER
VOLUME	55 GALLONS			150 GALLONS	55 GALLONS			
FLOW RATE		3 GPM	20 GPM	*INTEGRAL TO S-103*		20 GPM	20 GPM	50 GPM
PRESSURE		20 FT TDH				80 FT TDH		
POWER								

EQUIP. No.	P-109A/B	S-104	P-111A/B	C-101A/B	B-105A/B
EQUIP. NAME	AIR STRIPPER EFFLUENT PUMPS	MOISTURE SEPARATOR	MOISTURE SEPARATOR DISCHARGE PUMPS	CARBON CELLS	AIR STRIPPER EXHAUST BLOWER
VOLUME		60 GALLONS		1000 POUNDS	
FLOW RATE	30 GPM		20 GPM	20 GPM	600 SCFM
PRESSURE	60 PSI		40 PSI	50 PSI	
POWER	3 HP				15 HP



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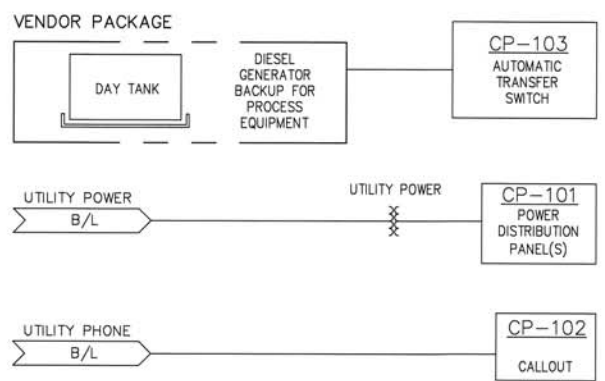
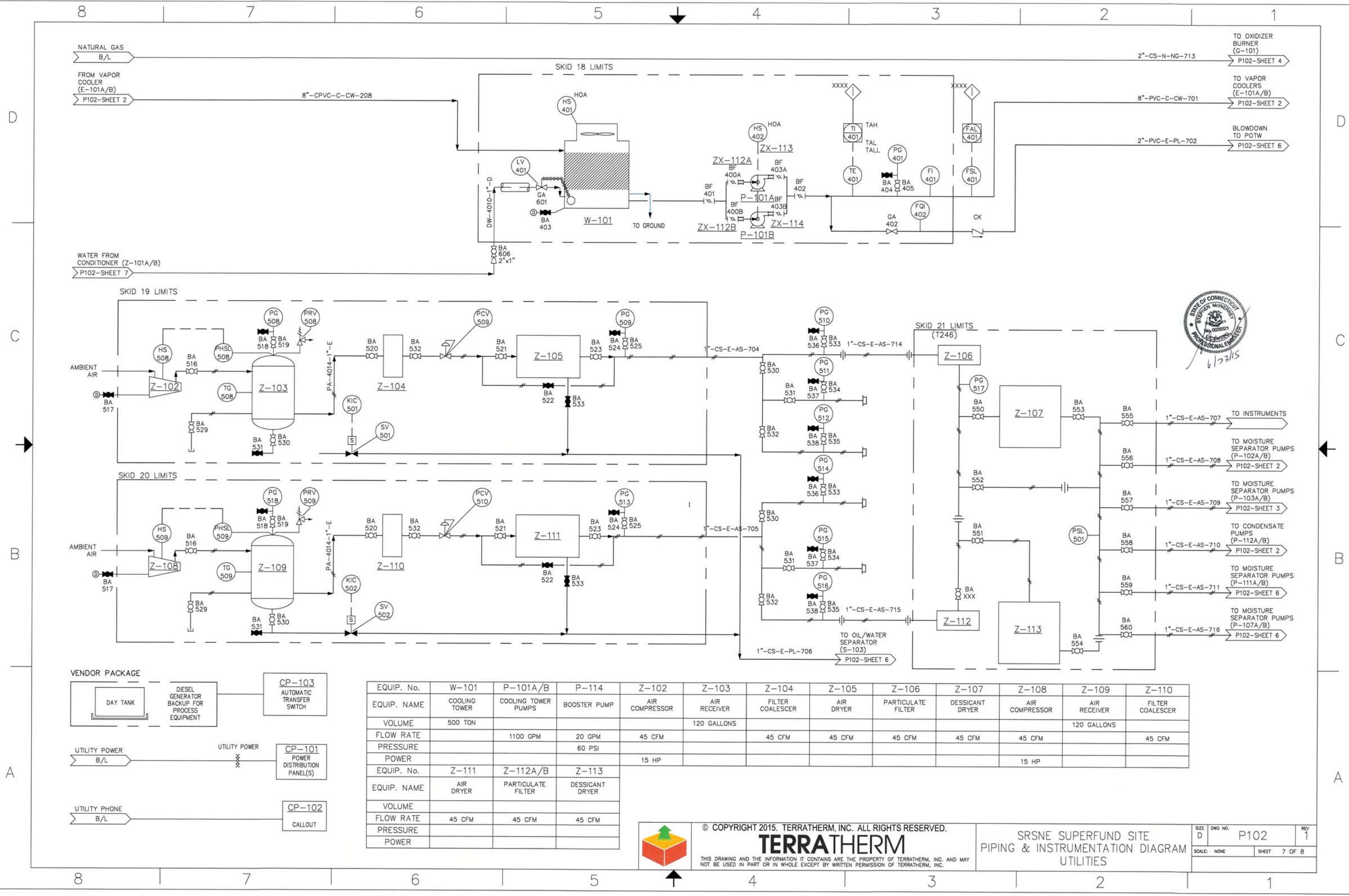
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SRNE SUPERFUND SITE  
PIPING & INSTRUMENTATION DIAGRAM  
LIQUID TREATMENT SYSTEM

SIZE	D	DWG NO.	P102	REV	1
SCALE:	NONE	SHEET	6 OF 8		





EQUIP. No.	W-101	P-101A/B	P-114	Z-102	Z-103	Z-104	Z-105	Z-106	Z-107	Z-108	Z-109	Z-110
EQUIP. NAME	COOLING TOWER	COOLING TOWER PUMPS	BOOSTER PUMP	AIR COMPRESSOR	AIR RECEIVER	FILTER COALESCER	AIR DRYER	PARTICULATE FILTER	DESSICANT DRYER	AIR COMPRESSOR	AIR RECEIVER	FILTER COALESCER
VOLUME	500 TON				120 GALLONS						120 GALLONS	
FLOW RATE		1100 GPM	20 GPM	45 CFM		45 CFM	45 CFM	45 CFM	45 CFM	45 CFM		45 CFM
PRESSURE			60 PSI									
POWER				15 HP							15 HP	
EQUIP. No.	Z-111	Z-112A/B	Z-113									
EQUIP. NAME	AIR DRYER	PARTICULATE FILTER	DESSICANT DRYER									
VOLUME												
FLOW RATE	45 CFM	45 CFM	45 CFM									
PRESSURE												
POWER												



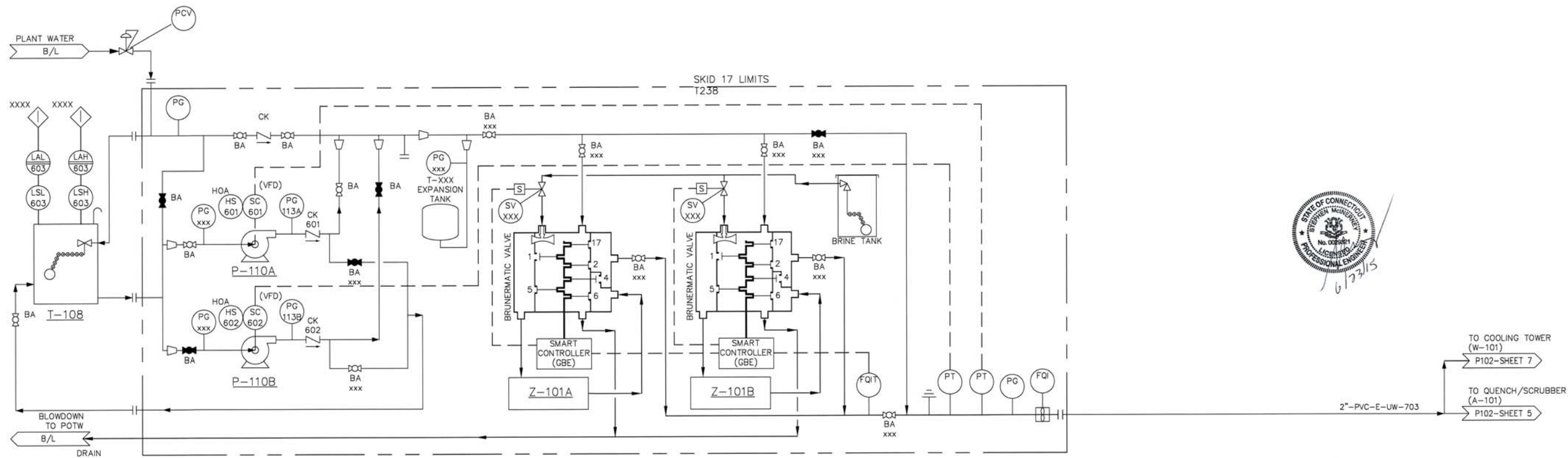
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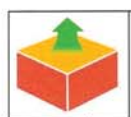
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SRSNE SUPERFUND SITE  
PIPING & INSTRUMENTATION DIAGRAM  
UTILITIES

SIZE	D	DWG NO.	P102	REV	1
SCALE	NONE	SHEET	7 OF 8		



EQUIP. No.	T-108	P-110A/B	Z-101
EQUIP. NAME	EMERGENCY WATER SUPPLY TANK	EMERGENCY WATER SUPPLY PUMPS	WATER CONDITIONER
VOLUME	850 GALLONS		
FLOW RATE		22 GPM	20 GPM
PRESSURE			
POWER		3 HP	



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SRSNE SUPERFUND SITE  
 PIPING & INSTRUMENTATION DIAGRAM  
 WATER CONDITIONING

SIZE	DWG NO.	REV
D	P102	1
SCALE: NONE	SHEET	8 of 8



**ATTACHMENT C**

**Detailed Description of ISTR Treatment System Components**

The ISTR treatment system consisted of the following components:

**Vacuum Blowers** - Positive displacement or induced draft vacuum blowers were used to create the vacuum in the wellfield and to create a high enough pressure to complete the remaining process steps. The vacuum blowers caused the vapor phase temperature to increase as a result of raising the pressure level.

**Moisture Separator** - Vapors extracted from the wellfield were drawn through a moisture separator to remove condensate and entrained liquid droplets. Water collected in the moisture separator pot were pumped to the oil/water separator for treatment prior to discharge.

**Heat Exchanger** - The vapors from the wellfield were initially processed in a pair of heat exchangers to knock down the incoming steam and reduce the moisture content of the vapor stream for the remaining steps in the process. The vapors entering the heat exchangers were cooled using a recirculating loop of water supplied by a cooling tower. The cooling tower released the heat removed from the vapor stream into the ambient air through evaporation of supplied water. The cooling tower loop circulation rate was adjusted to only reduce the temperature of the vapor stream to the point required to remove moisture from the wellfield vapors, with minimal or no COC removal/condensation. Both the vapor and liquid side of the heat exchangers were instrumented with temperature indicators to allow adjustment of the recirculation loop flow to maintain proper moisture removal.

**Cooling Tower** - The cooling tower supplied a cooled liquid stream to the heat exchanger. In general, the temperature of the cooled liquid would rise about ten degrees Fahrenheit as it passes through the heat exchanger. The returning liquid was delivered to the top of the cooling tower where it was cooled by evaporation and contact with ambient air. The cooled water was collected at the bottom of the tower and returned to the heat exchanger.

**Moisture Separator** - After exiting the heat exchangers, the cooled vapor stream was drawn through a moisture separator to remove condensate and entrained liquid droplets. Water collected in the moisture separator was pumped to the oil/water separator for treatment prior to discharge.

**Duct Heater** - Exiting the second moisture separator, the combined vapor stream was heated approximately 14 to 20°C (25 to 35°F), to adjust the temperature above the dew point of the stream by approximately 19°C (35°F) and minimize condensate formation in the oxidizer. The duct heater operated automatically based on a thermostat and SCR power controller, utilizing input from a downstream temperature sensor.

**Combustion Blower** - Supplemental combustion/dilution air was needed in the oxidizer. The combustion air performed two functions, ensuring that the LEL is below 25% and providing enough total air flow so that the evaporation in the quench can sufficiently reduce the oxidizer outlet gas temperature. The combustion blower needs to be able to produce a discharge pressure equal to or greater than the vacuum blowers in order to ensure that the combustion/dilution air can overcome the existing system pressure.

**Thermal Oxidizer** - The thermal oxidizer was the primary component of the proposed vapor treatment system. The proposed thermal oxidizer was a nominal 1100 SCFM oxidizer, with a rated hydrocarbon Destruction/Removal Efficiency (DRE) greater than 99%. The oxidizer was designed to automatically maintain a specific temperature profile within the thermal reaction zone (the oxidation chamber), typically in the range of 800°C (1,500°F), which is above the auto-ignition point for natural gas.

The oxidizer automatically maintained the temperature profile through a proportioning valve that adjusts the mixture of extracted vapors, combustion air, and supplemental fuel (natural gas) to maintain the reaction zone temperature profile. Within the reaction zone, the oxidizer destroys COC vapors, yielding carbon dioxide, water vapor, and HCl. The concentration of the HCl produced depends on the concentration of the chlorinated COCs in the vapors entering the unit.

**Scrubber** - The acid-laden gases entered the scrubber through a vertical quench section mounted directly to the scrubber gas inlet. As the hot gases entered the quench section, a water/caustic solution spray rapidly cooled them, resulting in a cooler, reduced volume saturated vapor stream. Some portion of the cooling spray was evaporated as a result of the flash cooling. Liquid condensate drained by gravity into the scrubber sump. The cooled vapors continued to a counter-current packed tower scrubber section. The vapors flowed upward through polypropylene packing media while a caustic solution is introduced through a series of spray nozzles at the top of the scrubber tower. The caustic solution flows downward through the tower packing media, countercurrent to the acidic vapors. The surfaces of the packing media provided a large contact surface area for the caustic solution to neutralize the acid gases. The scrubbing solution continued to fall through the packing media and return to the scrubber sump, typically at a lower pH and containing mineral salts that precipitate out as products of the neutralization reaction.

The pH of the scrubbing was automatically adjusted using a 50% sodium hydroxide solution (NaOH) to maintain the pH of the scrubbing liquid within the range necessary for effective neutralization of the acid gases. The scrubber pH controller automatically maintains the pH in the scrubber sump between 5.5 and 9.0 pH units.

## Liquid Treatment

Water from various sources, including the moisture separator and scrubber was treated prior to discharge to the POTW sewer. The peak estimated flow rate was approximately 60 gpm based on the mass and energy balance. The liquid treatment system depicted on the PFD consisted of the following major components:

- Moisture separator(s)
- Oil/Water separator
- Bag filter(s)
- Air stripper
- Granular activated carbon vessel(s)

Specific components of the liquid treatment system are described below.

**Moisture Separator(s)** - The moisture separators collected condensate generated in the vapor heat exchangers as described in the previous sections. This condensate was primarily water, but also contained some LNAPL and a small portion of DNAPL. The accumulated condensate will be sent to the oil/water separator periodically as determined by the level sensors in each moisture separator.

**Oil/Water Separator** - The oil-water separator is a HydroQuip model AG-4CS-HP-1H, parallel-corrugated plate coalescing oil water separator rated for a 30 gpm flow rate. The separator is designed to remove oil droplets larger than 20 microns with specific gravity ranging from 0.9 or less to greater than 1.1. The separator body is constructed of epoxy-coated carbon steel for improved corrosion resistance, with polypropylene coalescing plates. The unit is equipped with separate LNAPL and DNAPL accumulation areas, by virtue of an underflow weir and overflow weir. The separator has a vapor-tight cover, with appropriate vents that are connected to the vapor treatment system to capture emission from the separator. During peak operation, approximately 30 gallons of LNAPL was generated per day. Accumulated LNAPLed by gravity into 55 gallon drums and removed by a licensed waste hauler as hazardous waste. Accumulated DNAPL was automatically transferred from the separator to the NAPL accumulation tank by pneumatic diaphragm pumps, operated by an intrinsically-safe conductivity level controller. Effluent water from the final clear-water stilling chamber of the oil/water separator was pumped to the bag filters and air stripper for further treatment.

**Bag Filter(s)** - A Rosedale Model 6 duplex bag filter was installed downstream of the oil-water separator to remove emulsion globules or particulates prior to entering the air stripper.

**Air Stripper** - The air stripper for this project was a shallow-tray style air stripper, rated for a minimum flow rate of 1 gpm. Water exiting the bag filters was introduced at the top of a stack of perforated air stripper trays, and forced to follow a convoluted

path through the stripper housing while a countercurrent air stream was passed upward through the flowing water. This creates a turbulent flow condition within the air stripper housing, inducing the VOCs in the liquid to partition to the vapor phase. The air stripper achieved 99.9% or greater removal of VOCs from the liquid phase. The elevated temperature of the water entering the air stripper during the high COC mass removal periods, estimated to be approximately 160°F, further enhanced the vapor phase partitioning within the air stripper.

The air stripper operated continuously and was equipped with appropriate flow, temperature, pressure and level controls and alarm interlocks, and also provided with duplex pumps and blowers serving as an installed spare in the event of a problem with the primary pump/blower.

**Granular Activated Carbon Vessel(s)** - Two liquid phase activated carbon absorbers were installed downstream of the air stripper to provide a final effluent polish prior to discharging to the POTW. The carbon absorbers contained 2000 pounds of carbon and rated for a flow rate greater than 80 gpm. The carbon beds provided additional effluent polishing downstream of the air stripper. The carbon bed was equipped with isolation valves, pressure gauges and sample ports.

**Backup Granular Activated Carbon Vessel(s)** - A backup granular activated carbon (GAC) system was installed as a contingency to failure of the oxidizer or components. The GAC system consisted of two vessels configured and piped to operate in a lead/lag scenario. The backup GAC system was in operation for approximately 2 weeks during the shutdown of the oxidizer.



**ATTACHMENT E**

**Oxidizer Shutdown Root Cause Analysis Memorandum (September 18, 1994)**



## Memorandum

To: Bruce Thompson, Jessie McCusker, *demaximis, inc.*

CC: Jim Galligan, TerraTherm, Inc.

From: Tim Mahoney, Steve McInerney, Robin Swift, TerraTherm, Inc.

Date: 17 September 2014

**Re: *Thermal Oxidizer – Summary of Root Cause Analysis***

---

The thermal oxidizer shut down on 13 August due to a high temperature alarm in the unit. An initial inspection of the unit after the shutdown revealed what appeared to be a metal object lodged in the oxidizer chamber obstructing the flame. After thorough evaluation of the oxidizer, it was determined that the daisy wheel, which is internal to the oxidizer chamber that directs flow to the burner, had been damaged and/or melted. TerraTherm, Inc. (TT) performed a root cause analysis of this failure with its engineers and vendors to 1) identify the cause, 2) identify appropriate modifications, if any, to the oxidizer/overall treatment system to prevent recurrence, 3) develop a plan to bring the system back online, and 4) evaluate our current operating plan. Below is a summary of these efforts.

### GENERAL TIMELINE OF EVENTS

On 11 August, intermittent spikes of elevated temperature were observed at the process effluent side of the oxidizer heat exchanger (E-103). As the source of these temperature excursions was being investigated, the heat exchanger bypass valve was opened to reduce the heat exchanger effluent temperature and a dilution air intake valve upstream of the main process blowers was partially opened to allow approximately 420 standard cubic feet per minute (scfm) of dilution air into the process stream to reduce vapor concentrations and aid in cooling. The inlet to the oxidizer was reduced from a peak temperature of approximately 1550°F to a steady temperature of approximately 220°F.

As a result of these changes, the combustion blower increased flows from approximately 250 scfm to approximately 500 scfm, and the natural gas flow increased from approximately 20 scfm to approximately 40 scfm. With the stream not being pre-heated, and the increase in added dilution air flow, these increases in fuel usage and combustion air flow were expected. These operations are depicted in Sheet 4 of the selected Piping and Instrumentation Diagram (P&ID) in Attachment A.

Coincident with the spikes in heat exchanger process effluent temperature, the operators observed the flammability analyzer located downstream of the heat exchanger would periodically increase sharply above a baseline lower flammability limit (LFL) reading of approximately 30% up to approximately 38%, then drop precipitously to less than 5%. This drop was followed by a steady rise in LFL values back to the baseline of approximately 30%. At a fairly predictable interval, this cycle would repeat itself where the LFL value would hold for a period at a baseline level, rise sharply above the baseline, drop quickly, and then steadily recover to the baseline level over a brief period.

Operators also observed that the spikes in heat exchanger outlet temperatures and the spikes/decline cycles of LFL coincided with the oil water separator (OWS) pumps cycling to transfer fluids. Note that the OWS is controlled by level switches, and the fluid transfers are an intermittent operation. The Operators received several system warning alarms during the night of 12 August for LFL >40% at which point the oxidizer controls call for the introduction of dilution air flow. The shutdown alarm limit of 50% LFL was never reached, but dilution air was added to the system as designed.

Figure 1 below shows the history of project LFL data. It should be noted that the logging interval for these data was set to take a snapshot of data every two hours, whereas the cycles described above were occurring approximately every 20 minutes and the spike/drop conditions were of very limited duration. Therefore, the cyclical behavior of these readings was not captured on the logged data. On 12 August at midnight, the data logging schedule was changed to record LFL data every minute. A plot of the LFL data from this point in time until the oxidizer failure is provided below in Figure 2. The average and peak LFL values measured during this time interval were 23% and 43%, respectively.

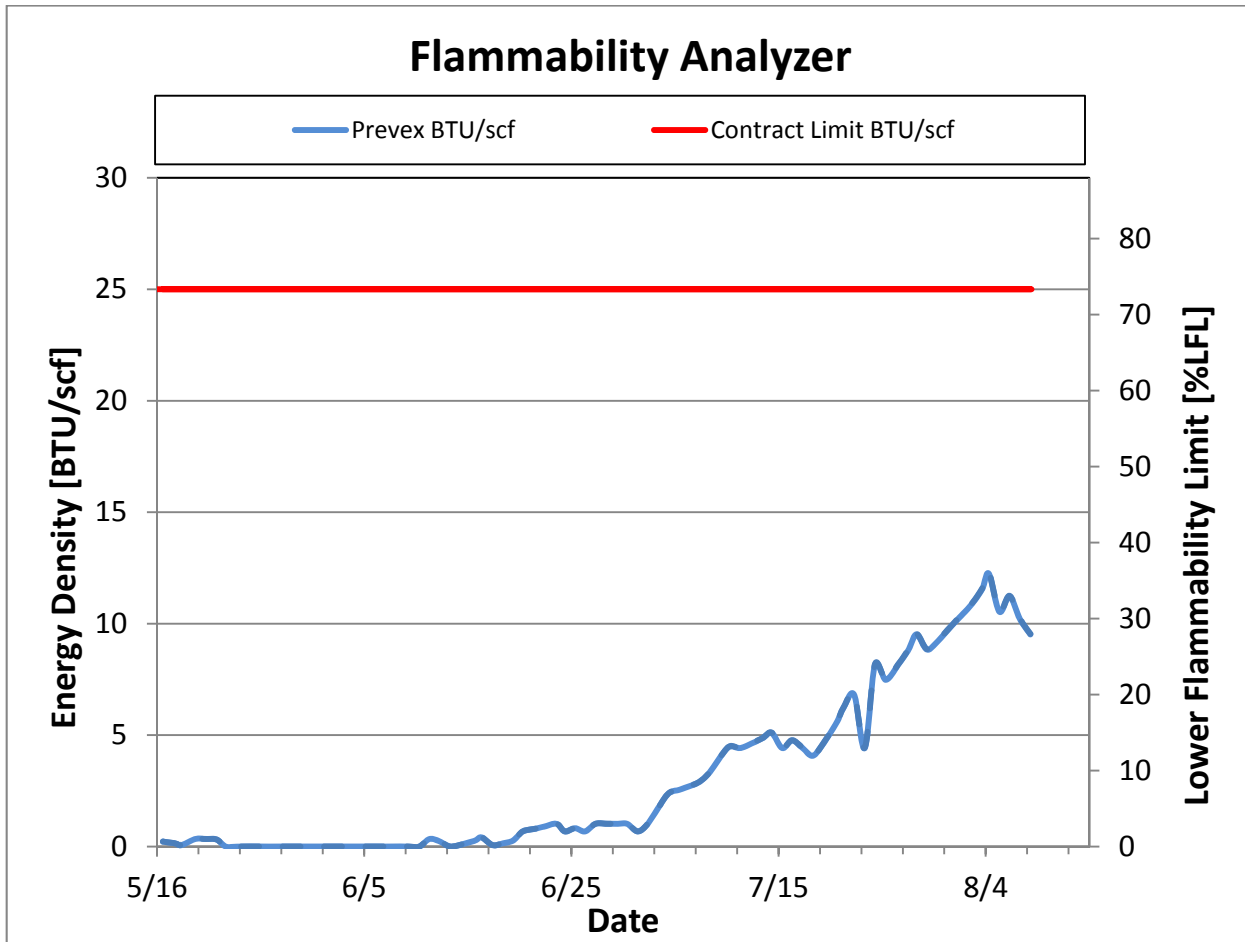
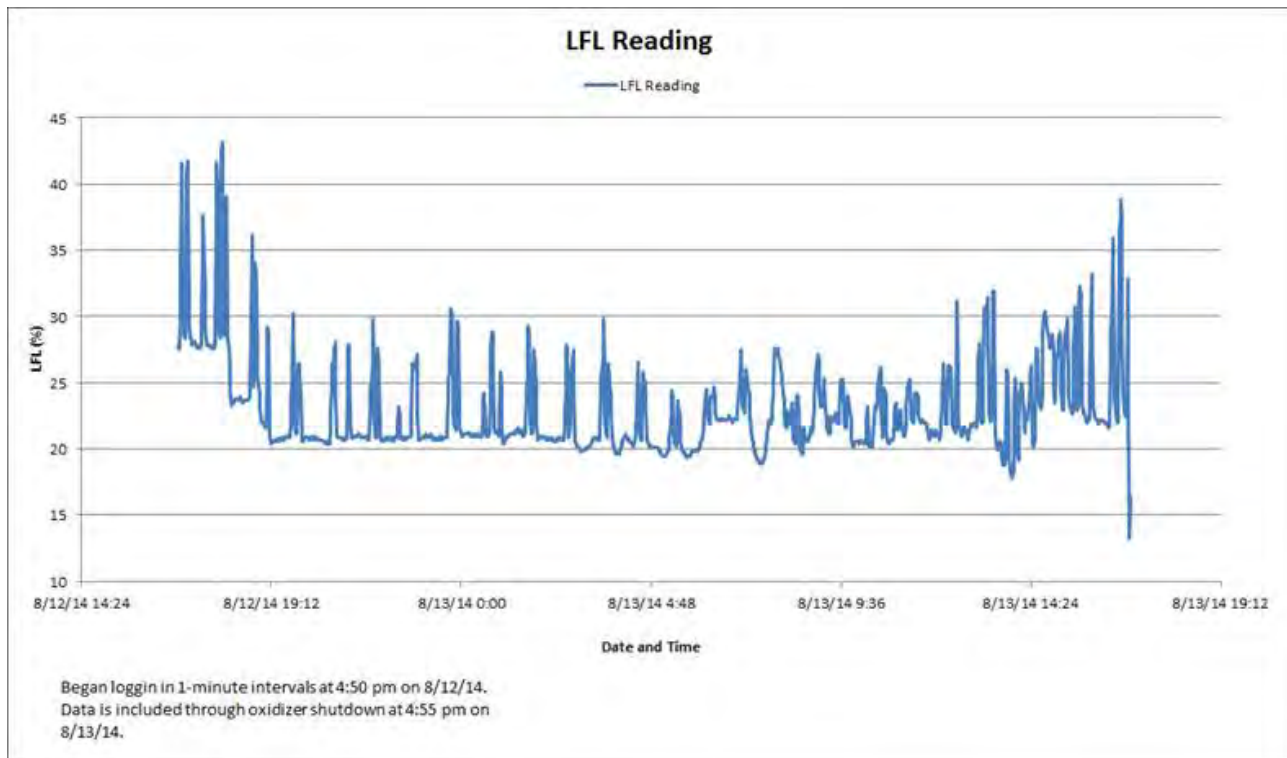


Figure 1 - Daily Average of Flammability Analyzer



**Figure 2 – Logged LFL Data - One Minute Logging Interval**

TerraTherm’s Project Engineer remotely observed LFL levels and temperatures in the effluent of the heat exchanger increase when the OWS pump cycled before the heat exchanger was bypassed. Our interpretation of these conditions is that vapor concentrations increased sharply, or perhaps an oily mist was present, when the OWS transferred fluids to the air stripper, and the stripper blower conveyed these materials towards the oxidizer. The heat exchanger operating temperature was above the auto-ignition temperature for some constituents, and brief pre-combustion episodes were occurring inside the heat exchanger. This may have resulted in the increased heat exchanger outlet temperature, and the spike and subsequent drop in LFL as the fuel value of the process stream was depleted by the combustion event. Therefore, the LFL sensor did not register values in excess of programmed alarm limits, and the meter readings never approached or exceeded flammable limit due to the location of the meter relative to where the combustion was occurring.

As indicated above, the heat exchanger was bypassed and the dilution air was introduced to the process vapor as discussed and agreed upon by Catalytic Combustion Corporation (CCC) to keep the system operational during further troubleshooting and information gathering activities. As a result, the heat exchanger inlet temperature was decreased from 1100°F to approximately 220°F, and LFL values stabilized.

TerraTherm believed that an emulsion or droplets of free phase materials may have been passing through the OWS to the air stripper and contributing to the transient spikes observed in LFL. The OWS and air stripper were opened and inspected. From the inspection, the OWS was found to contain both emulsified materials and a significant accumulation of Light Non-Aqueous Phase Liquid (LNAPL) (see below photos), even though the material was skimmed daily by the Operators.



#### **Photo of OWS Emulsion**

The air stripper trays were found clean other than a glob of “black tar” (as shown below). A sample of the material was collected for analysis. However, once dried, it was no longer a liquid and the laboratory was not able to perform analysis on it due to insufficient volume. We have not seen this black tar material in the process stream since. It is possible that NAPL carryover or emulsified organic material occurred in the OWS and was conveyed to the air stripper, creating brief spikes in oily mist or elevated vapor phase concentrations. Based on the sampling methodology for the LFL devices, the presence of an oily mist may not be detected by the LFL sensor.



#### **Photo of Glob of “Black Tar” in Air Stripper**

As a precaution, TerraTherm installed an organoclay media vessel downstream of the OWS to capture any free phase or emulsified organic material that may pass through the OWS. We also installed an additional liquid granular activated carbon vessel at the end of the process stream (just prior to discharge to the sewer) to facilitate change-out of two primary vessels at a time to better manage higher loading rates.

We further contacted our OWS vendor to confirm the size/flow/temperature/retention time of the design. They confirmed that the tank was appropriate for the operating conditions at the site. Refer to the vendor modeling summary below. Note that inputs are maximum system design rates, not current operating scenarios.

<b>RECTANGULAR OWS</b>			
Cust: <b>Terratherm</b>		Site: <b>AGM-3CS-150V-HP-1H</b>	
<b>I N P U T S</b>	<b>Media</b>		
	Media Length	2	ft.
	Media Height	2	ft.
	Force Media Width	3	ft.
	<b>Tank</b>		
	Tank Length	5	ft.
	Oil Storage Capacity	0	gal.
	<b>Inputs</b>		
	Flowrate	25	gpm
	Temperature	110	F
High Temperature	110	F	
Oil Specific Gravity	0.9		
Solids Specific Gravity	2.5		
Media Spacing	0.75	in.	
Removal	25	micron	
<b>Intermediate Calcs</b>			
Water Viscosity	0.00601	poise	
Product Rise Rate	0.01007	ft./min.	
Solid Drop Rate	0.16829	ft./min.	
Min. media area	332.02	sq.ft.	
Media Volume Req'd	7.91	cu.ft.	
Hydraulic Diameter	0.121	ft.	
<b>O U T P U T S</b>	<b>Media</b>		
	Media Width	3	ft.
	Actual Coalescing Area	504	sq.ft.
	Actual Settling Area	126	sq.ft.
	Actual Media Volume	12	cu.ft.
	Fluid Velocity in Pack	0.56	ft./min.
	Specific flowrate	0.0496	gpm/sq.ft.
	Detention Time in Pack	3.6	min.
	Actual Safety Factor	1.52	
	Reynolds No. (Low/High)	172	172

On 13 August at approximately 5:00PM, the system shut down due to a high temperature alarm in the oxidizer. The oxidizer attempted to reignite three times; failing each time. Upon visual inspection of the flame through the peek hole, it was observed that a large metallic object was obstructing the flame. Later, we would learn this was the daisy wheel. The oxidizer was officially taken offline, the power to the heater wells throughout the entire wellfield was reduced to 10%, and the extracted vapors were redirected through the backup vapor phase carbon units, consistent with the contingency plan design.

Starting on 15 August, TerraTherm began disassembling the inlet and outlet piping to the oxidizer for further internal inspections. With phone support from CCC, we were able to confirm that the daisy wheel had failed. CCC mobilized to the site on 21 August for additional disassembly of the oxidizer chamber itself.

## VENDOR INSPECTIONS

CCC disassembled the oxidizer piping before and after the combustion chamber, and the chamber itself. A summary of their findings is provided below:

- In the photo below, the process vapor inlet is from the left, and the burner flange is in the center. Note the shell discoloration is most likely from overheating. Combustion is designed to start ~3 ft away from this end plate, and there is evidence that pre-combustion was occurring upstream of the daisy wheel.





- The photo below shows the daisy wheel process flow distributor mounted on the end plate. The bent “petals” were oriented between 11:00 and 3:00 positions when viewed from the burner end plate. The impacted petals were discolored, further suggesting localized over-heating from influent vapors. A new daisy wheel assembly was designed, fabricated, and installed after this unit was removed for inspection. The replacement unit included a reinforcing ring welded to the petals of the wheel to minimize the chance of the assembly becoming distorted again due to high influent operating temperatures.





- In the photos below, the combustion chamber & roof show discoloration, likely due to impingement from a re-directed burner flame from the distorted shape of the daisy wheel.



- In the photo below, refractory has separated from the combustion chamber wall at the process inlet location, presumably due to localized over-heating.



Inspection of the heat exchanger showed some discoloration of the “turbulators” installed inside the heat exchanger tubes. These are helical bands of metal installed to boost heat transfer rates. Though discolored, there was no apparent distortion or damage observed on these devices. More importantly, the heat exchanger tubes and shell were in good condition.

#### **CONCLUSIONS AND CORRECTIVE ACTIONS**

- **CONCLUSION #1:** We suspect, but cannot confirm, that this failure may be due to a higher fuel value in the process vapor stream than detected by the single flammability analyzer. One plausible explanation is the analyzer location is not optimal, and we were getting some dilution flow through the dilution blower.
- **CORRECTIVE ACTION:** We have installed a second flammability analyzer at a sampling location influent to the heat exchanger, upstream of the dilution blower.

If both units consistently read acceptable LFL levels (<40%), and we still see evidence of pre-combustion, then that would suggest that additional testing is necessary to determine the nature of the contaminants and their combustion characteristics.

- CONCLUSION #2: Transient bursts of oily mist carrying fuel value in the process stream may have condensed or dropped out in the sample line and were not fully detected by the LFL sensor. It is possible that the mist eliminator in the air stripper was fouled and not properly removing mist from the stripper vent stream.
- CORRECTIVE ACTION: We have installed an organoclay media vessel downstream of the OWS to remove any free or emulsified oil from the OWS effluent. Once a day, the water color in the air stripper is inspected to confirm that the clay is not saturated. Spare clay is onsite. The mist eliminator in the air stripper was inspected, cleaned, and put back into service.
- CONCLUSION #3: We suspect that pre-combustion was occurring not only inside the heat exchanger when it was online, but may also have occurred in the inlet chamber of the oxidizer. This suspicion is based on visual observations of the inlet plenum where localized overheating appeared to have cause discoloration and deterioration of insulated surfaces inside this chamber. However, we cannot confirm this based on available operating data.
- CORRECTIVE ACTION: We have installed a new thermocouple sensor at the inlet to the oxidizer chamber and have programmed a high temperature shutdown alarm based on this device.

Additional CORRECTIVE ACTION: We have also increased our recording frequency to 1 minute intervals in order to better troubleshoot transient operating conditions that may occur in the future.

## INTERLOCKS

The system modifications described in this memorandum are depicted in the updated P&ID (only sheets modified are included). Additionally, the Alarm/Interlock schedule for the project has been updated to include the newly installed instruments and alarm settings. The Alarm/Interlock schedule is also provided as Attachment B. A summary of system improvements to address the operational issues described here is summarized below:

- An organoclay filter was added between the OWS and the air stripper to remove free or emulsified oil, and to reduce or eliminate any transient spikes in vapor concentrations related to fluid transfers between these two operations.
- A redundant LFL sensor was installed upstream of the heat exchanger and upstream of the dilution air blower. Like the primary unit, this device is programmed to alert operators with a warning alarm when 40% LFL is reached, and a shutdown alarm at 50%.

Additionally, a differential shutdown alarm will terminate operations if the readings from the two LFL sensors differ by more than 15%.

- The primary LFL sensor will continue to control the dilution air blower operation. The blower will idle whenever LFL levels are below 40%, and will speed up as LFL rise above this level.
- A temperature sensor was installed upstream of the daisy wheel to ensure that the inlet chamber temperatures remain close to the inlet process temperature. A shutdown Alarm is currently programmed to shut down operations if temperatures increase above 500°F in the inlet chamber to the oxidizer. Currently, the temperature of the process vapor as it enters the inlet plenum is approximately 220°F.

### **OPERATIONS GOING FORWARD**

To control the restart, the focus of subsurface heating operations will be on Phase 1 solely. Once the oxidizer is back online, data will be collected for some period (a couple days) to confirm the new instrumentation is functioning as designed. During this time, the pump to the OWS will be manually turned on in an attempt to replicate conditions seen prior to the daisy wheel failure.

If data appear to be consistent with design, Phase 1 will be increased over approximately one week in roughly 10% daily increments. Once we are at conditions similar to those observed prior to the shutdown event, and we are confident with the data collected/observed, we will begin to increase energy to the heaters in Phase 2. This will occur much slower than the original plan to ensure we do not exceed the operational limitations of the oxidizer, and that unexpected operating conditions do not adversely impact ongoing operations.

### **WHERE WE ARE TODAY**

We have had multiple discussions with CCC, Control Instruments (CI) (Prevex), and Bill Troxler sharing our analytical influent data results, the calculated BTU content data provided by the laboratory, and any system data requested to assist us in evaluation of the oxidizer shutdown.

Although still under review, at this time, none of our external support can identify a root cause for the oxidizer failure but has indicated that the flammability analyzer in use at the site may have up to a 50% error in its readings. This is largely because flammability analyzers are typically used in industrial settings where the process stream is consistent and can be easily monitored. CI has confirmed that the flammability analyzer in use is the best type for our application.

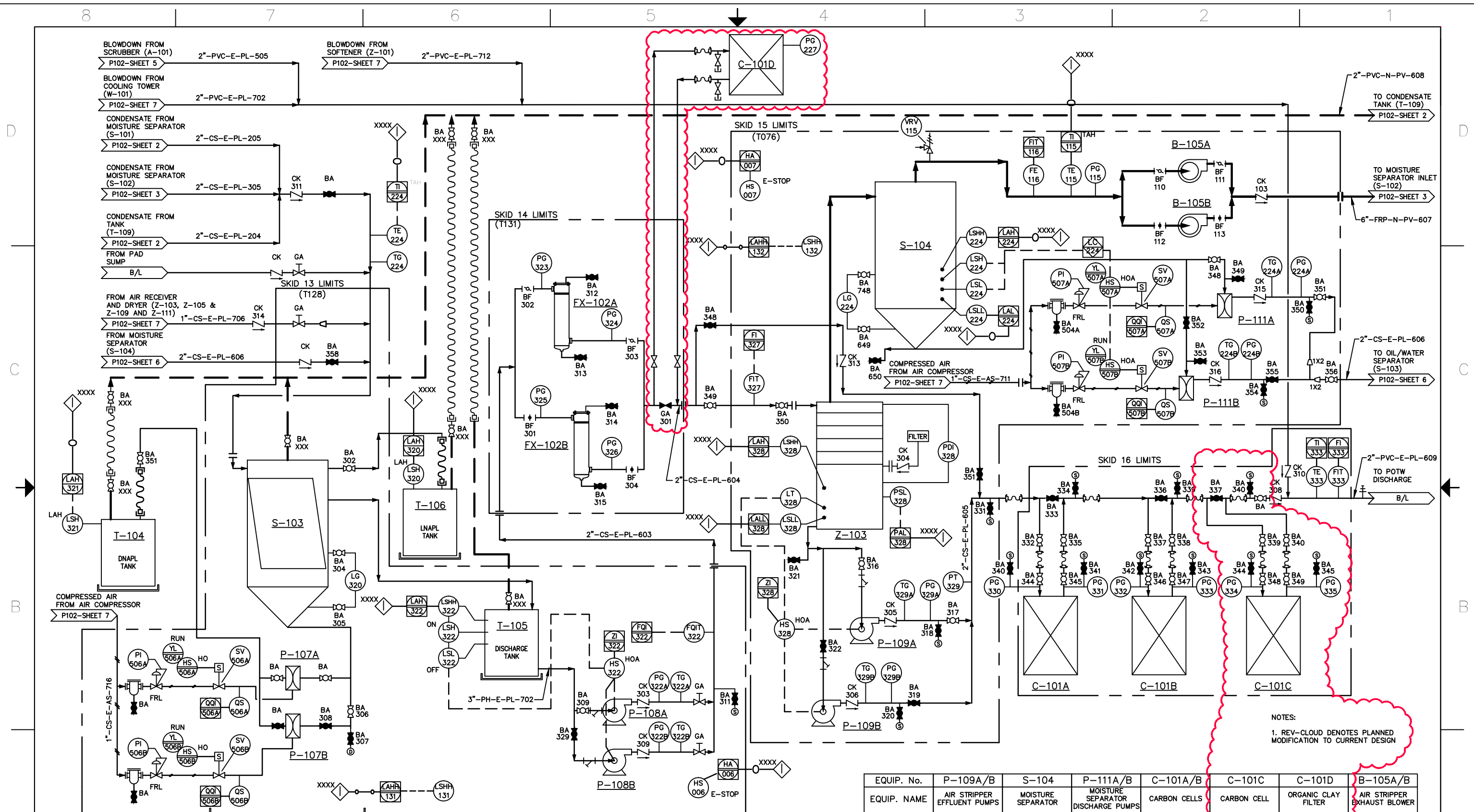
While the evaluation continues, we have made a conscious decision to operate extremely conservative, focusing on Phase 1 until the mass removal rate has decreased. We are assuming

that the flammability analyzer readings are at least 1/3 of the actual LFL value and will adjust as necessary based on recent laboratory data results. We have introduced dilution air into the system to maintain LFL levels below 12% and have reprogrammed the automated blower to begin ramp-up at 14% LFL.

**ATTACHMENT A**

Select P&ID Sheets Illustrating System Modifications





NOTES:  
1. REV-CLOUD DENOTES PLANNED MODIFICATION TO CURRENT DESIGN

EQUIP. No.	T-104	P-107A/B	S-103	T-105	T-106	P-108A/B	FX-102A/B	Z-103
EQUIP. NAME	DNAPL TANK	DNAPL PUMPS	OIL/WATER SEPARATOR	DISCHARGE TANK	LNAPL TANK	DISCHARGE PUMPS	BAG FILTER	AIR STRIPPER
VOLUME	55 GALLONS			150 GALLONS	55 GALLONS			
FLOW RATE		3 GPM	20 GPM	*INTEGRAL TO S-103*			20 GPM	50 GPM
PRESSURE						80 FT TDH		
POWER								

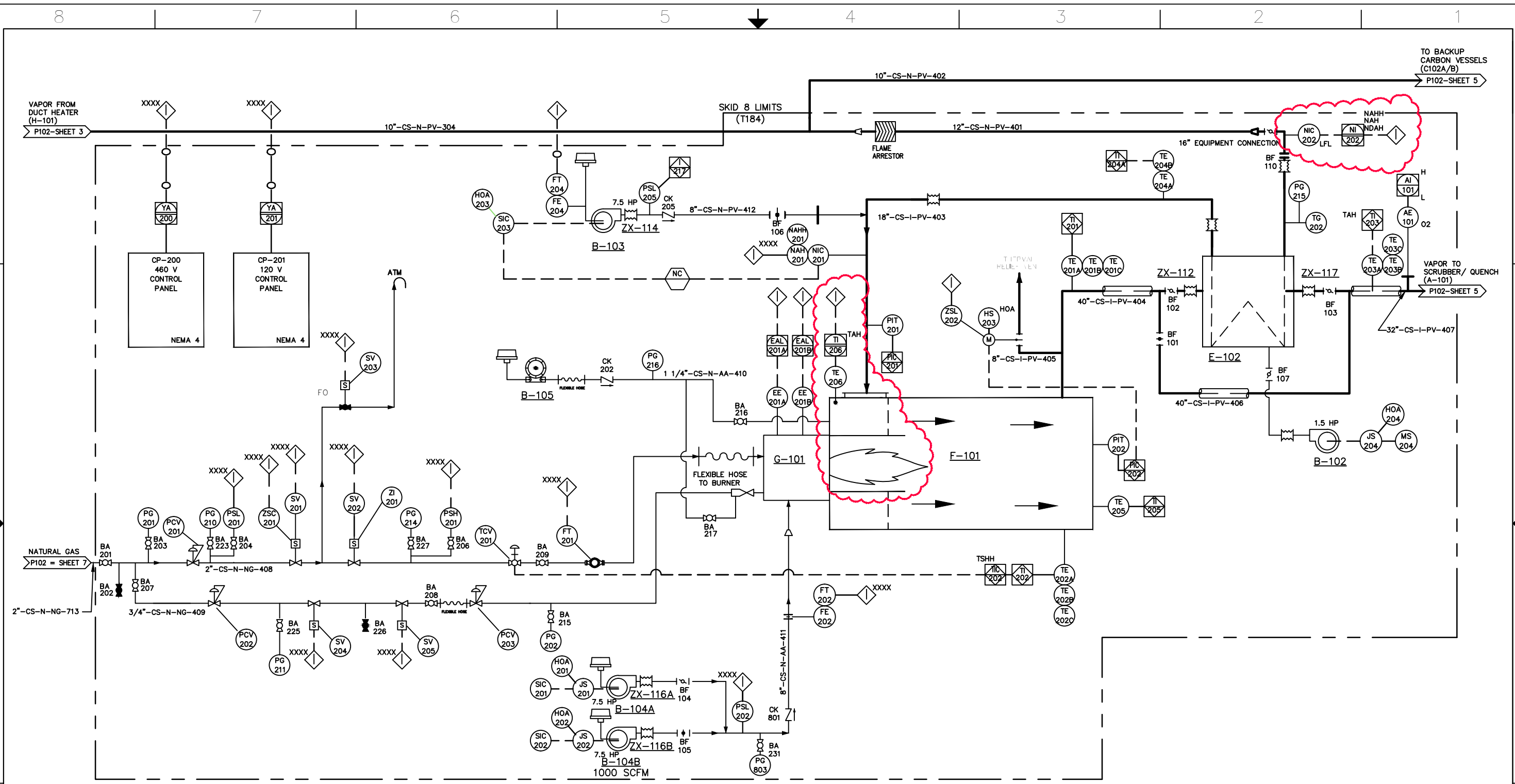
EQUIP. No.	P-109A/B	S-104	P-111A/B	C-101A/B	C-101C	C-101D	B-105A/B
EQUIP. NAME	AIR STRIPPER EFFLUENT PUMPS	MOISTURE SEPARATOR	MOISTURE SEPARATOR DISCHARGE PUMPS	CARBON CELLS	CARBON CELL	ORGANIC CLAY FILTER	AIR STRIPPER EXHAUST BLOWER
FLOW RATE	30 GPM	60 GALLONS	20 GPM	1000 POUNDS	500 POUNDS	2500 POUNDS	600 SCFM
PRESSURE	60 PSI		40 PSI	20 GPM	20 GPM	20 GPM	
	3 HP			50 PSI	50 PSI	50 PSI	15 HP



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SRNE SUPERFUND SITE  
PIPING & INSTRUMENTATION DIAGRAM  
LIQUID TREATMENT SYSTEM

SIZE	TWG NO.	
D	P102	2
SCALE	NONE	SHEET 6 OF 8



NOTES:  
 1. REV-CLOUD DENOTES PLANNED MODIFICATION TO CURRENT DESIGN

EQUIP. No.	B-103	B-104A/B	G-101	V-101	E-102	B-102
EQUIP. NAME	DILUTION AIR BLOWER	COMBUSTION AIR BLOWERS	OXIDIZER BURNER	THERMAL OXIDIZER	HEAT EXCHANGER	AIR SEAL BLOWER
VOLUME			4 MMBTU			
FLOW RATE	750 SCFM	1000 SCFM		3000 SCFM	3000 SCFM	
PRESSURE						
POWER	7.5 HP	7.5 HP				1.5 HP



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SRNE SUPERFUND SITE  
 PIPING & INSTRUMENTATION DIAGRAM  
 THERMAL OXIDIZER

SIZE: D	TWG NO.: P102	REV: 1
SCALE: NONE	SHEET: 4 OF 8	

ATTACHMENT B

Interlock Table



**ATTACHMENT F**

**April 2015 ISTR Demonstration of Attainment of Interim NAPL Cleanup Levels**

[provided on CD with hardcopies]



*de maximis, inc.*

200 Day Hill Road  
Suite 200  
Windsor, CT 06095  
(860) 298-0541  
(860) 298-0561 FAX

April 6, 2015

Ms. Karen Lumino  
Office of Site Remediation and Restoration, CT Superfund Section  
USEPA Region 1  
5 Post Office Square, Suite 100  
Mailcode OSRR07-4  
Boston, MA 02109

**Subject: Solvents Recovery Service of New England Inc. Superfund Site  
Southington, Connecticut  
Revised In-Situ Thermal Remediation – Demonstration of Attainment  
of Interim NAPL Cleanup Levels**

Dear Ms. Lumino:

Pursuant to Section VI, paragraph 12.b of the Consent Decree (CD) for the Remedial Design/Remedial Action at the Solvents Recovery Service of New England, Inc. Superfund Site entered on March 26, 2009 by the United States District Court for the District of Connecticut in connection with Civil Actions No. 3:08cv1509 (SRU) and No. 3:08cv1504 (WWE), and in accordance with Paragraph VIII.A of the Statement of Work (SOW) attached to the CD as Appendix B, enclosed please find the Revised In-Situ Thermal Remediation – Demonstration of Attainment of Interim NAPL Cleanup Levels and Recommendations. Also attached are responses to EPA's and CTDEEP's March 14, 2015 comments on the February 27, 2015 draft SRSNE Site ISTR Demonstration of Cleanup Levels report.

Please contact me if you have any questions.

Sincerely,

Bruce Thompson  
Project Coordinator

Enclosure

cc: Eva Davis, EPA  
Shannon Pociu, CTDEEP  
SRSNE Executive and Technical Committee  
Robin Swift, TerraTherm, Inc.

Albany, NY – Allentown, PA – Clinton, NJ – Greensboro, GA – Knoxville, TN – Riverside, CA  
San Diego, CA – Sarasota, FL – Houston, TX – Windsor, CT – Waltham, MA



## **Responses to Agency Comments**

Response to SRSNE Site ISTR Demonstration of Cleanup Levels (Feb 27, 2015)  
EPA/CT DEEP Comments of March 14, 2015  
(Responses in red)

General Comment

1. When discussing mass removal estimates, it is worth capturing the fact that what is being reported is an underestimate due to the thermox and LFL being taken off line briefly during meltdown over the summer, and then again towards the end of treatment when vapors were routed through carbon because of odor complaints.

Terminating the thermox and thus the use of the recovered fuel estimates in the estimate of mass removed effects the estimated total mass recovered on a daily basis and the total cumulative mass recovered estimate. One suggestion is to start with the mass estimate from the LFL at the time it was shut down, and assume this mass recovery decreased at the same rate as the TO-15 mass, to estimate how much fuel might still be recovered.

Addressed in section 3.3 of the revised document.

Specific Comments

2. Executive Summary, 5<sup>th</sup> bullet, and page 10, 3<sup>rd</sup> bullet. Replace “dropped substantially” with “leveled off” which is more consistent with the discussion on page 8.

Addressed in revised document.

3. Page 2, 5<sup>th</sup> paragraph, 2<sup>nd</sup> sentence. Delete what appears in the parenthesis which is out of place in a technical memo.

Addressed in revised document.

4. Table on page 3 shows that 64 vapor monitoring points were installed, and the first sentence of Section 3 states that subsurface vacuum levels were monitored. Please present a summary of this data, which was not included in the weekly progress reports.

Addressed in revised document and data provided as an attachment.

5. Page 5, 4<sup>th</sup> paragraph, 3<sup>rd</sup> sentence. Should this refer to Phase 1 rather than Phase 2 progress sampling locations?

Addressed in revised document

6. Page 6, last paragraph and Table 3 would be more appropriately placed in Section 3.3.

Addressed in revised document. Note: Table 3 and 4 titles have changed to follow proper sequence in the document.



7. Page 8, Section 3.3. Add to this section a discussion of what the peak mass removal rates were and when they occurred for each phase of heating. This will show a large contrast with the mass removal rates we have now at the end of treatment. There is a summary bullet on page 10 that states this.
8. Page 9. Consider adding to Section 3.4 a discussion about pre-treatment groundwater concentrations to demonstrate improvement following ISTR treatment.

Addressed in revised document.

9. Page 10. Recommendations should include increasing the vacuum on the subsurface to levels achieved during routine operation, after the heating is terminated to ensure that all remaining vapors are being recovered, and to reflect what actually happened post shutdown.

Addressed in revised document. Vacuum was increased on March 3, 2015, following approval to shutdown.

10. Page 10, Recommended Next Steps. Include a schedule for ISTR demobilization.

A draft demobilization plan has been added as an attachment

11. Figures B & C. Please add notes on each figure identifying the time period during which the shaded areas were heated.

Figures have been revised

12. Progress Soil Sampling Figures & Tables. Please provide figures that show the locations for all the confirmation soil samples. The figures are not clearly titled or labeled as to the phase and what they are showing, and they need keys. Sample dates can also be provided on all figures. Please include sampling summary information for all confirmation samples in Table 1.

Figures and tables have been revised

13. Toluene, because it is a COC, should be included on the groundwater trends graphs.

Toluene has been added to the trend graphs.

14. Soil temperature. Figures provided are out of order in the PDF document. Make sure to re-order them when finalizing the document.

Addressed



**In-Situ Thermal Remediation  
Demonstration of Attainment of Interim NAPL Cleanup  
Levels and Recommendations**

## **Executive Summary**

In-Situ Thermal Remediation (ISTR) was conducted at the Solvents Recovery Services of New England, Inc. Superfund Site in Southington, Connecticut as required by the Remedial Design / Remedial Action Consent Decree (CD). The goal of ISTR was to reduce volatile organic contamination (VOC) in the overburden treatment zone to levels that are not indicative of the presence of pooled or residual non-aqueous phase liquids (NAPL). Interim NAPL Cleanup Levels (INCLs) representative of soil concentrations that are not indicative of the presence of NAPL were established in the CD. The treatment zone was 56,670 cubic yards of soils that was estimated in the Feasibility Study to contain 500,000 to 2,000,000 pounds of VOCs.

The design process resulted in a decision to reduce peak VOC loading on the vapor treatment system by splitting the treatment zone into two phases, starting heating of the second phase after the VOC extraction rate in the first phase had peaked (roughly 60 days after Phase 1 startup).

The ISTR system was installed between April 2013 and May 2014, and heating in Phase 1 was initiated on May 15, 2014. Heating in Phase 2 started on July 16, 2014. Heating was continued until process monitoring suggested that 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. A total of 496,400 pounds of VOCs were removed through February 20, 2015. 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 Interim NAPL Cleanup Levels.
- Calculations of mass removed show that ISTR exceeded the expectation of 95 to 99% removal
- Soil temperatures within the ISTR treatment area have met design goals, and exceed the temperature where the target VOCs can exist as NAPL.
- 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.
- The mass removal versus time date indicates that the rate of mass removal leveled off as of January 16, 2015, indicating the system operation had passed a point of diminishing returns
- Mass removal rates declined from a peak of ~10,000 pounds TVOC per day to 26 pounds TVOC per day.

### **1. Introduction**

On September 30, 2005, the United States Environmental Protection Agency (EPA) issued a Record of Decision (ROD) (EPA 2005) for the Solvents Recovery Service of New England, Inc. (SRSNE) Superfund Site in Southington, Connecticut (Site). A

Consent Decree (CD) and Statement of Work (SOW) were subsequently prepared for the Remedial Design/Remedial Action (RD/RA) at the Site. The CD was developed between the EPA and the SRSNE Site Group (Group), and lodged on October 30, 2008 with the United States District Court for the District of Connecticut (Civil Action Nos. 3:08cv1509 (SRU) and No. 3:08cv1504 (WWE)). The CD was entered by the Court on March 26, 2009. The CD and the SOW define the response activities and deliverable obligations that the Group has to perform to implement RD/RA activities at the Site.

The ROD requires In-Situ Thermal Remediation (ISTR) to address an area where volatile organic compound (VOC) non-aqueous phase liquids (NAPLs) are present in the overburden soils (referred to as the Overburden NAPL Area). The Feasibility Study (FS) estimated that the Overburden NAPL Zone contains 500,000 to 2,000,000 pounds of VOCs. ISTR was implemented at the Site pursuant to the approved 100% Design / Remedial Action Work Plan and Project Operations Plan (ISTR RAWP/POP; TerraTherm 2014).

The ISTR design resulted in a decision to reduce the peak VOC loading to the vapor treatment system. This resulted in dividing the ISTR system roughly in half, and treating the Site in two phases (Phase 1 and 2), as shown in Figure A (Heating Zone Sequence). The intent of this approach was to spread the peak VOC loading out, by starting to heat Phase 2 approximately 60 days after commencing Phase 1 heating, or after confirming a decrease in Phase 1 VOC mass loading.

ISTR well field installation commenced on April 23, 2013. As a result of sheen, staining, and NAPL observed at drilling locations outside the designed thermal treatment zone the Group performed additional investigation, which delineated the extent of that NAPL. That investigation resulted in a decision to add eight additional heater wells southwest of the TTZ and to add six heater wells to the east.

During well field installation, it was noted that the depth to competent bedrock averaged approximately 3 feet deeper than predicted. The depth to rock was based on historic knowledge, which included the prior NAPL delineation study and a limited number of monitoring wells in the Operations Area. The method used to determine "top of rock" was also different. During the FS NAPL delineation study, geoprobes were utilized, which met refusal at the interpreted top of weathered rock. The ISTR heaters were installed with rotasonic drilling, which does not easily differentiate weathered rock from the overlying till, so the drilling proceeded into the "competent rock" and the depths to top of weathered and competent rock are visually interpreted from the recovered core material.

ISTR well field work was completed on September 24, 2013, and consisted of the following system components:

<b>Subsurface Item</b>	<b>Number Installed</b>
Heater Wells	607
Vapor Extraction Wells (Vertical)	551
Vapor Extraction Wells (Horizontal)	290 lineal feet
Temperature Monitoring Points	99
Vacuum Monitoring Points	64
Groundwater Monitoring Wells	7

Installation of the ISTR cap commenced on September 30, 2013 and was completed on October 30, 2013. Construction of the above ground portion of the ISTR system occurred after completion of the cap. Shake down of the completed ISTR system was completed in May 2014, and Phase 1 heating commenced on May 15, 2014. Phase 2 heating commenced on July 16, 2014. Heating of both phases was suspended on August 13, 2014 as a result of failure of part of the oxidizer used to treat VOC vapors. While heating was suspended, the heaters were reduced to “idle” (approximately 10% of capacity, necessary to protect them from rapid cooling). The oxidizer was repaired, and additional process monitoring implemented to help prevent a re-occurrence. Heating of Phase 1 at full power resumed on September 12, 2014, Phase 2 heating resumed on September 30, 2014. Confirmation soil sampling and completion of treatment in Phases 1 and 2 is discussed in Section 3 of this report.

## **2. Remediation Objectives / Performance Standards**

The ROD identified the following Remediation Objective for the Overburden NAPL Area:

“Reduce NAPL mass to achieve one or more of the following:

- shorten the time frame that groundwater standards are exceeded,
- shrink the size of the groundwater plume,
- reduce groundwater concentrations, and
- prevent the migration of NAPL.”

The ROD further states that “VOC contamination in the treatment zone will be reduced to levels that are not indicative of the presence of pooled or residual NAPL.” EPA determined that the attainment of such levels would be comparable to a VOC mass reduction within the treatment zone of 95 to 99%. The ROD also set a requirement to determine the contaminant concentrations in soil that are not indicative of the presence of pooled or residual NAPL. That determination was made in the SOW for the RD/RA at the Site. Section IV.A.4 of the SOW lists the following Interim NAPL Cleanup Levels (INCLs), as measured in soil:

Compound	Interim NAPL Cleanup Level mg/kg (parts per million)
Trichloroethylene (TCE)	222
Tetrachloroethylene (PCE)	46
1,1,1-Trichloroethane	221
Ethylbenzene	59
Toluene	48
p/m-Xylene	70
o-Xylene	42

Section IV.A.4 of the SOW also states:

*At the time all the Interim NAPL Cleanup Levels are attained in the Overburden NAPL Area, EPA will evaluate whether to continue to operate the in-situ thermal treatment system in areas within the Overburden NAPL Area where EPA determines that appreciable amounts of NAPL contamination continue to be recovered. For this purpose, EPA will only require continued operation of the portions of the in-situ thermal treatment where “appreciable recovery of NAPL contamination” continues to occur.*

*Regardless of the level of recovery, the maximum amount of time that EPA shall require continued operation of the in-situ thermal treatment system in portions of the Overburden NAPL Area where appreciable recovery of NAPL contamination continues to occur, after all the Interim NAPL Cleanup Standards are achieved, shall not exceed the initial heating time required to achieve Interim NAPL Cleanup Levels (e.g., if it takes 180 days of heating to achieve all the Interim NAPL Cleanup Levels, the maximum amount of time that EPA will require that any or all wells be operated will be an additional 180 days). The start date for measuring the duration of such period of additional operation, if any, will be the first day of operation after the collection of the last sample within the data set used to successfully demonstrate that all Interim NAPL Cleanup Levels have been attained at every location.*

### **3. ISTR Monitoring and Monitoring Results**

Various operational parameters including soil VOC concentrations, soil temperature, sub-surface vacuum levels, VOC mass extracted and extraction rate, and groundwater VOC concentrations were monitored during the course of ISTR operations to assess treatment progress. Once those parameters indicated that sufficient treatment within Phase 1 and Phase 2 had occurred, soil sampling programs were implemented to evaluate whether the INCLs had been met for each phase of treatment. The approach for confirmation soil sampling was initially presented in Section 6.2 of the Thermal Treatment Performance Criteria document (Attachment C to the Remedial Design Work

Plan [RDWP]) (ARCADIS 2010). Pending further development of the ISTR design documentation and corresponding discussions with the EPA, the preliminary approach for confirmation soil sampling was presented in Section 13.10.2 of the ISTR RAWP/POP. The final approach approved by EPA was presented in the ISTR Confirmatory Soil Sampling Plan – Revised (ARCADIS, November 2014).

The remainder of this section presents the results of confirmatory soil sampling, soil temperature monitoring, VOC mass extracted to date, VOC mass extraction rates, and groundwater VOC trends. Results for Phase 1, Phase 2 and VEW data are presented separately.

### **3.1 Progress and Confirmatory Soil Sampling**

Although not part of the formal demonstration of compliance, Phase 1 soil samples were collected by TerraTherm from October 14 to 21, 2014. Analyses of those samples supported the decision to perform confirmatory sampling. That was TerraTherm's second Phase 1 "progress soil sampling" event. The attached figure and table shows the Phase 1 progress sampling locations and analytical data for that sampling event. That second progress soil sampling effort represented a biased sampling scheme where locations were selected based on lagging temperature progressions and/or known site features (former lagoon, former drum staging area, etc.). Only one sample, T70 – 9', located along the Phase 1/Phase 2 boundary line had concentrations of VOCs detected above the INCLs. Samples were also collected at this location at 4', 7.5', 18' and 19.5' below grade, each met the INCLs. The centroid nearest this location was resampled during the confirmation sampling effort and also met the INCLs.

Phase 1 confirmation soil samples were collected from November 11 to 19, 2014 in the Phase 1 treatment area in accordance with the ISTR Confirmatory Soil Sampling Plan – Revised. Sixty samples were collected from 28 locations within the Phase 1 treatment area and analyzed for VOCs. The attached figure and table shows the Phase 1 progress sampling locations and analytical data for this sampling event. All sample results were less than INCLs. Even though the soil sampling results were less than INCLs, vapor data indicated VOC mass was still being recovered from an area of Phase 1 adjacent to Phase 2. Those results and other relevant data were summarized in a report submitted to EPA on December 1, 2014 titled "In-Situ Thermal Remediation - Phase 1 Confirmation Sampling Results and Recommended Operating Modifications." On December 3, 2014, EPA approved a partial shutdown of Phase 1 heaters as proposed in the report (heaters in the area where Phase 1 VOC mass continued to be recovered remained energized), as shown in Figure B.

Phase 2 progress soil sampling was conducted by TerraTherm from December 1 to 8, 2014. Soil samples collected at two of the 22 locations had concentrations exceeding INCLs, all others met the INCLs. The attached figure and table shows the Phase 2 progress sampling locations and analytical data for that sampling event. Based on these results, heating continued and Phase 2 confirmation sampling was conducted from January 5 to January 14, 2015. Sixty-one soil samples were collected from 22

locations within the Phase 2 treatment area. During the initial sampling, one or more depth intervals at three locations (CSL-32, -33, and -34) did not meet INCLs, all other samples were less than INCLs. Samples from two of the locations (CSL-033 and -034) that did not meet INCLs were collected on January 6 and 7, respectively. Re-sampling near those locations was conducted on January 14. One location (CSL-033) met INCLs after re-sampling, and the other (CSL-034) showed an order of magnitude reduction in concentration but still exceeded INCLs.

On January 17, 2015, additional insulation was placed on the concrete cap around the area where soil samples CSL-032, -033, and -034 were collected. In addition, the heaters were raised within the heater cans in this area where INCLs were not met, in order to increase heating the shallow subsurface (the depth interval where soil VOC concentrations were still above INCLs). On January 29, 2015, EPA approved a partial shutdown of Phase 2 heaters, as shown on Figure C. Re-sampling in the vicinity of CSL-32, -33, and 34 was conducted February 3 through February 4, 2015. That program targeted locations immediately north and south of those locations, with samples collected at three depths per location, resulting in the collection of 18 samples. All but one sample met INCLs. The shallowest sample at CSL-032S exceeded INCLs. Additional insulation was added to the area around CSL-032 and heating continued. That location was re-sampled on February 17, 2015. That sample and a duplicate both met INCLs.

The attached Figure 1A shows confirmatory sampling locations. Figure 1B depicts the final confirmation sampling results pictorially. A summary of sampling depths and other relevant information is provided in Table 1. As noted on Table 1, refusal occurred at several boring locations during the confirmatory soil sampling. When possible, efforts were made to shift the drill rig to reach the target sample depth intervals. However, in some instances boring refusal required sampling at an alternative depth interval, as indicated in Table 1. The potential inability to collect certain targeted samples was contemplated in the ISTR Confirmatory Sampling Plan - Revised, which stated: "In the event that the target sample depth interval cannot be achieved (e.g., because of insufficient recovery at the target interval or refusal of the drilling equipment at a shallower depth), efforts will be made to collect a sample from the same boring as close as possible to the targeted interval. To minimize the number of penetrations through the concrete cover, multiple borings per location will not be advanced solely for the purpose of sampling the specific interval targeted." Notwithstanding this statement, we attempted multiple borings at some locations in an effort to meet the objectives. Tables 2A and 2B, provide analytical data for Phase 1 and Phase 2 soil confirmatory sampling.

### **3.2 Soil Temperatures**

Average wellfield temperatures for Phase 1 achieved 100°C on September 19, 2014 and remained at or above 100°C for approximately 10 weeks. Average wellfield temperatures for Phase 2 achieved 100°C on November 3, 2014, and remained at or above 100°C for approximately 14 weeks.



Shallow thermocouples in Phase 1 achieved and maintained a temperature of at least 90°C for a minimum of 30 days, with many remaining at 90°C for approximately 90 days (see Figure 2A). The exceptions were T03 and T70, both at the shallowest interval (0 -2 ft bgs). T03 is located along the western perimeter of the well field where soils were observed to be NAPL impacted during well field installation. T70 is located along the Phase 1/Phase 2 dividing line toward the eastern side of the thermal treatment zone. Confirmation soil samples representative of those areas were collected from CSL-002 (T03) from 3.7 ft bgs and 7.5 ft bgs and CSL-040 (T70) from 4 ft bgs, 12.5 ft bgs, and 15 ft bgs. Bottom of treatment zone thermocouples have achieved and maintained a temperature of at least 90°C for an average of three months (see Figure 3A).

Shallow thermocouples in Phase 2 achieved and maintained a temperature of at least 90°C for a minimum of 44 days, with many remaining at 90°C for more than 100 days (see Figure 2B). Bottom of treatment zone thermocouples have achieved and maintained a temperature of at least 90°C for a minimum of 91 days, and an average of 148 days (see Figure 3B).

Table 3 (attached) provides the minimum and maximum temperature for each thermocouple, calculates the number of days at or over 90°C and at or over 100°C, and provides the temperature history for each thermocouple over the duration of Phase 1 heating.

### 3.3 VOC Mass Removed and Mass Extraction Rates

The ROD anticipated that ISTR would remove 95% to 99% of the NAPL mass. We evaluated the performance of ISTR by distributing the total VOC mass removed over the total mass of target soils (by converting the soil volume to mass using a bulk density of 1.86 grams / cubic centimeter), as illustrated below in Table 4.

**Table 4 – Percent Removal Calculation**

Total VOCs removed (through 2/20/2015)					
pounds	Kg	mg			
496,400	225,636	2.26E+11			
Soil Volume / Mass					
yards <sup>3</sup>	meter <sup>3</sup>	cc	g/cc	g	kg
56,770	43,404	4.34E+10	1.86	8.07E+10	8.07E+07
Average VOCs pre-treatment (VOCs/Soil Mass)				2,795	mg/kg
Average VOCs post-treatment				7.445	mg/kg
pre/post average concentration				0.2664%	
<b>Percent Removal</b>				<b>99.73%</b>	

This calculation uses the average confirmatory soil sample results from both Phase 1 and 2, and the total mass removed through February 20, 2015. As VOCs continued to be removed after completion of confirmatory sampling, the final post-treatment soil concentrations are likely lower than the average used in this calculation.

Mass removal estimates are determined using three different streams and then summing those individual streams together. The three streams are as follows:

- Data recorded from the flammability analyzer (converted from percent to a mass using laboratory calculated BTU content – ASTM method);
- EPA TO-15 analytical laboratory data for chlorinated compounds that are assumed not to be detected by the flammability analyzer, and
- Accumulated LNAPL (assuming a density of toluene).

Total VOC concentrations are recorded using a hand-held photo ionization detector (PID) and flow measurements are collected using a hand-held manometer. PID concentrations for each of the 29 locations are shown on Table 5. Using the data, mass fractions are determined and used to calculate mass removed and mass removal rates separately for Phase 1 and Phase 2.

For the periods between August 14 and 29, 2014 and after January 9, 2015, when the thermal oxidizer was not in operation, the flammability analyzer (FA) readings were estimated in order to give a more accurate total mass removal rate. To estimate the flammability reading during these periods, an average PID:FA reading ratio was taken for the week prior to the thermal oxidizer shutdown. This ratio was then applied to the continued PID readings during the corresponding thermal oxidizer shutdown period to yield theoretical FA readings during the shutdown. The theoretical FA readings were then used to calculate a mass removal rate based on FA readings. In addition, laboratory data for chlorinated compounds was used to calculate a chlorinated mass removal, as chlorinated mass is not detected by the flammability analyzer. The total mass was then calculated as the sum of the two mass estimates, plus any accumulated NAPL. This enabled a more accurate and consistent mass removal estimate for these periods and over the duration of the project.

Through February 20, 2015, the mass removal values are:

- Total VOC mass removed            496,400 pounds (Figure 4)
- Phase 1 VOC mass removed        253,000 pounds (Figure 5)
- Phase 2 VOC mass removed        243,000 pounds (Figure 6)

Each of the mass removal figures shows a flattening (e.g., reaching asymptotic limit) in the removal versus time curve, indicating removal has reached the point of diminishing returns.

On February 20, 2015, the mass removal rates were:

- Total system                            39 pounds per day (Figure 7)
- Phase 1                                    10 pounds per day (Figure 8)

- Phase 2 29 pounds per day (Figure 9)

Review of the TO-15 results shows that ~25% of the VOCs quantified with this analysis are ketones (acetone and 2-butanone), which are known to be formed through abiotic degradation of natural organic material in the heated soil. Removing these ketones results in corrected mass removal rates on February 20, 2015 as follows:

- Phase 1 8 pounds per day (Figure 10)
- Phase 2 22 pounds per day (Figure 11)

Influent data are collected from a sample port located downstream of the well field at the influent to the thermal oxidizer or primary carbon vessel. Those data represent the total well field. Individual vapor samples are collected using Tedlar bags from 29 locations along the manifold as shown in Figure 12. As illustrated in Table 5 and Figure 13, the current mass fraction (percent of the total being removed) for Phase 1 is 28%; the remainder of the mass (72%) is being removed from Phase 2. Vacuum levels were measured at VEWs in the ISTR well field after startup to confirm the system was working, then routinely monitored in the vacuum manifold legs throughout system operation. This data is presented in Table 6.

The peak mass removal rate for Phase 1 was approximately 4,000 pounds/day which occurred on August 12, 2014, just prior to the oxidizer shutdown. Between August 13 and September 4, 2014, mass removal rates dropped significantly corresponding to a reduced heater energy and well field vacuum. Once the oxidizer was back online and heating and vacuum rates increased to their design/operational setpoints, mass removal rates increased to approximately 3,000 pounds/day.

The peak mass removal rate for Phase 2 was approximately 4,600 pounds/day which occurred on October 2, 2014. This peak concentration corresponds to Phase 2 coming online and ramping up to full operational set points (temperatures). This removal rate continued for approximately one month before starting to decrease.

### **3.4 Groundwater Sampling**

Groundwater samples were collected from seven monitoring wells (ISTR 1 – 7) located within the thermal treatment area. Samples were collected before heating commenced, and monthly during ISTR. The attached figures and tables summarize those data. As illustrated in Table 7, groundwater concentrations are below the effective solubility levels for target compounds, indicating compliance with the ROD objective that “VOC contamination in the treatment zone will be reduced to levels that are not indicative of the presence of pooled or residual NAPL.”

The highest pre-treatment total VOC (TVOC) concentration was ~598 mg/L, observed at monitoring well ISTR-1. During ISTR, the TVOC concentration in ISTR-1 increased to a maximum of ~645 mg/L (June 2014 sampling event). These concentrations equate to 54% and 67%, respectively, of the effective solubility. Post-ISTR, the TVOC

concentration in monitoring well ISTR-1 had decreased to 34.4 mg/L, a 94.7% reduction from the peak concentration.

The highest post-treatment TVOC concentration was 56.4 mg/L, observed at monitoring well ISTR-7. That concentration equates to 14% of the effective solubility. As shown in Table 8, those concentrations are less than equilibrium pore-water concentrations that would be associated with residual soil concentrations found during confirmation sampling at CSL-050, the nearest location to ISTR-7. The average post-ISTR concentration is 15.6 mg/L, which equates to 3% of the effective solubility.

Average TVOC concentrations (average of all 7 ISTR monitoring wells) are shown on Figure 14. In general, total VOC concentrations in groundwater decreased an average of 87% from peak concentrations across the treatment area, ranging from a decrease of 57% (ISTR-2) to a decrease of 99% (ISTR-6). VOC concentrations were reduced by 95% or more in five of the seven wells, with a median value of 95%.

### **3.5 Perimeter Air Monitoring**

Perimeter air monitoring was performed in accordance with the approved plan throughout ISTR construction and operation. No exceedances of action levels occurred through the course of construction and operation. Complaints of objectionable odors were made by the Southington Police Department (SPD) starting in December 2014. The SPD headquarters is located approximately 700 feet north of the ISTR treatment area. The source of the odors was not determined. In reaction to the complaints, the thermal oxidizer was taken offline on January 10, 2015. Since that time, extracted vapors have been treated using vapor-phase granular activated carbon.

## **4 Monitoring Results Summary**

Based on the data presented in Section 3, we offer the following with respect to in-situ thermal remediation:

- 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 Interim NAPL Cleanup Levels.
- Calculations of mass removed suggest that ISTR results exceeded the ROD expectation of 95 to 99% removal
- Soil temperatures within the ISTR treatment area have met design goals, and exceed the temperature where the target VOCs can exist as NAPL.
- 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.
- The plot of Phase 2 mass removal versus time (Figure 6) indicates that the rate of mass removal leveled off as of January 16, 2015, indicating the system operation has passed a point of diminishing returns

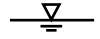
- Mass removal rates have declined from a peak of ~10,000 pounds TVOC per day to 26 pounds TVOC per day.
- The date of collection of the last sample used to demonstrate attainment of Phase 1 Interim NAPL Cleanup Levels was November 20, 2014. Accordingly, the duration of Phase 1 heating was 158 days, and the start date for additional operation was November 21, 2014. The date of collection of the last sample used to demonstrate attainment of Phase 2 Interim NAPL Cleanup Levels was February 17, 2015. Accordingly, the duration of Phase 2 heating was 146 days, and the start date for additional operation was February 18, 2015.

## **5 Recommended Next Steps**

Based on the data presented above, the INCLs have been met throughout the overburden NAPL zone. There is no indication of appreciable recovery of NAPL occurring through continued operation of the ISTR system. Accordingly, we recommend that heating be immediately terminated and increasing the vacuum on vapor recovery system to levels that will optimize removal of remaining vapors. Vapor recovery will cease once soil temperatures drop below 100°C. Once soil temperatures drop below the level to generate steam, there will no longer be a driving force present that could cause residual vapor phase VOC migration.

Once vapor recovery is terminated, we recommend that the ISTR system be demobilized.

A demobilization plan and schedule are attached.

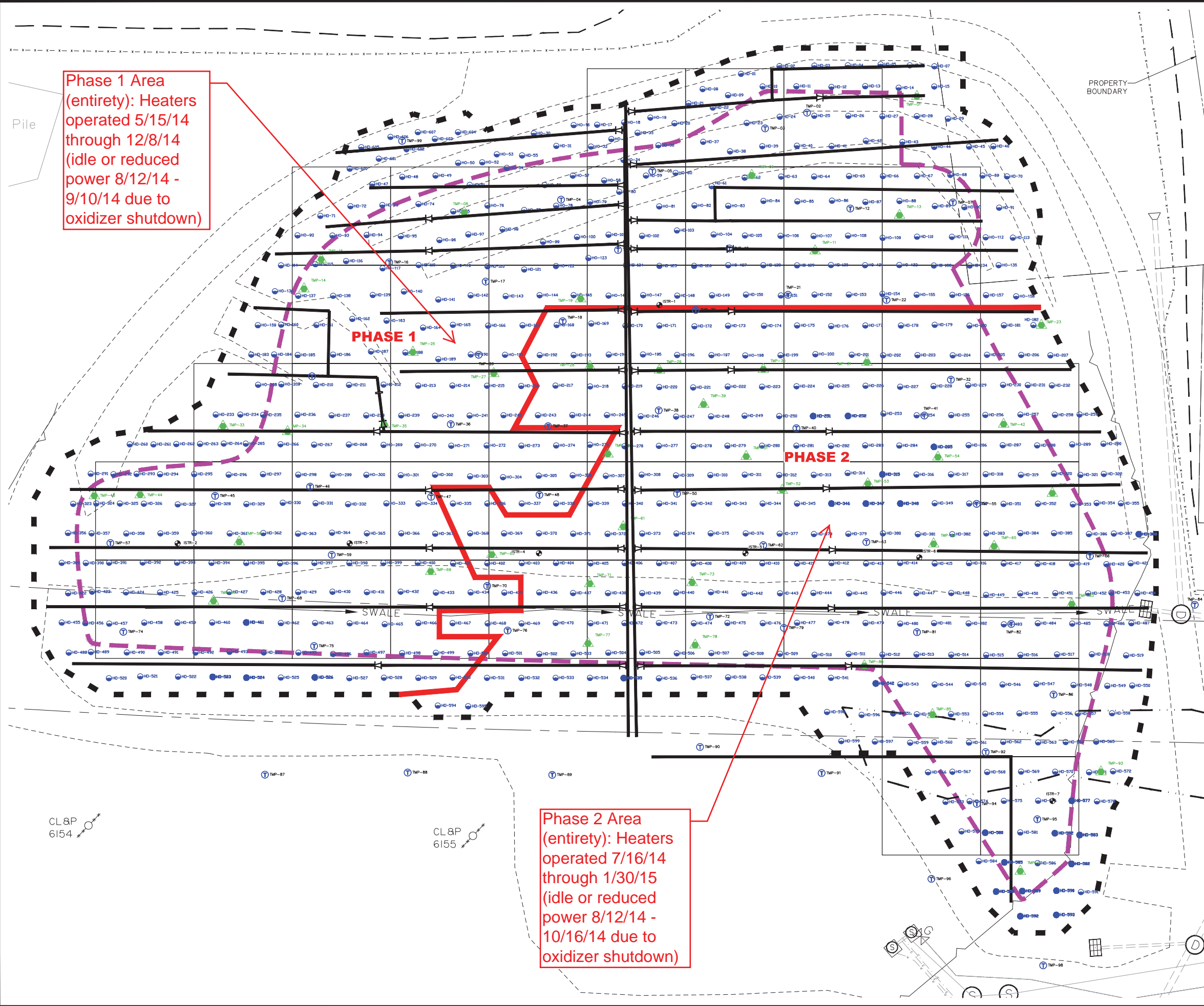


**Heating Zones  
Figures A, B and C**

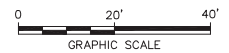
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Phase 1 Area (entirety): Heaters operated 5/15/14 through 12/8/14 (idle or reduced power 8/12/14 - 9/10/14 due to oxidizer shutdown)

Phase 2 Area (entirety): Heaters operated 7/16/14 through 1/30/15 (idle or reduced power 8/12/14 - 10/16/14 due to oxidizer shutdown)



- LEGEND:
- ISTR COVER LIMITS
  - THERMAL TREATMENT ZONE
  - PHASE I/II BOUNDARY
  - PROPERTY LINE
  - WETLAND BOUNDARY
  - ELECTRIC LINE
  - GAS LINE
  - TELEPHONE LINE
  - WATER LINE
  - CHAINLINK FENCE
  - SANITARY SEWER
  - SHEET PILE CONTAINMENT WALL
  - EDGE OF GRAVEL DRIVE
  - wg WATER GATE
  - ▣ CATCH BASIN
  - ⊙ MANHOLE SANITARY
  - ⊙ UTILITY POLE
  - ⊙ GUY
  - ⊙ MANHOLE DRAINAGE
  - ⊙ HEATER WELL LOCATION AND IDENTIFICATION
  - ⊙ ISTR-3 ISTR WELLS
  - ⊙ TMP-50 TMP LOCATIONS



SRSE SUPERFUND SITE  
SOUTHINGTON, CONNECTICUT

**BOUNDARY BETWEEN PHASE 1 AND 2 CIRCUITS**




FIGURE  
**A**

CL&P  
6154

CL&P  
6155

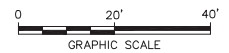
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Phase 1 Area (partial): Heaters operated 12/9/14 through 1/21/15

Phase 2 Area (entirety): Heaters operated 7/16/14 through 1/30/15 (idle or reduced power 8/12/14 - 10/16/14 due to oxidizer shutdown)

LEGEND:

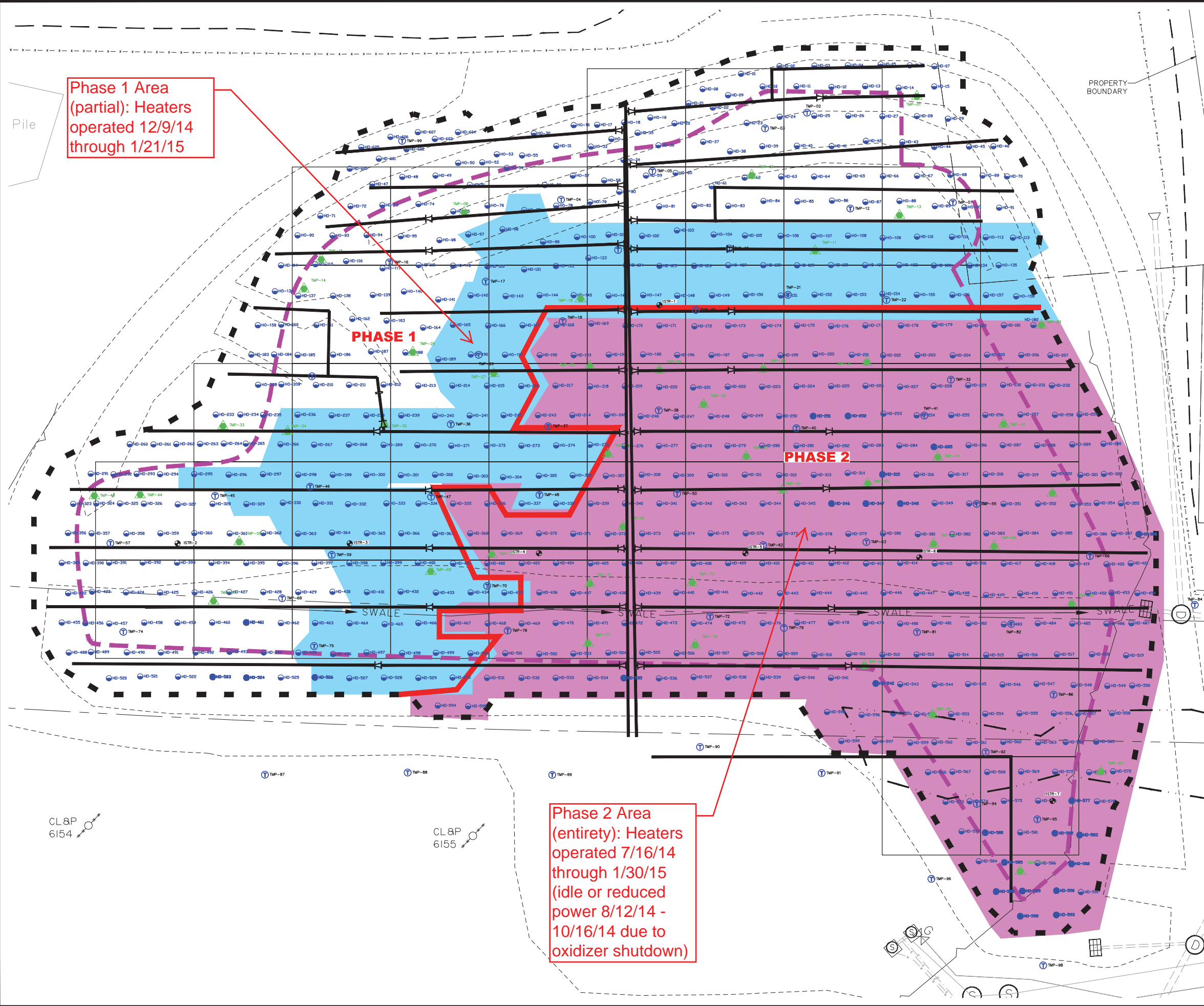
- ISTR COVER LIMITS
- THERMAL TREATMENT ZONE
- PHASE I/II BOUNDARY
- PROPERTY LINE
- WETLAND BOUNDARY
- ELECTRIC LINE
- GAS LINE
- TELEPHONE LINE
- WATER LINE
- CHAINLINK FENCE
- SANITARY SEWER
- SHEET PILE CONTAINMENT WALL
- EDGE OF GRAVEL DRIVE
- wg WATER GATE
- CATCH BASIN
- MANHOLE SANITARY
- UTILITY POLE
- GUY
- MANHOLE DRAINAGE
- HEATER WELL LOCATION AND IDENTIFICATION
- ISTR-3 ISTR WELLS
- TMP-50 TMP LOCATIONS
- PHASE 1 HEATER TO REMAIN ONLINE
- PHASE 2 HEATED AREA (PROPOSED - 11/20/2014)



SRSE SUPERFUND SITE  
SOUTHINGTON, CONNECTICUT

**HEATED CIRCUIT AREAS  
FOLLOWING PARTIAL PHASE 1  
SHUTDOWN**

FIGURE  
**B**



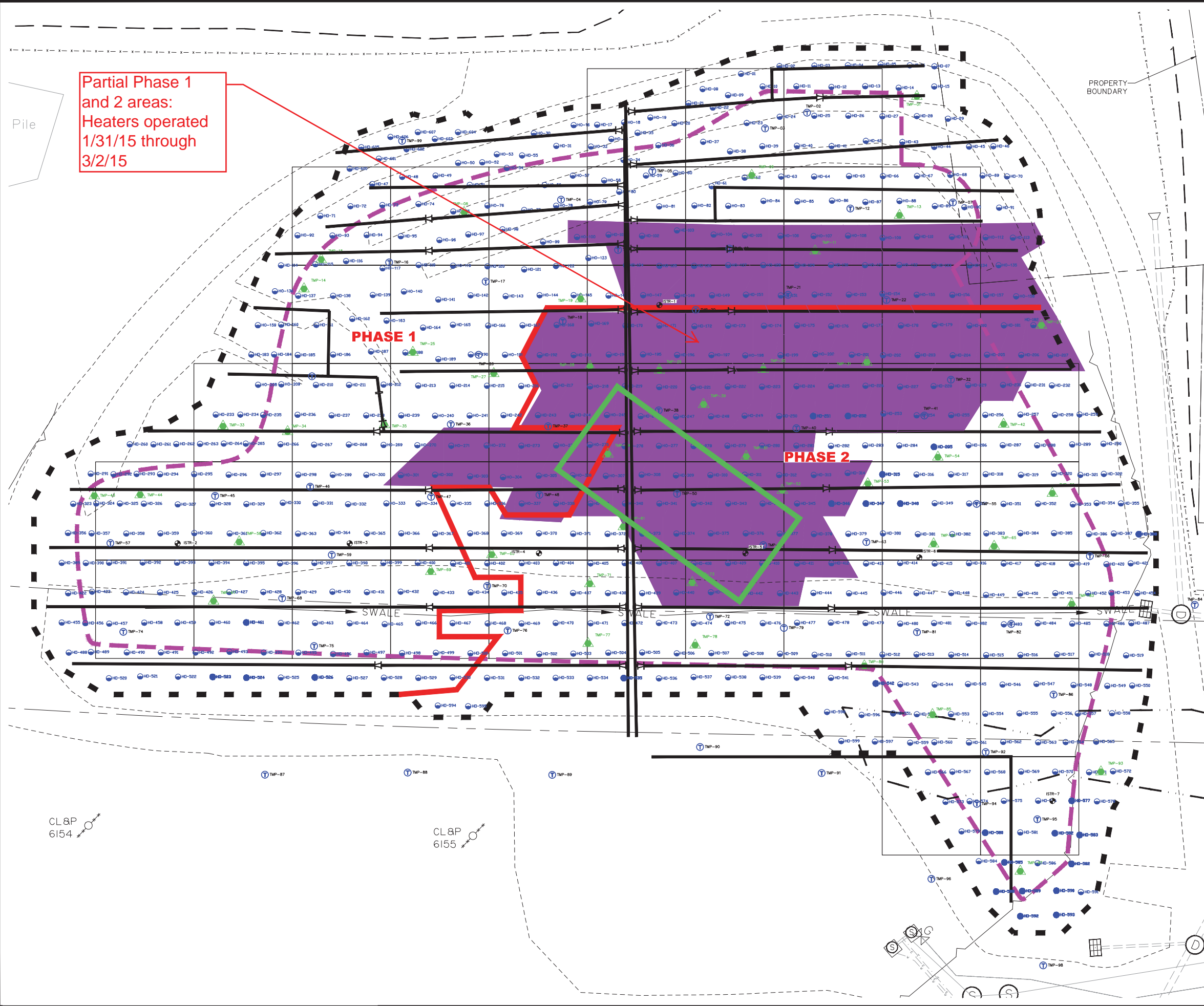
CL&P 6154

CL&P 6155

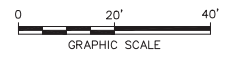


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Partial Phase 1  
and 2 areas:  
Heaters operated  
1/31/15 through  
3/2/15



- LEGEND:
- ISTR COVER LIMITS
  - THERMAL TREATMENT ZONE
  - PHASE I/II BOUNDARY
  - PROPERTY LINE
  - WETLAND BOUNDARY
  - ELECTRIC LINE
  - GAS LINE
  - TELEPHONE LINE
  - WATER LINE
  - CHAINLINK FENCE
  - SANITARY SEWER
  - SHEET PILE CONTAINMENT WALL
  - EDGE OF GRAVEL DRIVE
  - wg WATER GATE
  - ☐ CATCH BASIN
  - ⊙ MANHOLE SANITARY
  - ⊙ UTILITY POLE
  - ⊙ GUY
  - ⊙ MANHOLE DRAINAGE
  - ⊙ HD-279 HEATER WELL LOCATION AND IDENTIFICATION
  - ⊙ ISTR-3 ISTR WELLS
  - ⊙ TMP-50 TMP LOCATIONS
  - TARGET CONTINUED TREATMENT AREA, JAN. 2015
  - OPTION C HEATER CIRCUITS



SRSE SUPERFUND SITE  
SOUTHINGTON, CONNECTICUT

**HEATED CIRCUIT AREAS  
FOLLOWING PARTIAL PHASE 2  
SHUTDOWN**

FIGURE  
**C**

CL&P  
6154

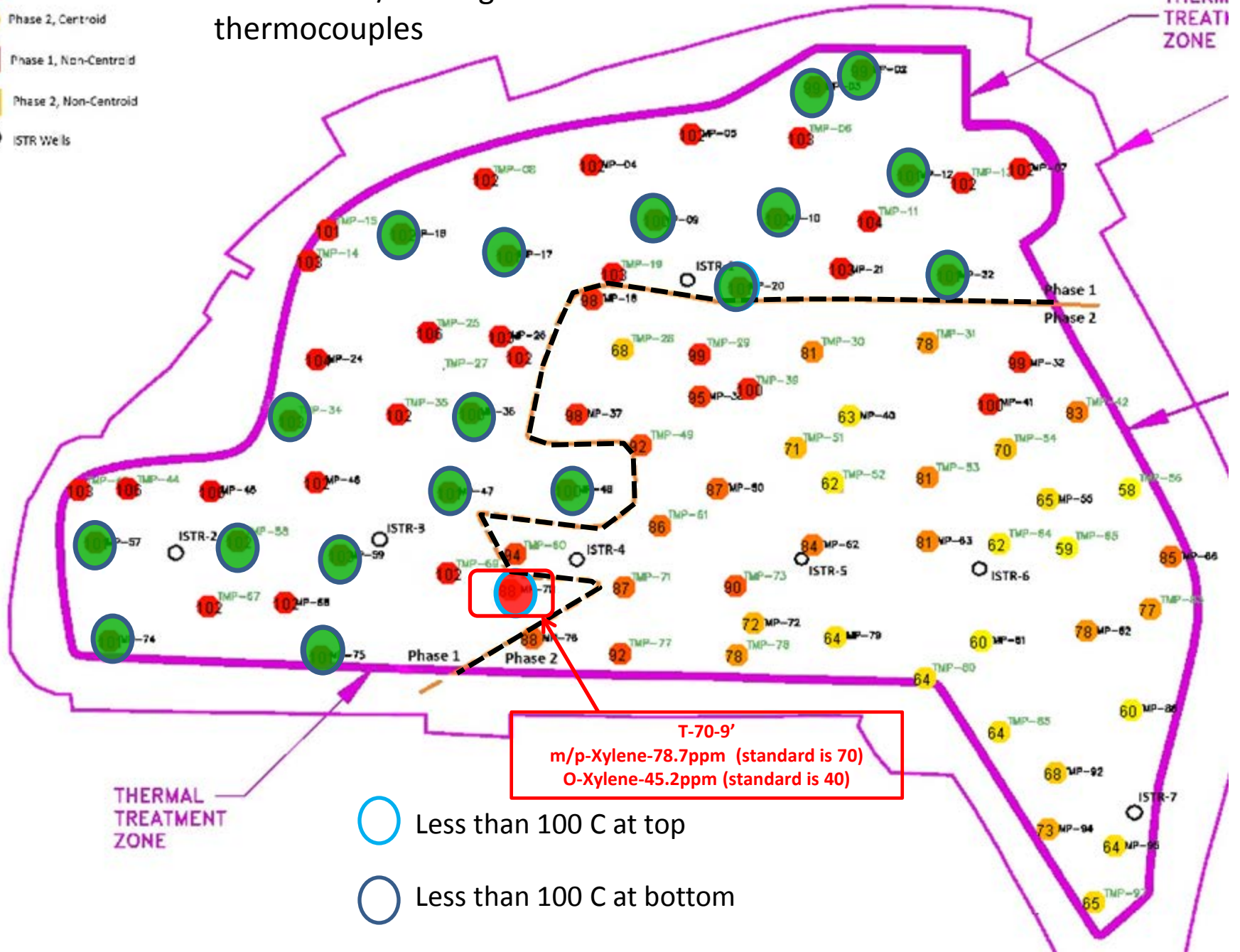
CL&P  
6155



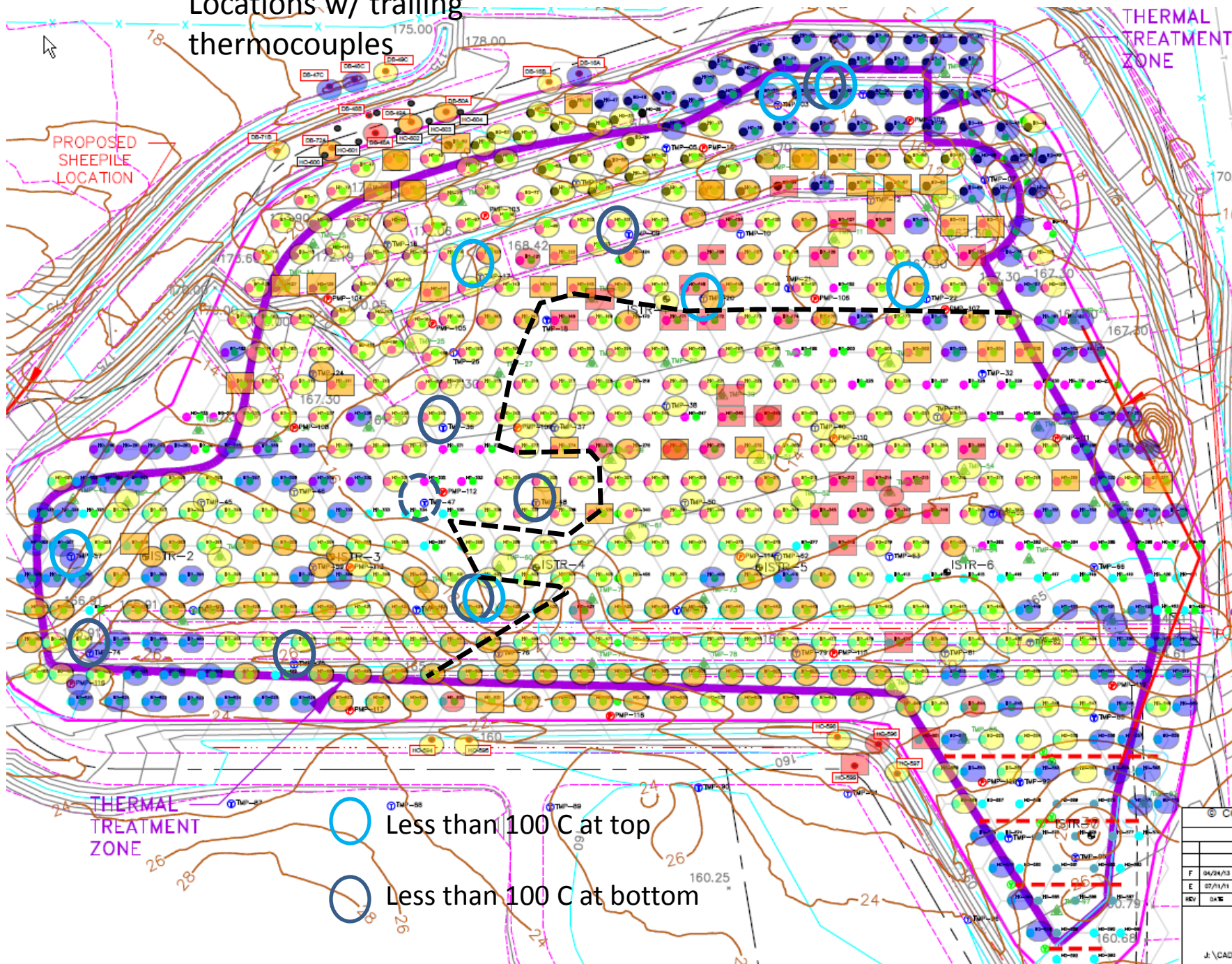
## **Progress Soil Sampling for Phases 1 and 2 Figure and Results**

# Locations w/ trailing thermocouples

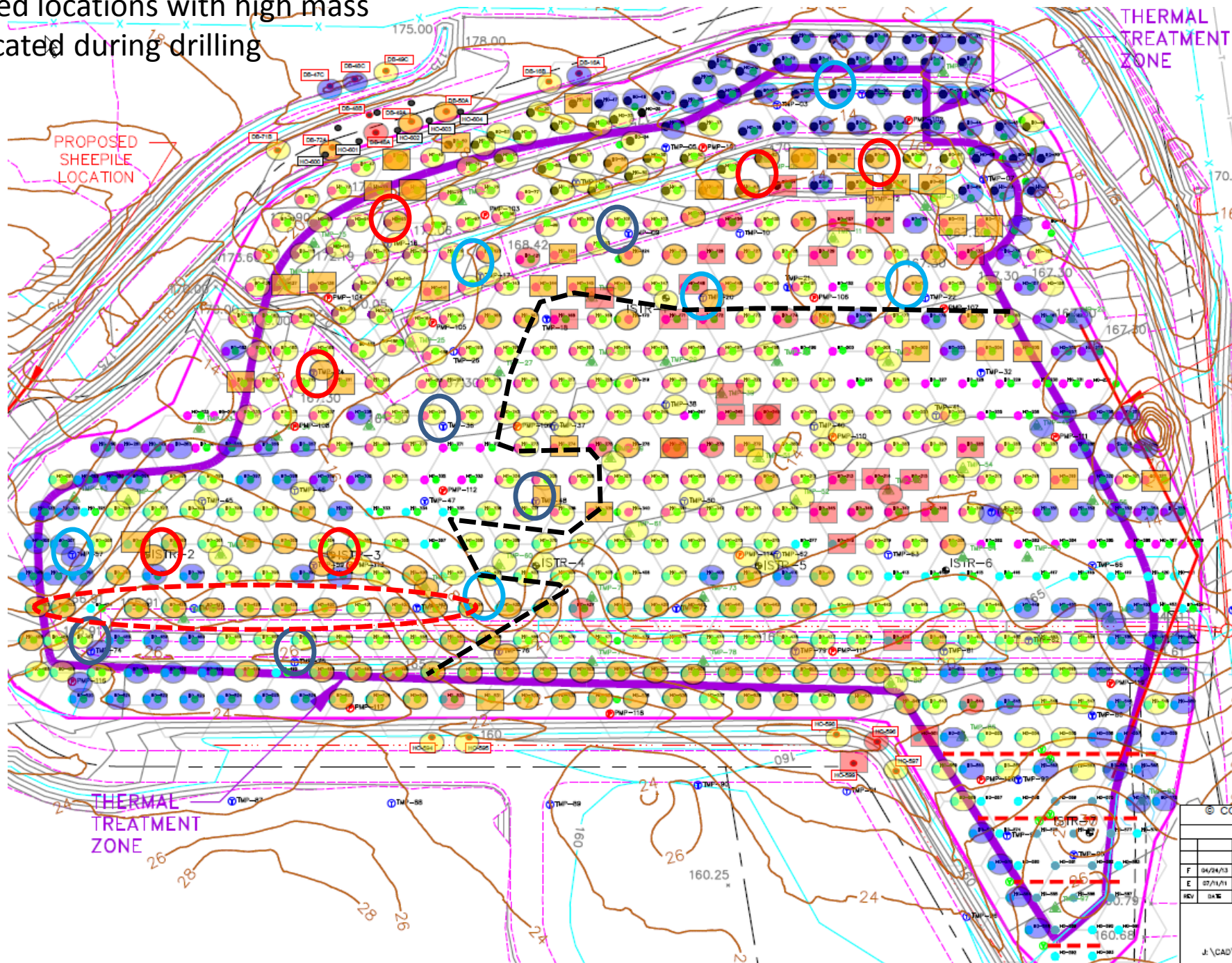
- Phase 1, Centroid
- Phase 2, Centroid
- Phase 1, Non-Centroid
- Phase 2, Non-Centroid
- ISTR Wells



# Locations w/ trailing thermocouples



Added locations with high mass indicated during drilling



© CO	
F	04/24/13
E	07/11/11
REV	DATE
J:\CAD	

Sample Location: Sample Date: Units:		T05-7.5	T05-9.5	T05-13	T10-7.5	T10-14	T10-17.5	T24-2.5	T24-7.5	T24-15	T47-1	T47-11.5	T47-14.5	T74-7.5	T74-17	T74-24	
		7/30/14	7/30/14	7/30/14	7/29/14	7/29/14	7/29/14	7/28/14	7/28/14	7/28/14	7/28/14	7/28/14	7/28/14	7/28/14	7/29/14	7/29/14	7/29/14
		mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
		CLEANUP GOALS (mg/Kg)	PROGRESS SAMPLING #1														
Ethylbenzene	Interim NAPL Clean Up Levels	59	48.2	157	20.3	8.97	830					49.9	92.6				
Tetrachloroethene		46	1.58			10.1	847					3.99	28				
Trichloroethene		222	0.765			1.39	2.63	263								0.841	
Toluene		48	22.2	69.7	1.7	3.73	250					71.5	179				
1,1,1-Trichloroethane		221									0.254						
m,p-Xylene		70	18.7	23.4	1.61	10.4	399					49	199			0.449	
o-Xylene	42	7.05	7.04	0.502	3.59	122					20.8	104					
Acetone	Other Site COCs (ROD Table L-2)	N/A	9.25			58								2.97	2.64		
Benzene		N/A													0.0845		
Bromodichloromethane		N/A															
2-Butanone (MEK)		N/A				127										0.0262	
Carbon tetrachloride		N/A															
Chlorobenzene		N/A															
Chloroform		N/A															
1,1-Dichloroethane		N/A															
1,1-Dichloroethene		N/A															
1,2-Dichloropropane		N/A															
4-Methyl-2-pentanone (MIBK)		N/A												5.44			
Methylene chloride		N/A															
Styrene		N/A	1.43			1.54	104							8.35			
1,1,2,2-Tetrachloroethane		N/A															
1,1,2-Trichloroethane	N/A																
Vinyl chloride	N/A																

Sample Location:		T70-4	T70-7.5	T70-9	T70-18	T70-19.5	T59-3.5	T59-19	T47-16	T74-22.5	T74-25	T57-4	T36-12	T36-14.5	T16-3.5	T16-15	
Sample Date:		10/14/14	10/14/14	10/14/14	10/14/14	10/14/14	10/14/14	10/14/14	10/15/14	10/13/14	10/13/14	10/16/14	10/16/14	10/16/14	10/17/14	10/17/14	
Units:		mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
<b>PROGRESS SAMPLING #2</b>																	
Ethylbenzene	<b>Interim NAPL Clean Up Levels</b>	0.601	2.71	37.5	0.538	0.0185	2.28		0.0054			0.0626	0.005	0.0028		0.0123	
Tetrachloroethene				2.85			0.493										
Trichloroethene																	0.0025
Toluene		1.8	4.89	45.3		0.0063	2.28		0.0125				0.0095				0.0334
1,1,1-Trichloroethane																	
m,p-Xylene		1.18	6.12	78.7	0.244	0.0078	4.7		0.0098				0.0112				0.0114
o-Xylene	0.542	2.72	45.2		0.0024	2.66		0.0049				0.0055				0.0036	
Acetone	<b>Other Site COCs (ROD Table L-2)</b>	1.26	0.651			0.0157		0.0448		0.0979		0.179	0.0409	0.0112	0.035	0.178	
Benzene												0.0227					
Bromodichloromethane																	
2-Butanone (MEK)										0.0189		0.0249					0.124
Carbon tetrachloride																	
Chlorobenzene																	
Chloroform																	
1,1-Dichloroethane																	
1,1-Dichloroethene																	
1,2-Dichloropropane																	
4-Methyl-2-pentanone (MIBK)													0.0297				
Methylene chloride																	
Styrene																	
1,1,2,2-Tetrachloroethane																	
1,1,2-Trichloroethane																	
Vinyl chloride																	

Sample Location:		T10-2.5	T10-5	T12-16	T12-2.5	T20-4	T22-4	T17-4	T2-10	T2-4	T2-8.5	T3-4	T9-13	T75-23	T48-16	T58-3.5	T58-19	T34-2.5	T34-16	
Sample Date:		10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/14/14	10/15/14	10/15/14	10/15/14	10/16/14	10/16/14	
Units:		mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
		<b>PROGRESS SAMPLING #2</b>																		
Ethylbenzene	<b>Interim NAPL Clean Up Levels</b>		0.0021	0.0088		0.011		0.0049	0.409	0.006	0.0919	0.0091	0.232							
Tetrachloroethene			0.008	0.0087		0.0089		0.0056			0.0139	0.0073	0.153							
Trichloroethene					0.0098		0.0097				0.007		0.225							
Toluene			0.0072	0.0115	0.0148		0.0125				0.0091	0.017	0.0116							
1,1,1-Trichloroethane																				
m,p-Xylene			0.0053	0.0055			0.0107					0.0239	0.0077	0.692						
o-Xylene						0.0054					0.0058	0.0043	0.343							
Acetone	<b>Other Site COCs (ROD Table L-2)</b>			0.253	0.0274		2.02	0.0939		9.84	0.209	0.816	1.42	0.0432	0.0187				0.0458	
Benzene										0.0015		0.0049								
Bromodichloromethane																				
2-Butanone (MEK)				0.0444		0.223	0.113			0.595	0.0321	0.14								
Carbon tetrachloride																				
Chlorobenzene																				
Chloroform																				
1,1-Dichloroethane																				
1,1-Dichloroethene																				
1,2-Dichloropropane																				
4-Methyl-2-pentanone (MIBK)			0.0077		0.019		0.0424			0.0142		0.0141								
Methylene chloride			0.0028		0.0043		0.004													
Styrene																				
1,1,2,2-Tetrachloroethane																				
1,1,2-Trichloroethane																				
Vinyl chloride																				



Sample Location: Sample Date: Units:		T05-7.5	T05-9.5	T05-13	T10-7.5	T10-14	T10-17.5	T24-2.5	T24-7.5	T24-15	T47-1	T47-11.5	T47-14.5	T74-7.5	T74-17	T74-24	
		7/30/14	7/30/14	7/30/14	7/29/14	7/29/14	7/29/14	7/28/14	7/28/14	7/28/14	7/28/14	7/28/14	7/28/14	7/28/14	7/29/14	7/29/14	7/29/14
		mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Acrylonitrile	Other Reported VOCs	N/A															
Bromobenzene		N/A															
Bromoform		N/A															
Bromomethane		N/A															
n-Butylbenzene		N/A		4.19										8.22			
sec-Butylbenzene		N/A															
tert-Butylbenzene		N/A															
Carbon disulfide		N/A															
Chloroethane		N/A															
Chloromethane		N/A															
o-Chlorotoluene		N/A															
p-Chlorotoluene		N/A															
1,2-Dibromo-3-chloropropane		N/A															
Dibromochloromethane		N/A															
1,2-Dibromoethane		N/A															
1,2-Dichlorobenzene		N/A															
1,3-Dichlorobenzene		N/A															
1,4-Dichlorobenzene		N/A															
Dichlorodifluoromethane		N/A															
1,2-Dichloroethane		N/A															
cis-1,2-Dichloroethene		N/A	0.52					10.2					3.9	10.8		0.286	
trans-1,2-Dichloroethene		N/A															
1,3-Dichloropropane		N/A															
2,2-Dichloropropane		N/A															
1,1-Dichloropropene		N/A															
cis-1,3-Dichloropropene		N/A															
trans-1,3-Dichloropropene		N/A															
Freon 113		N/A															
Hexachlorobutadiene		N/A															
2-Hexanone		N/A															
Isopropylbenzene		N/A	1.87	3.79	0.923	0.504		30.7					4.68	5.83			
p-Isopropyltoluene		N/A											3.01	15.6			
Methyl Tert Butyl Ether	N/A																
Methylene bromide	N/A																
Naphthalene	N/A													13	1.11		
n-Propylbenzene	N/A	1.5			0.71		44.6					5.42	17.9				
1,1,1,2-Tetrachloroethane	N/A																
Tetrahydrofuran	N/A																
Trans-1,4-Dichloro-2-Butene	N/A																
1,2,3-Trichlorobenzene	N/A																
1,2,4-Trichlorobenzene	N/A												11.4				
Trichlorofluoromethane	N/A																
1,2,3-Trichloropropane	N/A																
1,2,4-Trimethylbenzene	N/A	5.4	26.5	1.08	2.7		157					27.5	181				
1,3,5-Trimethylbenzene	N/A	1.62	10.2		0.988		54.7					6.82	40.1				

Notes:

T5-7.5 = "TMP-5" is the location / identification number; 7.5 is the depth of sample collection

blank cells = non detect

sample exceeded Interim NAPL Clean Up Standard

Sample Location:		T70-4	T70-7.5	T70-9	T70-18	T70-19.5	T59-3.5	T59-19	T47-16	T74-22.5	T74-25	T57-4	T36-12	T36-14.5	T16-3.5	T16-15	
Sample Date:		10/14/14	10/14/14	10/14/14	10/14/14	10/14/14	10/14/14	10/14/14	10/15/14	10/13/14	10/13/14	10/16/14	10/16/14	10/16/14	10/17/14	10/17/14	
Units:		mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Acrylonitrile	Other Reported VOCs																
Bromobenzene																	
Bromoform																	
Bromomethane																	
n-Butylbenzene				14.4													
sec-Butylbenzene				3.07													
tert-Butylbenzene																	
Carbon disulfide																	
Chloroethane																	
Chloromethane																	
o-Chlorotoluene																	
p-Chlorotoluene																	
1,2-Dibromo-3-chloropropane																	
Dibromochloromethane																	
1,2-Dibromoethane																	
1,2-Dichlorobenzene					1.63												
1,3-Dichlorobenzene																	
1,4-Dichlorobenzene																	
Dichlorodifluoromethane																	
1,2-Dichloroethane																	
cis-1,2-Dichloroethene			0.507	0.363	1.51												0.0105
trans-1,2-Dichloroethene																	
1,3-Dichloropropane																	
2,2-Dichloropropane																	
1,1-Dichloropropene																	
cis-1,3-Dichloropropene																	
trans-1,3-Dichloropropene																	
Freon 113																	
Hexachlorobutadiene																	
2-Hexanone																	
Isopropylbenzene					3.04												
p-Isopropyltoluene					13.4												
Methyl Tert Butyl Ether																	
Methylene bromide																	
Naphthalene			0.442	28													
n-Propylbenzene				11.1													
1,1,1,2-Tetrachloroethane																	
Tetrahydrofuran																	
Trans-1,4-Dichloro-2-Butene																	
1,2,3-Trichlorobenzene				5.34													
1,2,4-Trichlorobenzene			1.02	20.7													
Trichlorofluoromethane																	
1,2,3-Trichloropropane																	
1,2,4-Trimethylbenzene			3.62	119	5.56		4.62		0.0094								
1,3,5-Trimethylbenzene			1.11	28.8			1										

Notes:

T5-7.5 = "TMP-5" is the location / identifier

blank cells = non detect

sample exceeded Interim NAPL Clean Up

Sample Location:		T10-2.5	T10-5	T12-16	T12-2.5	T20-4	T22-4	T17-4	T2-10	T2-4	T2-8.5	T3-4	T9-13	T75-23	T48-16	T58-3.5	T58-19	T34-2.5	T34-16	
Sample Date:		10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/21/14	10/14/14	10/15/14	10/15/14	10/15/14	10/16/14	10/16/14	
Units:		mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Acrylonitrile	Other Reported VOCs																			
Bromobenzene																				
Bromoform																				
Bromomethane																				
n-Butylbenzene										0.707										
sec-Butylbenzene										0.602										
tert-Butylbenzene																				
Carbon disulfide																				
Chloroethane																				
Chloromethane																				
o-Chlorotoluene																				
p-Chlorotoluene																				
1,2-Dibromo-3-chloropropane																				
Dibromochloromethane																				
1,2-Dibromoethane																				
1,2-Dichlorobenzene																				
1,3-Dichlorobenzene																				
1,4-Dichlorobenzene																				
Dichlorodifluoromethane																				
1,2-Dichloroethane																				
cis-1,2-Dichloroethene				0.0073																
trans-1,2-Dichloroethene																				
1,3-Dichloropropane																				
2,2-Dichloropropane																				
1,1-Dichloropropene																				
cis-1,3-Dichloropropene																				
trans-1,3-Dichloropropene																				
Freon 113																				
Hexachlorobutadiene																				
2-Hexanone																				
Isopropylbenzene												0.0151								
p-Isopropyltoluene																				
Methyl Tert Butyl Ether																				
Methylene bromide																				
Naphthalene					0.0147								0.471							
n-Propylbenzene											0.0135									
1,1,1,2-Tetrachloroethane																				
Tetrahydrofuran																				
Trans-1,4-Dichloro-2-Butene																				
1,2,3-Trichlorobenzene																				
1,2,4-Trichlorobenzene																				
Trichlorofluoromethane																				
1,2,3-Trichloropropane																				
1,2,4-Trimethylbenzene					0.0139				0.725		0.0193		1.39							
1,3,5-Trimethylbenzene																				

Notes:  
T5-7.5 = "TMP-5" is the location / identifier  
blank cells = non detect  
sample exceeded Interim NAPL Clean Up

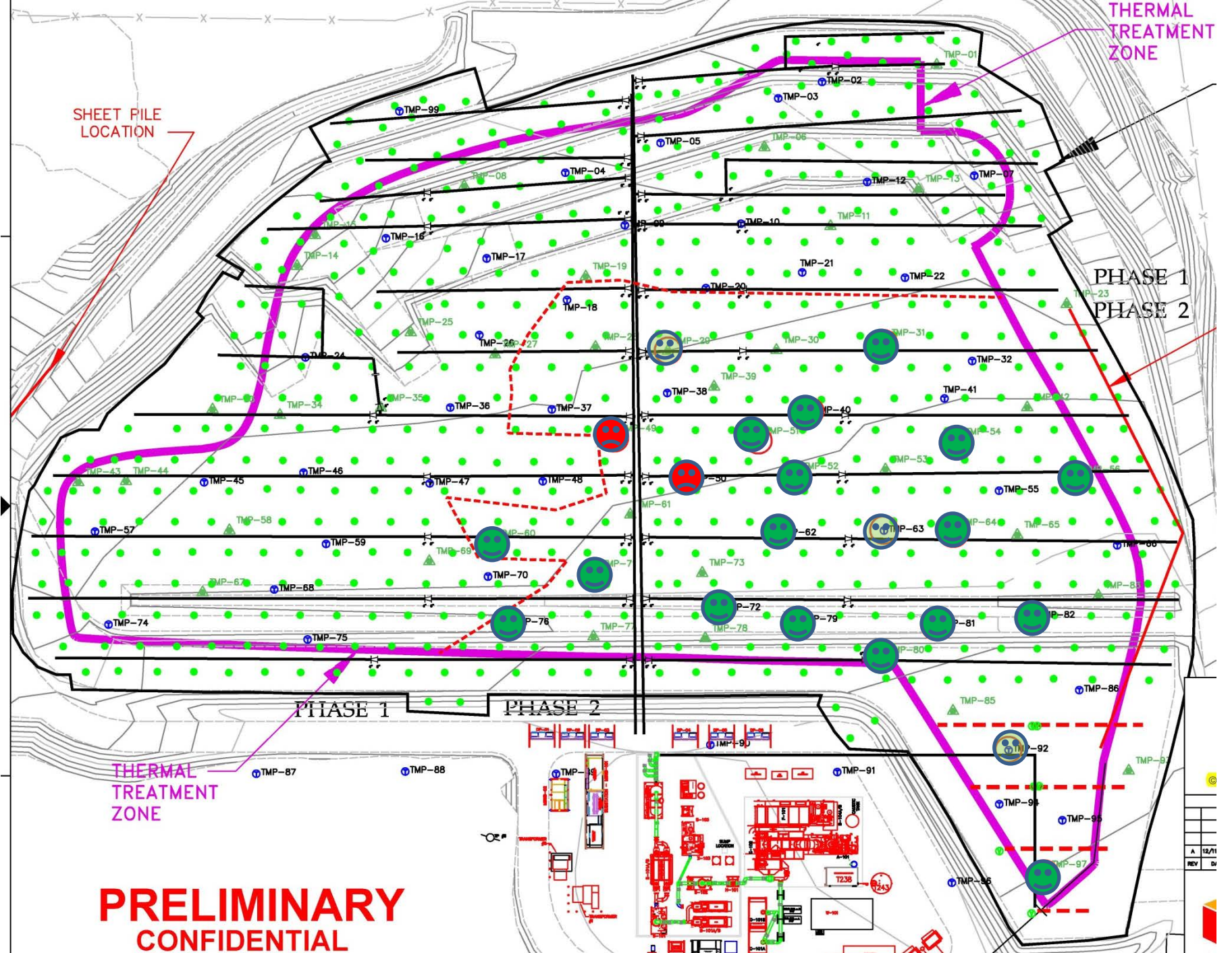
THERMAL TREATMENT ZONE

SHEET FILE LOCATION

PHASE 1  
PHASE 2

THERMAL TREATMENT ZONE

**PRELIMINARY  
CONFIDENTIAL**



©
A 12/71
REV 01

**SRSNE Superfund Site  
Progress Soil Sampling - Summary Results**

		PROGRESS - PHASE 2																											
Sample Location:	CLEANUP GOALS	T29-2.5	T31-17.5	T50-3.5	T51-1.5	T51-14	T40-1	T40-16.5	T52-16	T54-4	T56-16	T56-5	T49-11.5	T49-3.5	T62-17	T63-4	T64-5	T71-18.5	T72-4	T79-4	T80-17	T81-16.5	T81-3.5	T82-4	T92-3.5	T97-4.5	T60-17	T76-4.5	
Sample Date:		12/1/14	12/1/14	12/1/14	12/1/14	12/1/14	12/2/14	12/2/14	12/2/14	12/2/14	12/2/14	12/2/14	12/5/14	12/5/14	12/3/14	12/3/14	12/3/14	12/5/14	12/3/14	12/3/14	12/4/14	12/4/14	12/4/14	12/3/14	12/4/14	12/4/14	12/8/14	12/8/14	
Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Ethylbenzene	PROJECT GOALS	59	32.1	34.7	1.37					0.0066	0.25	9.65	108	0.0483	14.4			0.0082				0.0068				43.3			
Tetrachloroethene		46	8.17	11	8.21	0.0082	0.596			0.0089		0.91	251	0.264	1.29				0.0116		0.0097					42.8			
Trichloroethene		222	1.22	1.98		0.0273		0.813		0.0133		0.282	14.2	0.313					0.0219	0.0044	0.0583					16.8			
Toluene		48	11.1	9.87		0.0225				0.0074	0.515	4.98	90.5	0.147	7.32			0.0168		0.009		0.0273				23.2			
1,1,1-Trichloroethane		221																											
m,p-Xylene		70	37.9	178	6.21	0.0041				0.0187	0.582	24.6	179	0.114	56.6						0.0101				30.1	0.0047			
o-Xylene		42	15.4	65.1	2.44					0.0077	0.281	10.7	67.2	0.048	26.9						0.0055				12				
Acetone	OTHER PROJECT COMPOUNDS OF INTEREST	N/A	10.7			0.0659			0.0201	3.51				0.28				0.224	0.245	0.29	0.0256		0.0813		3.26	0.148	0.624		
Benzene		N/A												0.502							0.00063								
Bromodichloromethane		N/A																											
2-Butanone (MEK)		N/A				0.139			0.0657	0.16					0.392				0.343		0.0371					0.214		0.111	
Carbon tetrachloride		N/A																											
Chlorobenzene		N/A																											
Chloroform		N/A																											
1,1-Dichloroethane		N/A																											
1,1-Dichloroethene		N/A																											
1,2-Dichloropropane		N/A																											
4-Methyl-2-pentanone (MIBK)		N/A	2.7				0.0488			0.0668	0.0082				0.0114						0.0035				0.0053				
Methylene chloride		N/A					0.005			0.0067	0.0034	0.0039		0.978	6.41	0.216			0.133										
Styrene		N/A	18.6											5.71	8.33												6.17		
1,1,2,2-Tetrachloroethane		N/A																											
1,1,2-Trichloroethane		N/A																											
Vinyl chloride		N/A																											

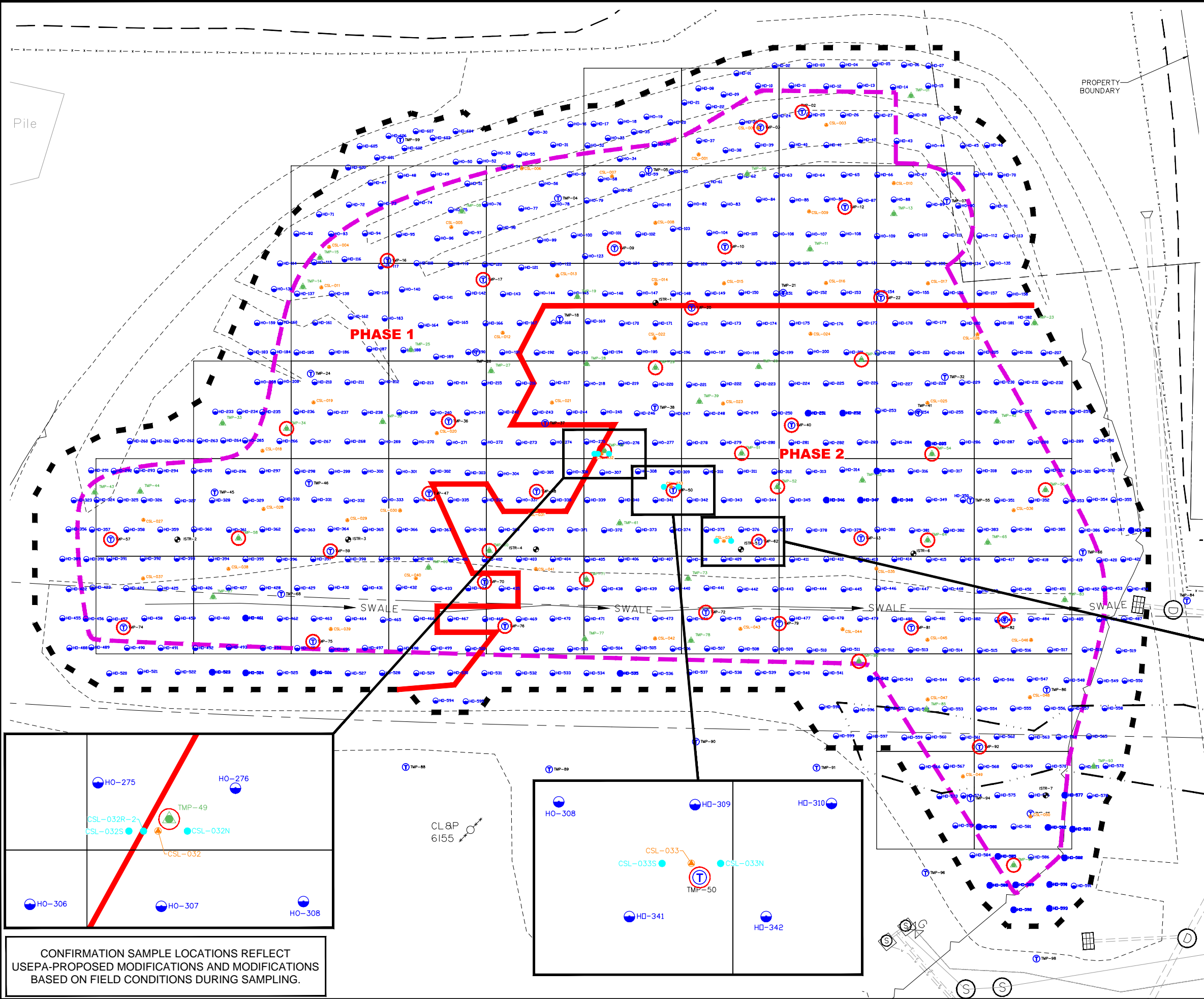
NOT SITE RELATED - FULL VOC REPORTING LIST												
Acrylonitrile	N/A											
Bromobenzene	N/A											
Bromoform	N/A											
Bromomethane	N/A											
n-Butylbenzene	N/A		5.86	1.82			1.77	3.2	5.12			1.08
sec-Butylbenzene	N/A	1.2	2.17				0.565					1.26
tert-Butylbenzene	N/A											
Carbon disulfide	N/A											
Chloroethane	N/A											
Chloromethane	N/A											
o-Chlorotoluene	N/A											
p-Chlorotoluene	N/A											
1,2-Dibromo-3-chloropropane	N/A											
Dibromochloromethane	N/A											
1,2-Dibromoethane	N/A											
1,2-Dichlorobenzene	N/A											
1,3-Dichlorobenzene	N/A											
1,4-Dichlorobenzene	N/A											
Dichlorodifluoromethane	N/A											
1,2-Dichloroethane	N/A											
cis-1,2-Dichloroethene	N/A			0.0302				0.0824	0.0384	0.003	0.045	3.06 0.005
trans-1,2-Dichloroethene	N/A											
1,3-Dichloropropane	N/A											
2,2-Dichloropropane	N/A											
1,1-Dichloropropene	N/A											
cis-1,3-Dichloropropene	N/A											
trans-1,3-Dichloropropene	N/A											
Freon 113	N/A											
Hexachlorobutadiene	N/A											
2-Hexanone	N/A											
Isopropylbenzene	N/A	3.33	4.53				0.92	6.65	1.81			2.37
p-Isopropyltoluene	N/A		4.25				1.06	3.2	3.21			
Methyl Tert Butyl Ether	N/A											
Methylene bromide	N/A											
Naphthalene	N/A		3.8	1.64			3.43	2.68	0.0111	3.53	12.9	2.25
n-Propylbenzene	N/A	4.32	11.2				2.62	9.51	5.89			2.65
1,1,1,2-Tetrachloroethane	N/A											
Tetrahydrofuran	N/A									0.0248		
Trans-1,4-Dichloro-2-Butene	N/A											
1,2,3-Trichlorobenzene	N/A											
1,2,4-Trichlorobenzene	N/A											
Trichlorofluoromethane	N/A							0.813	0.0133			
1,2,3-Trichloropropane	N/A											
1,2,4-Trimethylbenzene	N/A	13.1	87.2	4			20.2	46.2	0.0352	60.4		11
1,3,5-Trimethylbenzene	N/A	4.12	26.9				4.62	14	0.0092	22.2		3.31

Notes:  
TMP-5-7.5 = TMP-5 is the identification number; 7.5 is the depth of sample collection  
blank cells = non detect  
exceeds Interim NAPL Cleanup Levels



**Confirmatory Soil Sampling  
Figures 1A and 1B, Tables 1, 2A and 2B**

CITY: SYRACUSE, NY DIV: GROUP: ENV/CAD DB: B. DECLERCO, LD: B. DECLERCO, PIC: PM: K. FABIAN, TM: J. MORGAN, LYRON: OFF-REF: TEXT  
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**LEGEND:**

- ISTR COVER LIMITS
- THERMAL TREATMENT ZONE
- PHASE I/II BOUNDARY
- PROPERTY LINE
- WETLAND BOUNDARY
- ELECTRIC LINE
- GAS LINE
- TELEPHONE LINE
- WATER LINE
- CHAINLINK FENCE
- SANITARY SEWER
- SHEET PILE CONTAINMENT WALL
- EDGE OF GRAVEL DRIVE

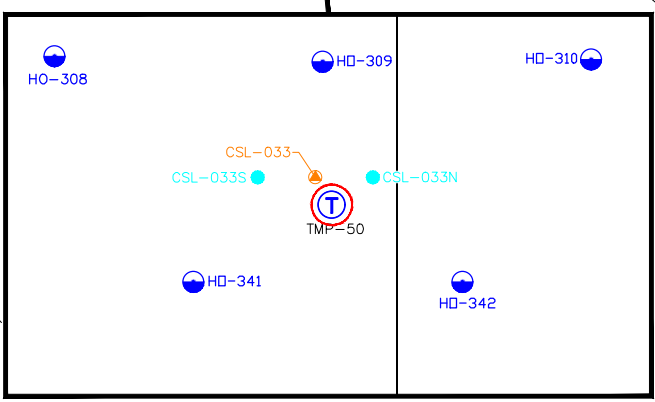
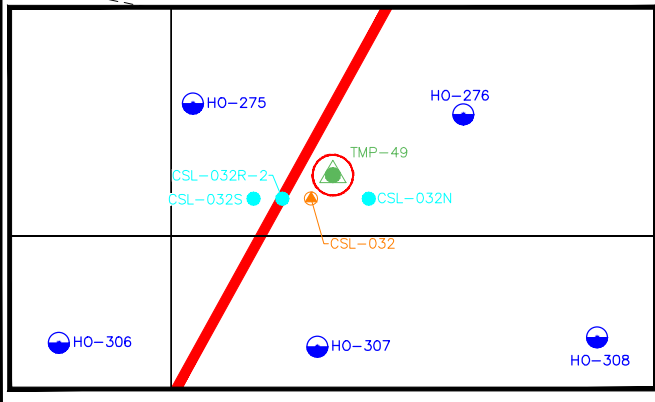
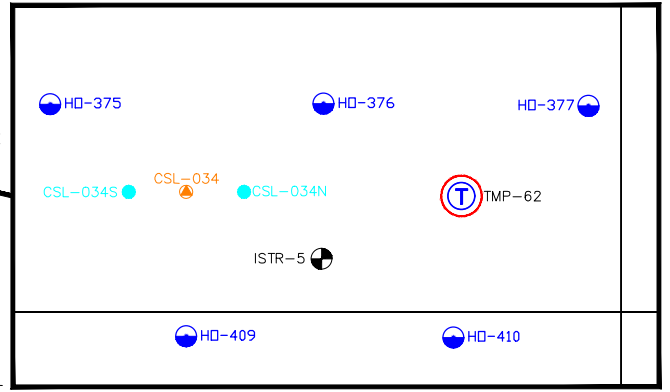
  

- wg WATER GATE
- CATCH BASIN
- MANHOLE SANITARY
- UTILITY POLE
- GUY
- MANHOLE DRAINAGE
- HEATER WELL LOCATION AND IDENTIFICATION
- ISTR WELLS
- TMP LOCATIONS

ISTR SOIL SAMPLE TYPES:

- ARCADIS CONFIRMATION SAMPLE LOCATION AND IDENTIFICATION
- TERRATHERM CONFIRMATION SOIL SAMPLE LOCATIONS
- TERRATHERM PROGRESS SOIL SAMPLING LOCATIONS



CONFIRMATION SAMPLE LOCATIONS REFLECT USEPA-PROPOSED MODIFICATIONS AND MODIFICATIONS BASED ON FIELD CONDITIONS DURING SAMPLING.

**DRAFT**



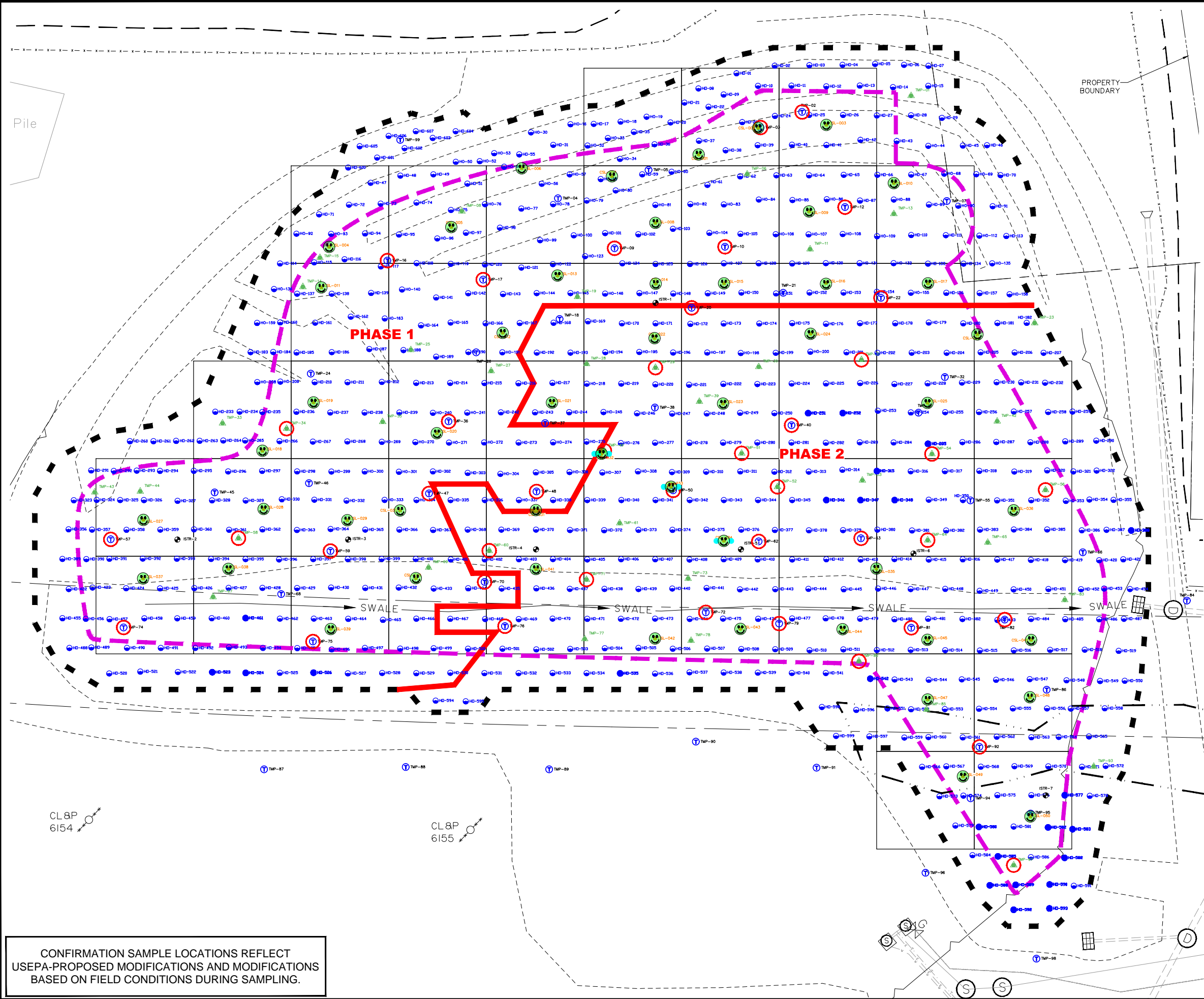
**SRISNE SUPERFUND SITE**  
 SOUTHWINGTON, CONNECTICUT  
**ISTR CONFIRMATION SOIL SAMPLING LOCATIONS**



FIGURE  
**1A**



CITY: SYRACUSE, NY DIV: GROUP: ENV/CAD DB: B. DECLERCO, ID: B. DECLERCO, PIC: PM-K.FABIAN, TM: JMORGAN, LYRON+OFF+REF, TEXT G:\ENV\CAD\Manchaster\ACT1800546340001\035001\THERMAL\5463401B.dwg LAYOUT: 1B, SAVED: 4/1/2015 9:47 AM, ACADVER: 18, I.S (LIMS TECH) PAGES: 10, PLOT: PLT, PLOTTER: HP DesignJet 5000, PLOTTED: 4/1/2015 9:48 AM, BY: SMALL, BRIAN



**LEGEND:**

- ISTR COVER LIMITS
- THERMAL TREATMENT ZONE
- PHASE I/II BOUNDARY
- PROPERTY LINE
- WETLAND BOUNDARY
- ELECTRIC LINE
- GAS LINE
- TELEPHONE LINE
- WATER LINE
- CHAINLINK FENCE
- SANITARY SEWER
- SHEET PILE CONTAINMENT WALL
- EDGE OF GRAVEL DRIVE

wg WATER GATE

CATCH BASIN

MANHOLE SANITARY

UTILITY POLE

GUY

MANHOLE DRAINAGE

HEATER WELL LOCATION AND IDENTIFICATION

ISTR WELLS

TMP LOCATIONS

PHASE 1 AND 2 CONFIRMATION SAMPLE BELOW INTERIM NAPL CLEANUP LEVELS

ISTR SOIL SAMPLE TYPES:

- CSL-024 ARCADIS CONFIRMATION SAMPLE LOCATION AND IDENTIFICATION
- TERRATHERM CONFIRMATION SOIL SAMPLE LOCATIONS
- TERRATHERM PROGRESS SOIL SAMPLING LOCATIONS

CL&P  
6154

CL&P  
6155

**DRAFT**

0 20' 40'  
GRAPHIC SCALE

CONFIRMATION SAMPLE LOCATIONS REFLECT USEPA-PROPOSED MODIFICATIONS AND MODIFICATIONS BASED ON FIELD CONDITIONS DURING SAMPLING.

SRISNE SUPERFUND SITE  
SOUTHINGTON, CONNECTICUT

**ISTR CONFIRMATION SOIL SAMPLING LOCATIONS AND RESULTS**

**ARCADIS**

FIGURE  
**1B**

**Table 1. ISTR Confirmatory Soil Sample Summary**  
**Solvents Recovery Service of New England (SRSNE) Superfund Site**  
**Southington, Connecticut**

DRAFT

Sample Location ID	ISTR Area		Initial Sample (ARCADIS)	Supplemental (ARCADIS)	Supplemental (TerraTherm)	Sample Date	Treatment Depth <sup>1</sup> (ft bgs)	First Sample Interval		Second Sample Interval		Third Sample Interval		Notes
	Phase 1	Phase 2						Target Sample Depth per WP (ft bgs)	Nominal Collected Depth (ft bgs)	Target Sample Depth per WP (ft bgs)	Nominal Collected Depth (ft bgs)	Target Sample Depth per WP (ft bgs)	Nominal Collected Depth (ft bgs)	
CSL-001	X		X			11/13/14	12.0	4.2	4.2	8.3	8.3	NA		
CSL-002	X		X			11/13/14	11.9	3.7	3.7	8.6	7.5	NA		Refusal at 7.5 ft bgs.
CSL-003	X		X			11/13/14	12.0	2.2	2.2	7.8	7.8	NA		Dup-2 collected at 7.8 ft bgs, MS/MSD.
CSL-004	X		X			11/19/14	17.0	7.4	7.4	12.2	12.2	NA		Move location approximately 10ft south due to access limitations.
CSL-005	X		X			11/12/14	14.5	6.0	6.0	11.7	11.7	NA		
CSL-006	X		X			11/13/14	17.0	0.2	0.2	17.0	17.0	NA		
CSL-007	X		X			11/13/14	17.0	2.7	2.7	12.6	12.6	NA		
CSL-008	X		X			11/13/14	17.0	0.0	0.1	11.2	11.2	NA		2 refusals prior to reaching bottom target depth.
CSL-009	X		X			11/14/14	17.0	3.4	3.4	13.6	13.6	NA		
CSL-010	X		X			11/14/14	12.0	3.0	3.0	8.7	8.7	NA		
CSL-011	X		X			11/19/14	17.0	8.6	8.6	14.3	14.0	NA		Refusal at 14 ft bgs. Three additional refusals at 2.5 ft bgs; moved boring location approximately 15 ft south.
CSL-012	X		X			11/12/14	17.0	1.9	1.9	10.3	10.3	NA		Dup-1 collected at 1.9 ft bgs.
CSL-013	X		X			11/12/14	17.0	2.8	2.8	16.7	none- see note	NA		4-attempts; 3 refusals between 2.5 and 3 ft bgs, 4th refusal at 16.5 ft bgs; no sample recovered from bottom interval. Due to refusals boring was adjusted to the north (east of HO-122).
CSL-014	X		X			11/14/14	17.0	1.1	1.1	10.6	10.6	NA		
CSL-015	X		X			11/14/15	17.0	8.0	8.0	12.0	10.5	NA		Refusal at 10.5 ft bgs.
CSL-016	X		X			11/14/15	21.0	0.7	0.7	9.7	9.7	20.5	none- see note	No sample recovered from 3rd interval.
CSL-017	X		X			11/17/14	16.7	2.4	2.4	9.8	9.8	NA		
CSL-018	X		X			11/19/14	17.0	5.3	5.3	12.9	12.9	NA		Refusal at 14.5 ft bgs.
CSL-019	X		X			11/19/14	18.1	7.1	7.1	10.3	10.3	NA		Refusal at 11.5 ft bgs.
CSL-020	X		X			11/18/14	17.0	8.2	8.2	13.3	13.3	NA		Moved boring one row east (east of heater wells HO-239 and HO-240). Unable to reach target location with the crane.
CSL-027	X		X			11/18/14	19.8	6.4	6.4	10.1	10.1	NA		
CSL-028	X		X			11/18/14	19.9	2.5	2.5	16.5	13.5	NA		Refusal at 13.5 ft bgs.
CSL-029	X		X			11/18/14	21.1	2.1	2.1	11.0	11.0	20.4	15.5	Dup-3 collected at 2.1 ft bgs; Refusal at 15.5 ft bgs.
CSL-030	X		X			11/18/14	17.0	6.5	6.5	15.9	12.5	NA		Refusal at 12.5 ft bgs.
CSL-037	X		X			11/11/14	22.0	7.1	7.1	11.2	11.2	16.7	16.7	
CSL-038	X		X			11/17/14	22.0	3.5	3.5	12.5	12.5	20.1	18.1	Refusal at 18.1 ft bgs.
CSL-039	X		X			11/11/14	24.5	3.2	3.2	11.2	11.2	19.3	19.3	
CSL-040	X		X			11/17/14	22.0	4.0	4.0	12.5	12.5	17.5	15.0	Refusal at 15.5 ft bgs. Recovered soils to 15.0 ft bgs.
CSL-021		X	X			1/13/15	14.5	0.2	0.2	13.5	13.5	NA	NA	
CSL-022		X	X			1/5/15	17.0	4.0	4.0	14.0	14.0	NA	NA	Dup-4 collected from 4.0 ft bgs; 2 attempts.
CSL-022A		X		X		1/14/15	17.0	4.0	4.0	NA	NA	NA	NA	Located one foot east of CSL-022.
CSL-023		X	X			1/6/15	22.0	6.6	6.6	9.9	9.9	15.2	15.2	2 attempts.
CSL-024		X	X			1/5/15	17.0	2.3	2.3	10.4	10.4	12.9	12.9	3 attempts.
CSL-025		X	X			1/6/15	21.9	0.5	0.5	13.1	13.1	20.4	15.5	refusal at 15.5 after 3 attempts.
CSL-026		X	X			1/5/15	19.5	6.0	6.0	9.2	9.2	15.2	15.2	
CSL-031		X	X			1/12/15	17.0	3.8	3.8	9.5	9.5	NA	NA	
CSL-032		X	X			1/12/15	17.0	4.1	4.1	9.6	9.6	NA	NA	
CSL-032N		X			X	2/4/15	17.0	2.0	2.0	10.0	10.0	15.0	15.0	resample by TerraTherm ~3' North of CSL-032.
CSL-032S		X			X	2/4/15	17.0	2.0	2.0	10.0	10.0	15.0	15.0	resample by TerraTherm ~3' South of CSL-032; location is within Phase 1 area, but collected as part of Phase 2 sampling.
CSL-032S-R-2		X			X	2/17/15	17.0	2.0	2.0	NA	NA	NA	NA	resample by TerraTherm ~1.5' South of CSL-032; "duplicate" location.
CSL-033		X	X			1/6/15	19.0	2.1	2.1	11.8	11.8	15.2	14.5	2 attempts; refusal at 14.5 ft bgs.
CSL-033A		X		X		1/14/15	19.0	2.1	2.1	NA	NA	NA	NA	Located one foot west of CSL-033.
CSL-033N		X			X	2/3/15	19.0	2.0	2.0	10.0	10.0	15.0	15.0	resample by TerraTherm ~3' North of CSL-033.

**Table 1. ISTR Confirmatory Soil Sample Summary**  
**Solvents Recovery Service of New England (SRSNE) Superfund Site**  
**Southington, Connecticut**

DRAFT

Sample Location ID	ISTR Area		Initial Sample (ARCADIS)	Supplemental (ARCADIS)	Supplemental (TerraTherm)	Sample Date	Treatment Depth <sup>1</sup> (ft bgs)	First Sample Interval		Second Sample Interval		Third Sample Interval		Notes
	Phase 1	Phase 2						Target Sample Depth per WP (ft bgs)	Nominal Collected Depth (ft bgs)	Target Sample Depth per WP (ft bgs)	Nominal Collected Depth (ft bgs)	Target Sample Depth per WP (ft bgs)	Nominal Collected Depth (ft bgs)	
CSL-033S		X			X	2/3/15	19.0	2.0	2.0	10.0	10.0	15.0	15.0	resample by TerraTherm ~3' North of CSL-033.
CSL-034		X	X			1/7/15	21.6	0.3	0.3	12.5	12.5	16.3	16.3	Dup-5 collected from 0.3 ft bgs.
CSL-034A		X		X		1/14/15	21.6	0.3	0.3	NA	NA	NA	NA	Located one foot SW of CSL-034.
CSL-034N		X			X	2/4/15	21.6	2.0	2.0	10.0	10.0	15.0	15.0	resample by TerraTherm ~3' North of CSL-034.
CSL-034S		X			X	2/3/15	216.0	2.0	2.0	10.0	10.0	15.0	15.0	resample by TerraTherm ~3' North of CSL-034.
CSL-035		X	X			1/7/15	18.6	6.0	6.0	9.7	9.7	15.7	15.7	
CSL-036		X	X			1/6/15	19.5	1.6	1.6	14.8	14.8	NA	NA	
CSL-041		X	X			1/12/15	22.0	2.5	2.5	8.6	8.6	20.2	19.0	Refusal at 19 ft (2 attempts) Dup-6-1-12-15 collected from 2.5 ft.
CSL-042		X	X			1/8/15	24.5	3.3	3.3	8.5	8.5	17.8	17.8	Moved location 4 ft north due to system utilities.
CSL-043		X	X			1/8/15	24.5	1.5	1.5	8.7	8.7	16.9	12.5	2 attempts; refusal at 12.5 ft bgs.
CSL-044		X	X			1/8/15	22.0	7.1	7.1	10.2	10.2	21.3	18.0	2 attempts; refusal at 18.0 ft bgs.
CSL-045		X	X			1/7/15	22.0	4.3	4.3	13.8	13.8	17.2	16.5	
CSL-046		X	X			1/7/15	22.0	5.3	5.3	8.0	8.0	15.0	15.0	
CSL-047		X	X			1/13/15	22.0	4.6	4.6	13.0	13.0	17.7	17.7	Dup-7-1-13-15 collected from 17.7 ft bgs.
CSL-048		X	X			1/13/15	20.7	0.2	0.2	12.9	12.9	15.6	15.6	
CSL-049		X	X			1/13/15	22.0	0.4	0.4	13.2	13.2	21.2	19.0	Refusal at 19.0 ft bgs.
CSL-050		X	X			1/13/15	24.5	7.5	7.5	12.7	12.7	20.0	20.0	
<b>Totals:</b>	<b>28</b>	<b>32</b>												

**Notes:**

ft bgs - feet below ground surface

NA - Not applicable (no second/third sample interval targeted)

**Yellow highlight** - indicates sample depth interval differed from target due to field recovery

**Red Text** - indicates sample locations modified relative to work plan due to field conditions

**Blue Text** - indicates confirmation samples collected by TerraTherm after initial confirmation sample at the corresponding location exceeded NAPL ICL

1. Represents estimated depth of treatment from ground surface to top of bedrock based on target location and Work Plan approach.









Table 2A – ISTR Phase 1 Confirmation Soil Sample Results  
 Solvents Recovery Service of New England, Inc. (SRSNE) Superfund Site  
 Southington, Connecticut

Analyte	CAS No.	Unit	NAPL ICL	Sample Location																				Overall Average		
				CSL-037		CSL-037		CSL-038		CSL-038		CSL-038		CSL-039		CSL-039		CSL-039		CSL-040		CSL-040			CSL-040	
				11.2		16.7		3.5		12.5		18.1		3.2		11.2		19.3		4		12.5			15	
				Sample Depth (ft)		Sample ID		Sample Date		Sample Date		Sample Date		Sample Date		Sample Date		Sample Date		Sample Date		Sample Date			Sample Date	
1,1,1-Trichloroethane	71-55-6	ug/kg	221000	1	U	0.95	U	60	U	0.9	U	0.94	U	1.1	U	0.99	U	0.88	U	200	U	230	U	1	U	ND
Ethylbenzene	100-41-4	ug/kg	59000	1	U	0.95	U	<b>700</b>	--	<b>1.1</b>	--	0.94	U	<b>2.6</b>	--	0.99	U	0.88	U	<b>15000</b>	--	<b>19000</b>	--	<b>5.6</b>	--	<b>1520</b>
M,P-Xylene	179601-23-1	ug/kg	70000	2.1	U	1.9	U	<b>110</b>	J	<b>2.2</b>	--	1.9	U	<b>2.5</b>	--	2	U	1.8	U	<b>29000</b>	--	<b>36000</b>	--	<b>8.5</b>	--	<b>2500</b>
o-Xylene	95-47-6	ug/kg	42000	2.1	U	1.9	U	<b>48</b>	J	<b>1.2</b>	J	1.9	U	<b>1.2</b>	J	2	U	1.8	U	<b>14000</b>	--	<b>18000</b>	--	<b>4.1</b>	--	<b>1350</b>
Tetrachloroethene	127-18-4	ug/kg	46000	1	U	0.95	U	60	U	0.9	U	0.94	U	1.1	U	0.99	U	0.88	U	200	U	<b>310</b>	--	1	U	<b>251</b>
Toluene	108-88-3	ug/kg	48000	<b>1.4</b>	J	1.4	U	<b>80</b>	J	<b>8.8</b>	--	1.4	U	<b>2.4</b>	--	1.5	U	1.3	U	<b>8900</b>	--	<b>12000</b>	--	<b>8.8</b>	--	<b>771</b>
Trichloroethene	79-01-6	ug/kg	222000	1	U	0.95	U	60	U	0.9	U	0.94	U	1.1	U	0.99	U	0.88	U	200	U	230	U	1	U	<b>136</b>
Total Target VOCs (7)	TS7VO	ug/kg	--	<b>1.4</b>	--	0	--	<b>938</b>	--	<b>13.3</b>	--	0	--	<b>8.7</b>	--	0	--	0	--	<b>66900</b>	--	<b>85310</b>	--	<b>27</b>	--	<b>6500</b>
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	--	1	U	0.95	U	60	U	0.9	U	0.94	U	1.1	U	0.99	U	0.88	U	200	U	230	U	1	U	ND
1,1,2-Trichloroethane	79-00-5	ug/kg	--	1.6	U	1.4	U	91	U	1.4	U	1.4	U	1.7	U	1.5	U	1.3	U	300	U	340	U	1.5	U	ND
1,1-Dichloroethane	75-34-3	ug/kg	--	1.6	U	1.4	U	91	U	1.4	U	1.4	U	1.7	U	1.5	U	1.3	U	300	U	340	U	1.5	U	ND
1,1-Dichloroethene	75-35-4	ug/kg	--	1	U	0.95	U	60	U	0.9	U	0.94	U	1.1	U	0.99	U	0.88	U	200	U	230	U	1	U	<b>19.3</b>
1,2-Dichloroethene, Total	540-59-0	ug/kg	--	1	U	0.95	U	60	U	0.9	U	0.94	U	1.1	U	0.99	U	0.88	U	200	U	230	U	1	U	<b>19.6</b>
1,2-Dichloropropane	78-87-5	ug/kg	--	3.7	U	3.3	U	210	U	3.2	U	3.3	U	3.9	U	3.5	U	3.1	U	710	U	800	U	3.5	U	ND
2-Butanone (MEK)	78-93-3	ug/kg	--	<b>32</b>	--	<b>15</b>	--	<b>1100</b>	--	<b>10</b>	--	<b>5.6</b>	J	<b>130</b>	--	<b>6.1</b>	J	<b>6.7</b>	J	<b>410</b>	J	<b>600</b>	J	<b>12</b>	--	<b>374</b>
4-Methyl-2-pentanone (MIBK)	108-10-1	ug/kg	--	10	U	9.5	U	600	U	9	U	9.4	U	<b>3.6</b>	J	9.9	U	8.8	U	2000	U	2300	U	10	U	<b>255</b>
Acetone	67-64-1	ug/kg	--	<b>130</b>	--	<b>63</b>	--	<b>8500</b>	--	<b>48</b>	--	<b>25</b>	J	<b>1400</b>	J	<b>32</b>	J	<b>36</b>	--	<b>1600</b>	J	<b>2300</b>	J	<b>54</b>	--	<b>2290</b>
Benzene	71-43-2	ug/kg	--	1	U	0.95	U	<b>96</b>	--	0.9	U	0.94	U	<b>0.93</b>	J	0.99	U	0.88	U	200	U	230	U	1	U	<b>20.9</b>
Carbon tetrachloride	56-23-5	ug/kg	--	1	U	0.95	U	60	U	0.9	U	0.94	U	1.1	U	0.99	U	0.88	U	200	U	230	U	1	U	ND
Chlorobenzene	108-90-7	ug/kg	--	1	U	0.95	U	60	U	0.9	U	0.94	U	1.1	U	0.99	U	0.88	U	200	U	<b>550</b>	--	1	U	<b>31.5</b>
Chlorodibromomethane	124-48-1	ug/kg	--	1	U	0.95	U	60	U	0.9	U	0.94	U	1.1	U	0.99	U	0.88	U	200	U	230	U	1	U	ND
Chloroform	67-66-3	ug/kg	--	1.6	U	1.4	U	91	U	1.4	U	1.4	U	1.7	U	1.5	U	1.3	U	300	U	340	U	1.5	U	ND
cis-1,2-Dichloroethene	156-59-2	ug/kg	--	1	U	0.95	U	60	U	0.9	U	0.94	U	1.1	U	0.99	U	0.88	U	200	U	230	U	1	U	<b>19.6</b>
Methylene chloride	75-09-2	ug/kg	--	10	U	<b>2.2</b>	J	600	U	9	U	9.4	U	11	U	9.9	U	8.8	U	2000	U	2300	U	10	U	<b>193</b>
Styrene	100-42-5	ug/kg	--	2.1	U	1.9	U	<b>180</b>	--	1.8	U	1.9	U	2.2	U	2	U	1.8	U	410	U	<b>400</b>	J	2	U	<b>77.9</b>
trans-1,2-Dichloroethene	156-60-5	ug/kg	--	1.6	U	1.4	U	91	U	1.4	U	1.4	U	1.7	U	1.5	U	1.3	U	300	U	340	U	1.5	U	ND
Vinyl chloride	75-01-4	ug/kg	--	2.1	U	1.9	U	120	U	1.8	U	1.9	U	2.2	U	2	U	1.8	U	410	U	460	U	2	U	ND
Xylenes, Total	1330-20-7	ug/kg	--	2.1	U	1.9	U	<b>160</b>	J	<b>3.4</b>	J	1.9	U	<b>3.7</b>	J	2	U	1.8	U	<b>43000</b>	--	<b>54000</b>	--	<b>13</b>	--	<b>3850</b>
Total Volatile Organics (25)	TVO	ug/kg	--	<b>163.4</b>	--	<b>80.2</b>	--	<b>10814</b>	--	<b>71.3</b>	--	<b>30.6</b>	--	<b>1543.23</b>	--	<b>38.1</b>	--	<b>42.7</b>	--	<b>68910</b>	--	<b>89160</b>	--	<b>93</b>	--	<b>9270</b>

Notes:  
 U = Analyte not detected above the laboratory reporting limit  
 J = Analyte result is estimated  
 E = Result should be considered estimated because the concentration exceeded the level of calibration. This analyte was not detected in the high-level screen analysis  
 ug/kg = micrograms per kilogram  
 VOCs = volatile organic compounds  
 NAPL ICL = Interim NAPL Cleanup Levels  
 Bold = Analyte detected above the laboratory reporting limit  
 Shaded Cell = Analyte detected above the NAPL ICL  
 Total VOC calculations based on Non-Detect = 0  
 Overall Average of each analyte is calculated using normal samples. Field duplicates excluded from averaging. Averaging based on Non-Detect = 1/2 Reporting Limit















Table 2B – ISTR Phase 2 Confirmation Soil Sample Results  
 Solvents Recovery Service of New England, Inc. (SRSNE) Superfund Site  
 Southington, Connecticut

Analyte VOCs (8260C)	CAS No.	Unit	NAPL ICL	Sample Location																	Overall Average										
				CSL-048			CSL-048			CSL-048			CSL-049			CSL-049			CSL-049			CSL-050			CSL-050			CSL-050			
				0.2			12.9			15.6			0.4			13.2			19			7.5			12.7			20			
				CSL-048 (0.2)			CSL-048 (12.9)			CSL-048 (15.6)			CSL-049 (0.4)			CSL-049 (13.2)			CSL-049 (19.0)			CSL-050 (7.5)			CSL-050 (12.7)			CSL-050 (20.0)			
Sample Date				1/13/2015			1/13/2015			1/13/2015			1/13/2015			1/13/2015			1/13/2015			1/13/2015			1/13/2015						
1,1,1-Trichloroethane	71-55-6	ug/kg	221000	1.1	U	0.86	U	0.86	U	0.95	U	0.92	U	0.86	U	0.98	U	0.91	U	0.9	U	ND									
Ethylbenzene	100-41-4	ug/kg	59000	<b>4.9</b>	--	0.86	U	0.86	U	<b>2.8</b>	--	0.92	U	0.86	U	0.98	U	<b>6.5</b>	--	0.9	U	830									
M,P-Xylene	179601-23-1	ug/kg	70000	<b>11</b>	--	1.7	U	1.7	U	<b>4.9</b>	--	<b>0.97</b>	J	1.7	U	2	U	<b>16</b>	--	1.8	U	2210									
o-Xylene	95-47-6	ug/kg	42000	<b>4.1</b>	--	1.7	U	1.7	U	<b>2.3</b>	--	1.8	U	1.7	U	2	U	<b>6.8</b>	--	1.8	U	1040									
Tetrachloroethene	127-18-4	ug/kg	46000	<b>16</b>	--	0.86	U	0.86	U	<b>1.3</b>	--	0.92	U	0.86	U	0.98	U	<b>15</b>	--	0.9	U	456									
Toluene	108-88-3	ug/kg	48000	<b>20</b>	--	1.3	U	1.3	U	<b>1.8</b>	--	1.4	U	1.3	U	1.5	U	<b>10</b>	--	1.3	U	313									
Trichloroethene	79-01-6	ug/kg	222000	<b>54</b>	--	0.86	U	0.86	U	<b>0.77</b>	J	0.92	U	0.86	U	0.98	U	<b>18</b>	--	<b>0.76</b>	J	173									
Total Target VOCs (7)	TS7VO	ug/kg	--	<b>110</b>	--	0	--	0	--	<b>13.87</b>	--	<b>0.97</b>	--	0	--	0	--	<b>72.3</b>	--	<b>0.76</b>	--	5010									
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	--	1.1	U	0.86	U	0.86	U	0.95	U	0.92	U	0.86	U	0.98	U	0.91	U	0.9	U	ND									
1,1,2-Trichloroethane	79-00-5	ug/kg	--	1.6	U	1.3	U	1.3	U	1.4	U	1.4	U	1.3	U	1.5	U	1.4	U	1.3	U	ND									
1,1-Dichloroethane	75-34-3	ug/kg	--	1.6	U	1.3	U	1.3	U	1.4	U	1.4	U	1.3	U	1.5	U	1.4	U	1.3	U	ND									
1,1-Dichloroethene	75-35-4	ug/kg	--	1.1	U	0.86	U	0.86	U	0.95	U	0.92	U	0.86	U	0.98	U	0.91	U	0.9	U	ND									
1,2-Dichloroethene, Total	540-59-0	ug/kg	--	<b>3.6</b>	--	0.86	U	0.86	U	0.95	U	0.92	U	0.86	U	0.98	U	<b>1.7</b>	--	0.9	U	26.3									
1,2-Dichloropropane	78-87-5	ug/kg	--	3.7	U	3	U	3	U	3.3	U	3.2	U	3	U	3.4	U	3.2	U	3.1	U	0									
2-Butanone (MEK)	78-93-3	ug/kg	--	<b>23</b>	--	<b>3</b>	J	<b>3</b>	J	<b>76</b>	--	<b>21</b>	--	8.6	U	<b>11</b>	--	<b>15</b>	--	<b>2.7</b>	J	217									
4-Methyl-2-pentanone (MIBK)	108-10-1	ug/kg	--	11	U	8.6	U	8.6	U	<b>3.1</b>	J	9.2	U	8.6	U	9.8	U	9.1	U	9	U	113									
Acetone	67-64-1	ug/kg	--	<b>130</b>	--	<b>12</b>	J	<b>11</b>	J	<b>400</b>	E	<b>110</b>	--	<b>1.9</b>	J	<b>53</b>	--	<b>79</b>	--	<b>23</b>	J	575									
Benzene	71-43-2	ug/kg	--	<b>0.87</b>	J	0.86	U	0.86	U	0.95	U	0.92	U	0.86	U	0.98	U	0.91	U	0.9	U	14.2									
Carbon tetrachloride	56-23-5	ug/kg	--	1.1	U	0.86	U	0.86	U	0.95	U	0.92	U	0.86	U	0.98	U	0.91	U	0.9	U	ND									
Chlorobenzene	108-90-7	ug/kg	--	1.1	U	0.86	U	0.86	U	0.95	U	0.92	U	0.86	U	0.98	U	0.91	U	0.9	U	ND									
Chlorodibromomethane	124-48-1	ug/kg	--	1.1	U	0.86	U	0.86	U	0.95	U	0.92	U	0.86	U	0.98	U	0.91	U	0.9	U	ND									
Chloroform	67-66-3	ug/kg	--	1.6	U	1.3	U	1.3	U	1.4	U	1.4	U	1.3	U	1.5	U	1.4	U	1.3	U	ND									
cis-1,2-Dichloroethene	156-59-2	ug/kg	--	<b>3.6</b>	--	0.86	U	0.86	U	0.95	U	0.92	U	0.86	U	0.98	U	<b>1.7</b>	--	0.9	U	26.6									
Methylene chloride	75-09-2	ug/kg	--	11	U	8.6	U	8.6	U	9.5	U	9.2	U	8.6	U	9.8	U	9.1	U	9	U	ND									
Styrene	100-42-5	ug/kg	--	2.1	U	1.7	U	1.7	U	1.9	U	1.8	U	1.7	U	2	U	1.8	U	1.8	U	50.6									
trans-1,2-Dichloroethene	156-60-5	ug/kg	--	1.6	U	1.3	U	1.3	U	1.4	U	1.4	U	1.3	U	1.5	U	1.4	U	1.3	U	ND									
Vinyl chloride	75-01-4	ug/kg	--	2.1	U	1.7	U	1.7	U	1.9	U	1.8	U	1.7	U	2	U	1.8	U	1.8	U	ND									
Xylenes, Total	1330-20-7	ug/kg	--	<b>15</b>	--	1.7	U	1.7	U	<b>7.2</b>	--	<b>0.97</b>	J	1.7	U	2	U	<b>23</b>	--	1.8	U	3250									
Total Volatile Organics (25)	TVO	ug/kg	--	<b>267.47</b>	--	<b>15</b>	--	<b>14</b>	--	<b>492.97</b>	--	<b>131.97</b>	--	<b>1.9</b>	--	<b>64</b>	--	<b>168</b>	--	<b>26.46</b>	--	5620									

Notes:

- U = Analyte not detected above the laboratory reporting limit
- J = Analyte result is estimated
- E = Result should be considered estimated because the concentration exceeded the level of calibration. This analyte was not detected in the high-level screen analysis
- ug/kg = micrograms per kilogram
- VOCs = volatile organic compounds
- NAPL ICL = Interim NAPL Cleanup Levels
- Bold = Analyte detected above the laboratory reporting limit
- Shaded Cell = Analyte detected above the NAPL ICL
- Total VOC calculations based on Non-Detect = 0
- Overall Average of each analyte is calculated using normal samples. Field duplicates excluded from averaging. Averaging based on Non-Detect = 1/2 Reporting Limit

CSL-043 (1.5), CSL-042 (3.3), CSL-021 (13.5) were analyzed as a High Level Methanol in order to quantitate the sample within the calibration range. Results reported in this summary table are from the Low Level Methanol analysis unless the compound exceeded the calibration on the initial Low Level analysis. These results are from the High Level analysis (2-Butanone (MEK) and Acetone).

CSL-022 (4.0) and DUP-4-1-5-15 - The internal standard (IS) response for some parameters was outside the acceptance criteria. Re-analysis was within acceptance criteria; however, the continuing calibration failed for 1,1-dichloroethene. Both results are reported in the laboratory report, however only the first analysis is included in the this summary table.

CSL-032 (Shaded Sample ID) = indicates sample was replaced by subsequent sample, and not used in Overall Average calculation

**Soil Temperatures**  
**Figures 2A, 2B, 3A and 3B**  
**Table '**



Figure 2A – Phase 1 Shallow Thermocouples – Days above 90°C

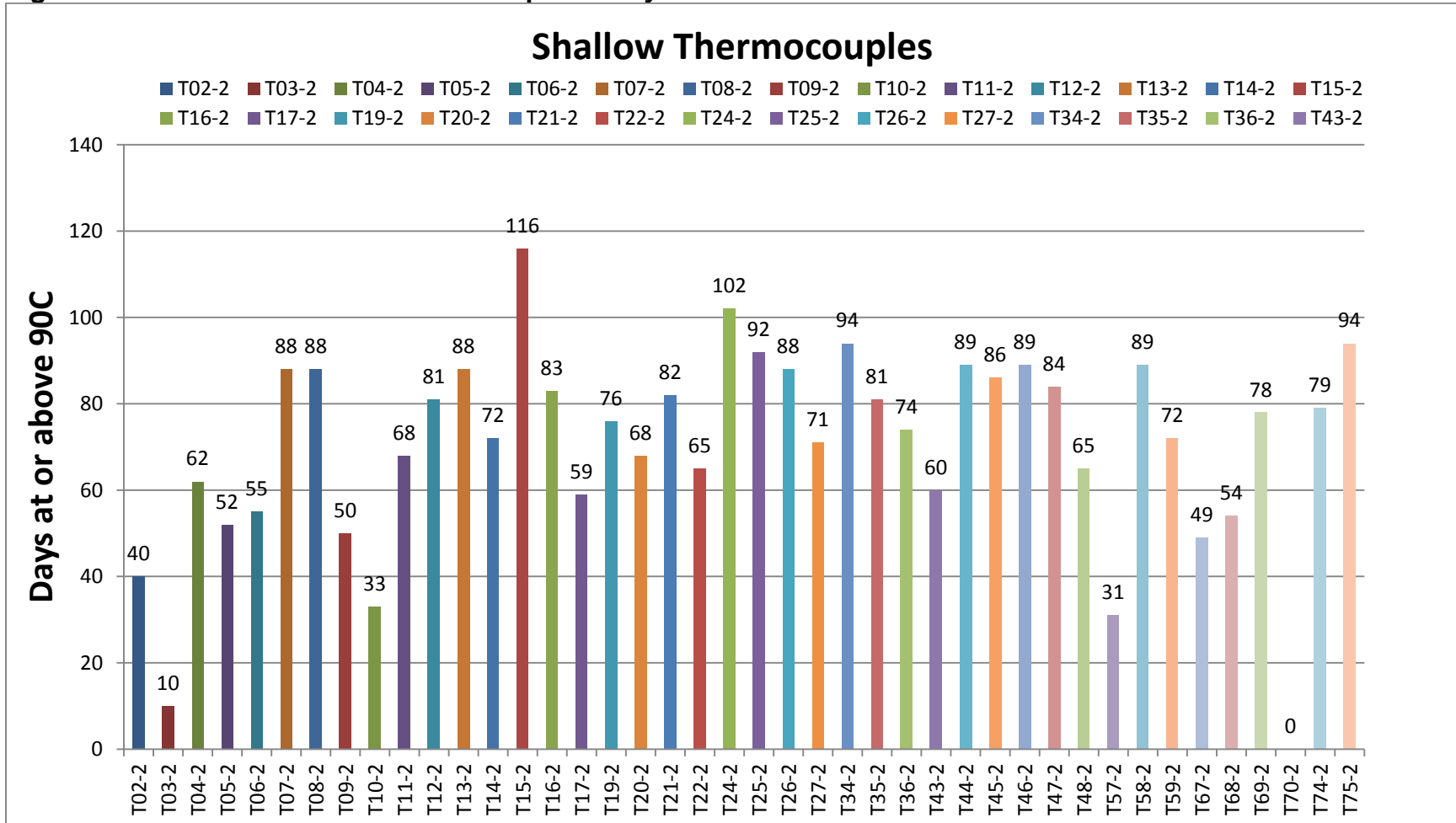


Figure 3A – Phase 1 Deep Thermocouples – Days above 90°C

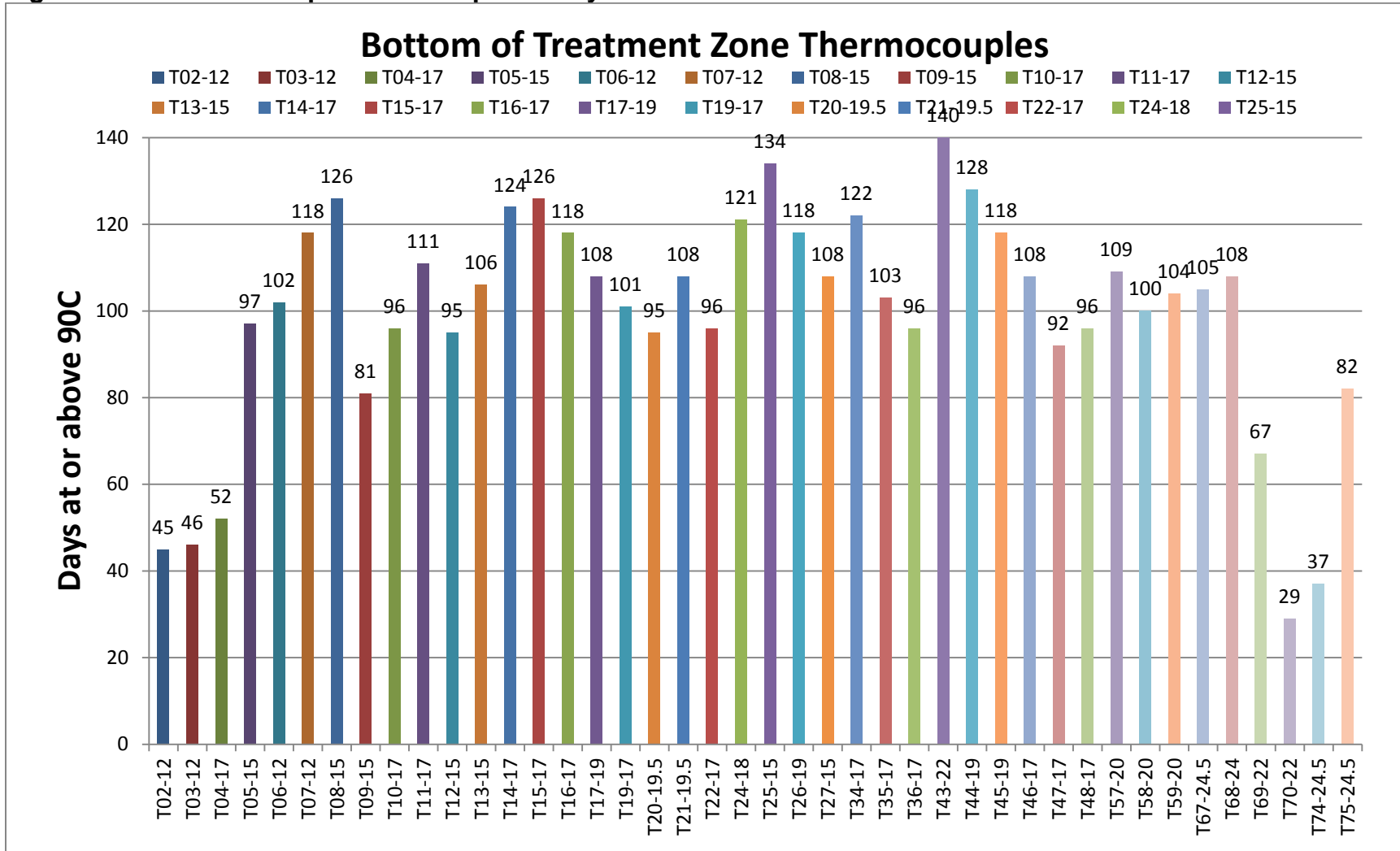
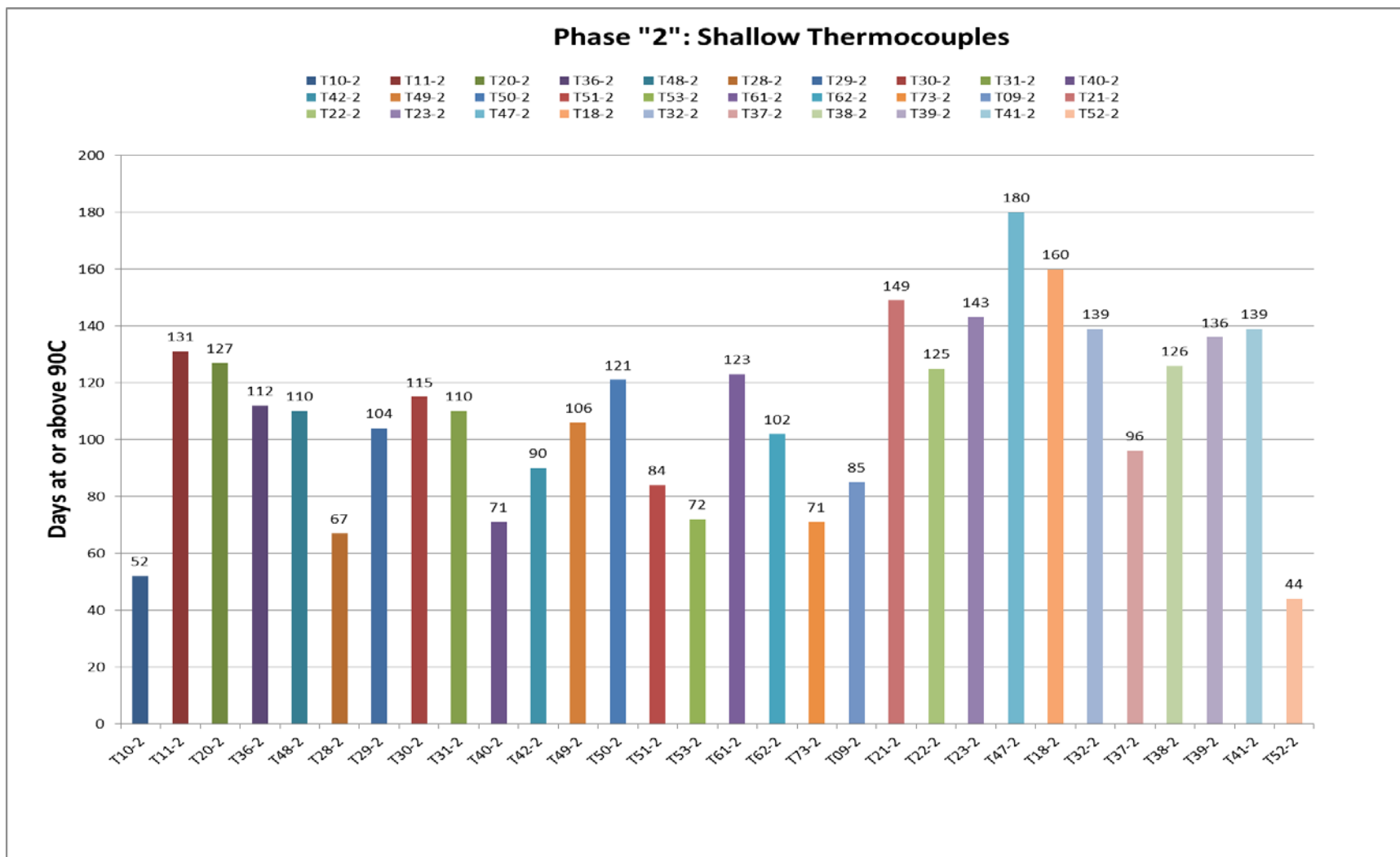
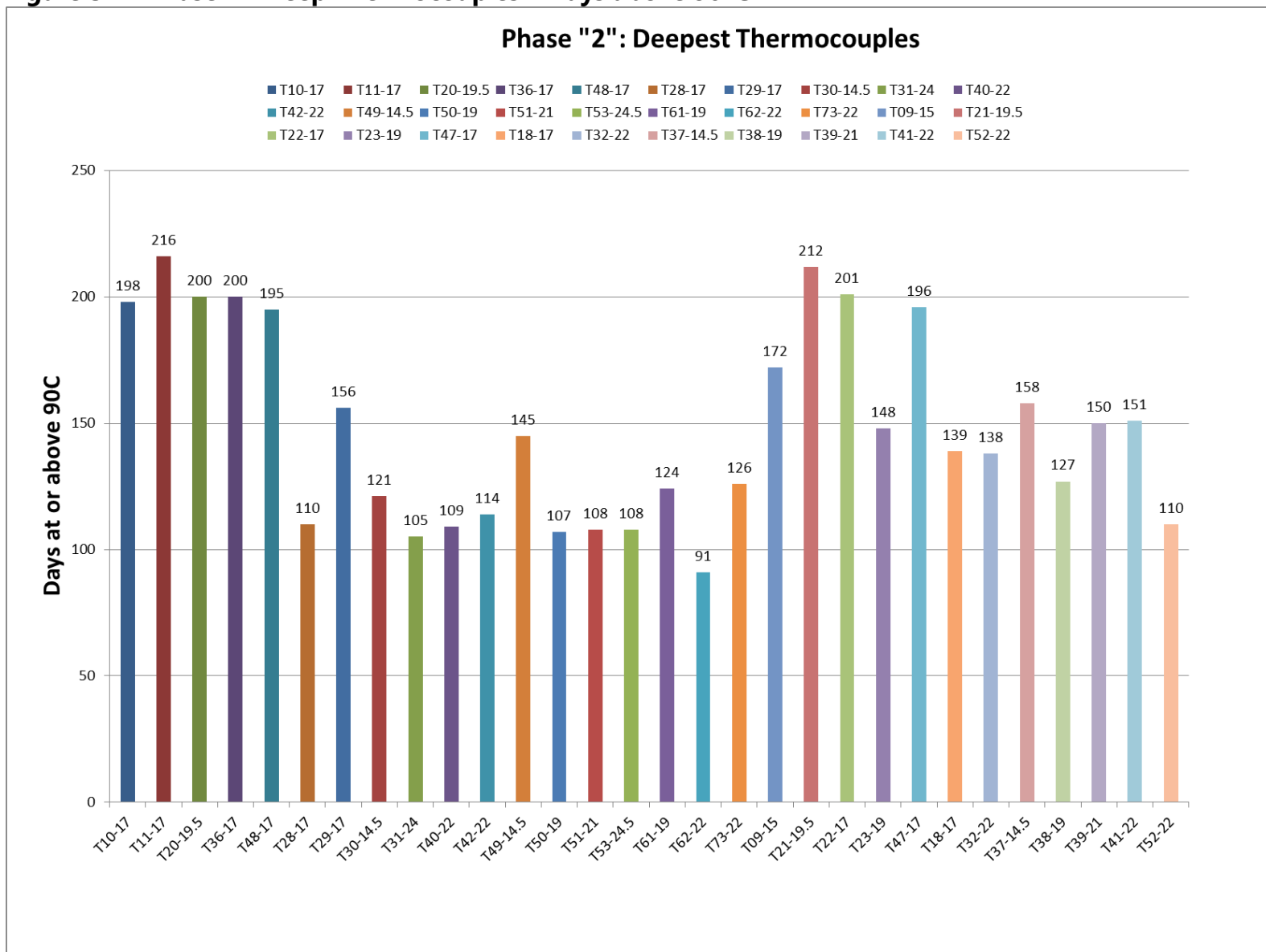


Figure 2B – Phase 2 Shallow Thermocouples – Days above 90°C



**Figure 3B – Phase 2 - Deep Thermocouples – Days above 90°C**



















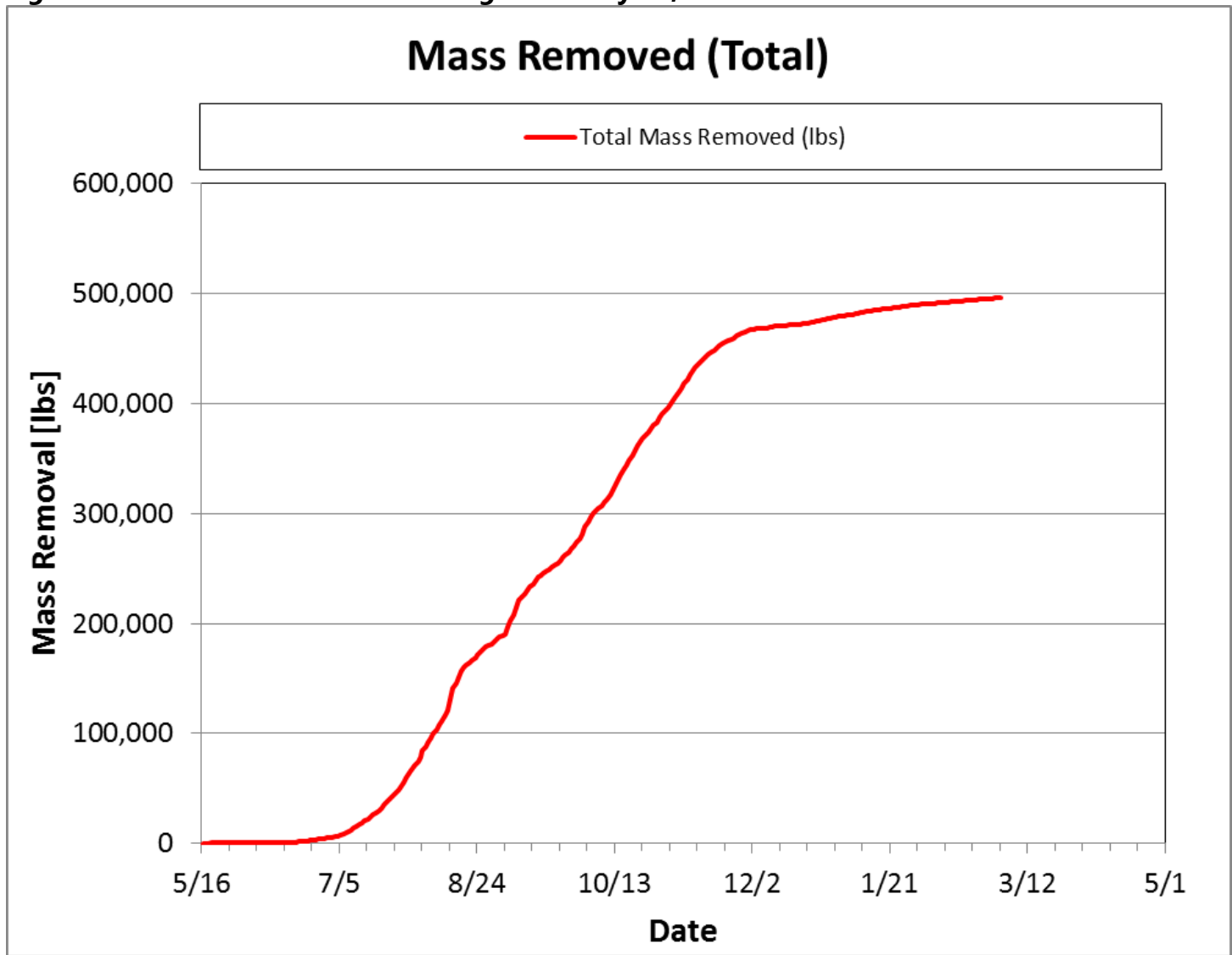




1/27/2015	92.8	105.2	97.4	96.8	100.1	96.1	96.5	100.4	99.0	100.3	100.1	99.0	100.4	101.0	100.5	100.1	96.4	100.3	101.0	100.1	98.1	102.0	101.5	101.8	94.9	98.0	97.0	96.4	100.9	83.6
1/28/2015	91.8	104.5	97.0	94.5	99.1	95.7	96.1	99.6	98.4	100.5	98.9	94.0	100.0	101.0	99.9	100.3	96.6	98.9	101.1	99.9	97.1	102.6	101.8	101.3	94.1	97.0	95.8	94.6	100.5	82.3
1/29/2015	90.5	103.0	96.7	92.3	97.6	95.6	96.4	99.1	97.6	98.2	96.7	89.4	99.5	101.3	97.7	100.4	96.5	95.7	102.2	99.5	97.2	103.0	102.0	101.5	93.5	93.3	94.8	93.7	100.2	81.5
1/30/2015	91.5	103.8	97.1	90.7	96.5	96.0	95.8	99.1	97.6	97.2	95.4	91.9	99.2	101.9	98.4	100.0	96.5	93.9	101.1	100.5	96.8	102.2	102.0	101.3	92.6	93.3	94.8	94.3	99.8	81.6
1/31/2015	91.3	103.4	96.5	89.0	95.4	94.9	94.3	98.6	97.1	97.3	95.6	97.0	99.4	101.3	99.6	99.3	96.8	95.2	100.8	100.8	95.8	101.0	101.8	101.0	92.7	92.5	94.9	95.0	98.8	81.0
2/1/2015	93.5	104.9	96.6	89.0	98.5	95.2	95.6	99.8	98.5	100.3	99.1	99.4	100.6	101.9	100.8	99.9	97.7	100.0	102.0	100.2	95.8	98.8	101.8	101.1	92.8	94.5	98.1	97.5	100.5	83.0
2/2/2015	91.7	104.2	96.0	88.0	96.9	95.0	94.4	99.0	98.1	99.9	97.0	96.8	101.2	101.2	99.4	99.5	97.3	99.3	101.1	99.1	95.5	94.9	101.4	101.0	92.5	92.4	96.3	94.1	97.1	83.0
2/3/2015	89.5	101.8	94.9	86.0	93.9	93.6	93.5	98.0	96.6	96.5	93.4	90.5	99.6	97.6	96.3	97.7	97.0	97.0	100.1	97.5	94.9	91.9	101.8	100.7	91.2	89.9	93.9	91.9	94.0	83.0
2/4/2015	88.7	100.8	94.5	85.3	90.7	93.6	93.0	97.2	95.7	94.8	91.5	86.8	98.3	95.5	92.8	96.0	96.4	93.0	99.4	97.8	95.0	89.0	102.2	100.9	90.1	88.5	91.3	91.0	92.2	83.0
2/5/2015	88.5	98.6	93.7	83.7	88.4	92.8	92.0	96.7	94.5	92.4	89.2	84.1	97.5	92.1	90.4	94.8	95.9	88.5	99.5	96.3	93.3	86.1	101.3	99.8	88.5	86.9	89.6	89.5	90.1	81.9
2/6/2015	86.3	95.3	92.1	81.7	86.2	91.3	91.2	95.8	92.5	90.1	87.0	80.2	96.1	88.8	88.2	91.5	94.9	84.3	97.7	93.7	90.8	84.5	100.9	97.8	87.9	85.4	87.3	88.1	88.4	80.9
2/7/2015	86.3	94.1	91.5	81.2	84.9	92.0	90.9	96.0	91.9	89.6	85.8	80.6	95.8	87.7	86.3	90.9	94.3	81.6	96.0	93.7	90.9	84.0	102.0	97.0	87.2	84.8	85.7	87.6	87.1	80.8
2/8/2015	85.9	92.8	90.8	79.9	83.9	92.0	89.8	95.7	90.8	88.7	84.1	82.3	96.1	86.5	84.5	91.4	94.0	78.8	95.2	93.7	91.2	83.6	101.4	96.5	86.4	83.7	84.3	86.8	86.1	79.7
2/9/2015	85.0	91.7	89.6	78.4	82.9	91.8	88.7	95.0	90.0	87.4	82.2	83.3	96.0	84.9	82.5	90.1	93.3	76.1	93.5	93.0	91.0	82.8	100.0	95.8	87.0	82.0	83.0	86.0	85.0	78.6
2/10/2015	84.8	91.4	89.0	77.7	82.5	92.0	88.5	95.3	89.9	87.1	80.9	85.4	96.3	84.0	80.7	88.3	93.1	74.2	92.5	93.8	91.8	82.4	100.6	96.0	86.3	82.3	82.6	85.8	84.2	77.9
2/11/2015	83.9	91.0	88.6	76.5	82.7	91.3	88.5	95.7	89.3	87.0	79.6	82.6	96.6	83.5	79.5	84.8	92.7	72.2	91.6	94.2	92.2	83.1	98.1	96.3	85.6	82.7	82.8	85.3	83.5	76.8
2/12/2015	84.0	91.8	88.5	75.7	82.6	92.3	88.5	95.9	90.0	87.9	78.8	81.4	96.8	85.9	78.0	90.0	91.9	71.5	90.9	95.1	93.2	85.0	100.1	99.3	86.2	82.7	84.8	85.8	83.9	77.7
2/13/2015	83.3	91.1	87.7	74.1	82.8	91.4	87.6	95.5	89.9	87.3	77.5	79.9	96.9	85.9	77.1	90.9	91.0	69.3	89.9	94.5	93.0	88.0	95.7	97.6	86.5	82.6	85.5	85.3	84.3	77.3
2/14/2015	83.2	92.3	87.6	73.9	82.8	92.1	88.1	96.3	90.6	88.2	77.3	80.8	97.4	91.0	76.3	95.0	90.1	69.2	90.3	95.4	93.6	91.9	98.4	100.2	87.6	83.0	86.5	86.4	85.9	78.3
2/15/2015	84.0	93.0	88.8	72.9	83.4	92.0	87.3	96.6	91.7	88.7	76.9	84.3	99.0	98.2	75.8	95.5	90.0	67.7	90.6	95.0	93.6	95.3	98.3	99.7	87.9	84.3	88.5	86.8	87.9	78.5
2/16/2015	83.5	93.2	88.7	72.0	84.1	91.5	87.8	95.9	91.9	88.5	77.2	84.5	99.2	95.0	75.8	93.1	89.5	66.9	89.9	95.5	93.5	96.3	93.5	99.6	88.4	84.7	88.5	86.9	89.0	78.8
2/17/2015	84.0	94.0	89.0	71.7	84.5	92.0	88.1	96.8	92.1	89.3	77.7	88.4	99.8	98.5	75.5	92.4	89.5	66.9	90.2	96.0	94.0	97.8	91.4	100.0	89.1	85.1	89.8	87.5	91.2	79.9
2/18/2015	84.3	94.5	89.3	70.9	85.0	92.3	88.5	97.0	92.6	89.7	77.6	89.4	100.7	100.6	75.3	91.9	90.0	66.3	90.7	95.1	92.4	99.0	89.3	99.9	89.3	85.6	90.3	88.7	93.7	80.7
2/19/2015	85.1	93.8	90.0	70.0	85.2	92.2	88.3	96.8	93.0	90.0	78.7	92.3	100.5	100.9	74.9	92.9	89.6	65.9	91.0	94.9	91.2	99.5	87.7	99.9	89.4	86.1	91.3	89.5	95.0	81.8
2/20/2015	84.7	92.9	89.8	69.0	85.5	92.0	88.3	96.4	93.0	89.3	79.5	88.8	100.5	100.0	74.9	92.6	89.5	65.4	90.7	94.5	92.3	99.3	85.5	99.4	90.3	86.2	90.7	89.3	94.9	81.9
2/21/2015	84.9	93.5	90.0	69.3	85.0	92.2	88.3	96.6	93.4	89.6	79.6	89.0	100.3	100.2	74.6	92.8	89.1	65.7	89.9	95.6	93.5	99.8	84.4	99.5	90.3	85.8	90.3	89.5	95.8	81.9
2/22/2015	86.3	94.5	91.3	69.0	86.0	92.9	89.7	97.7	93.9	91.1	80.0	93.3	101.3	101.9	74.3	94.6	90.2	65.5	91.0	97.1	94.5	101.0	82.9	100.5	90.0	87.4	93.0	91.4	97.6	83.1
2/23/2015	86.1	95.1	91.3	67.8	86.8	93.0	89.2	97.5	94.0	91.0	81.3	91.1	101.3	101.7	74.4	93.4	90.0	64.3	90.7	98.1	94.4	100.8	80.8	100.0	90.6	87.5	93.0	91.6	97.5	81.3
2/24/2015	85.3	95.1	90.6	67.0	87.1	92.6	89.6	97.2	94.1	90.8	81.4	89.4	101.4	101.1	74.7	93.4	89.4	64.3	91.2	97.4	94.1	100.9	80.0	100.7	91.6	87.4	92.4	91.6	97.7	81.1

**VOC Mass Removal**  
**Figures 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13**  
**Tableg 5 UbX\***

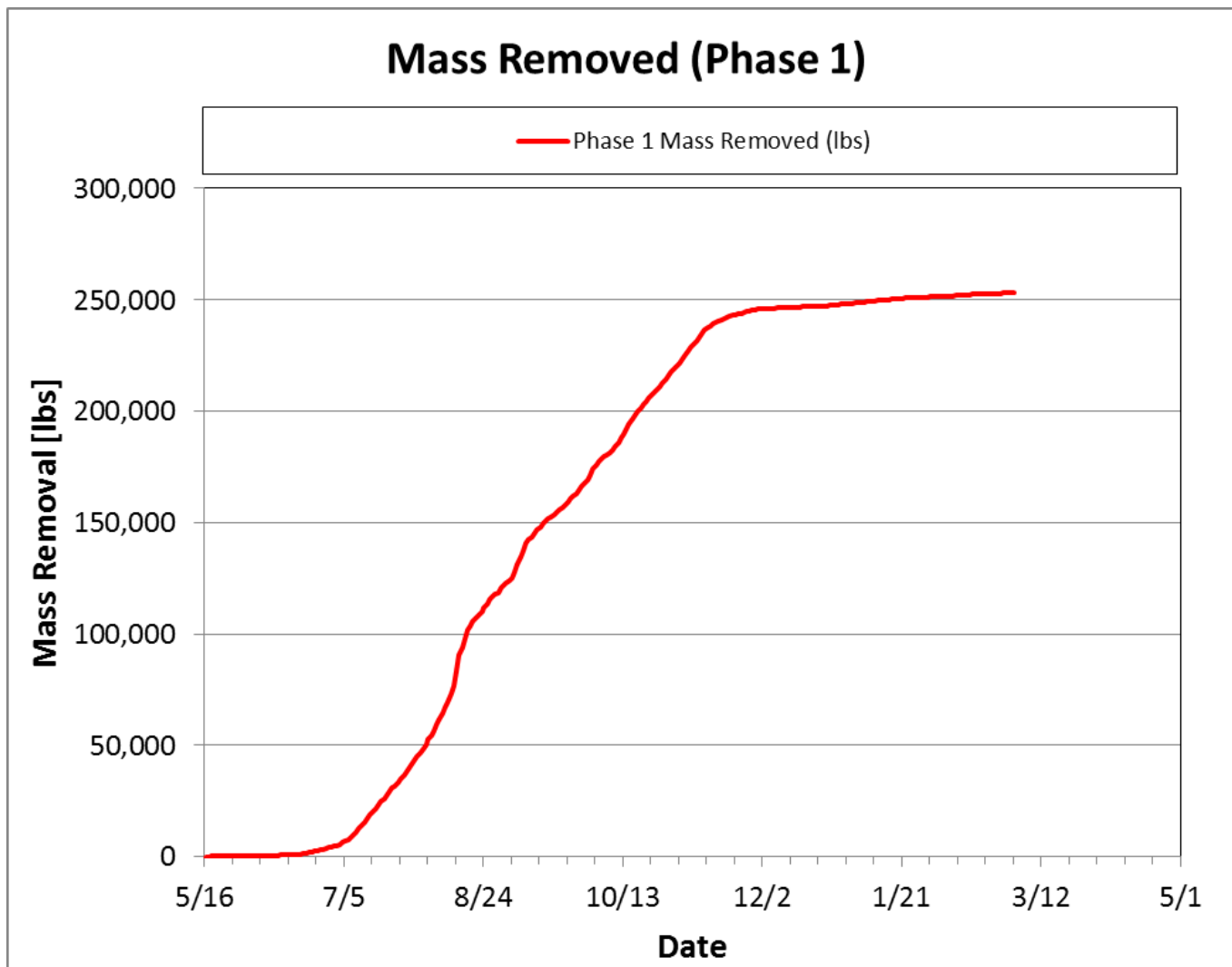
Figure 4 - Total Mass Removed through February 20, 2015



Total mass: 496,400 lbs.

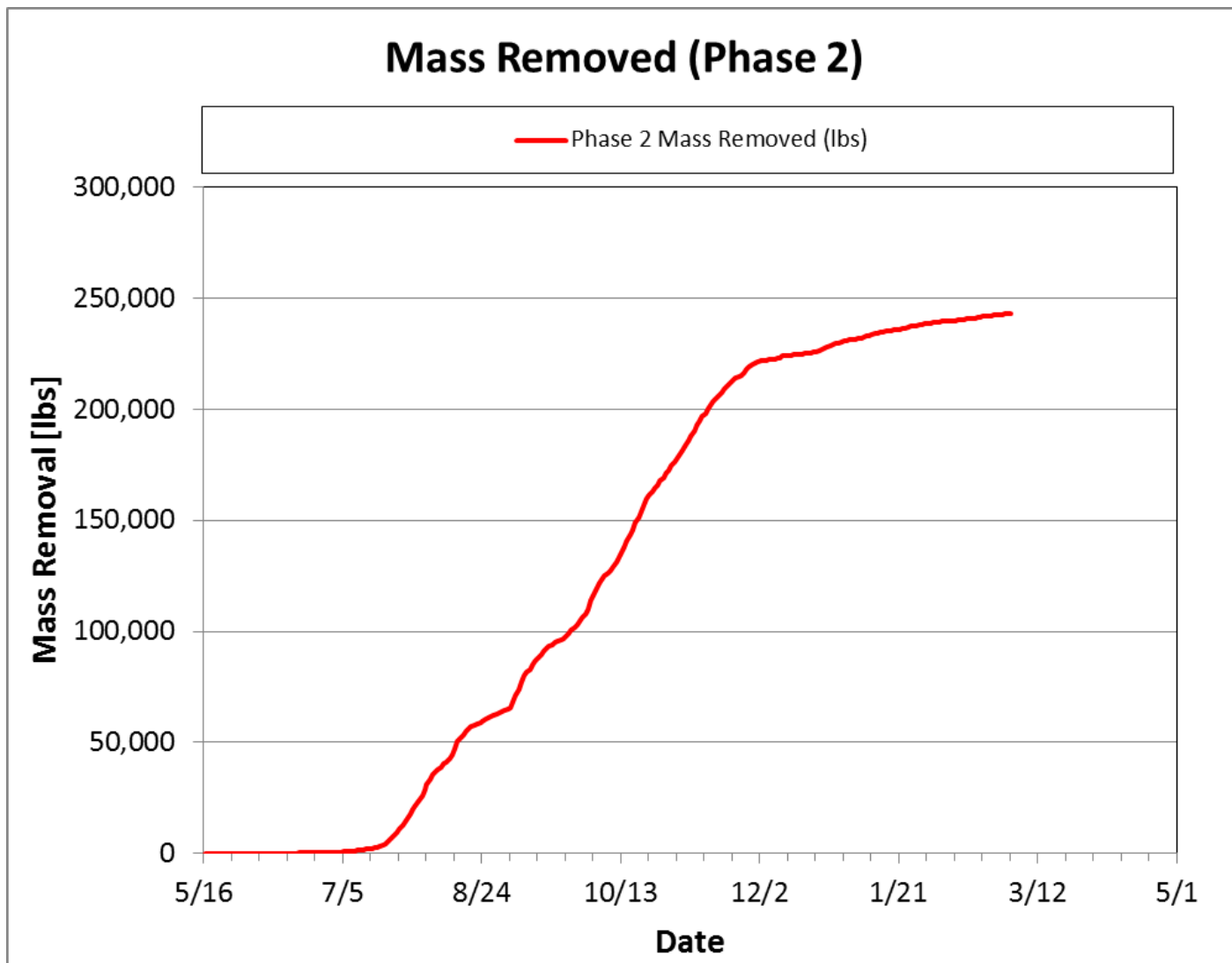


Figure 5 - Phase 1 mass removed through February 20, 2015



Phase 1 total: 253,000 lbs

Figure 6- Phase 2 mass removed through February 20, 2015



Phase 2 total: 243,400 lbs

Figure 7 - Total mass removal rate (assumes all TO-15 reported compounds)

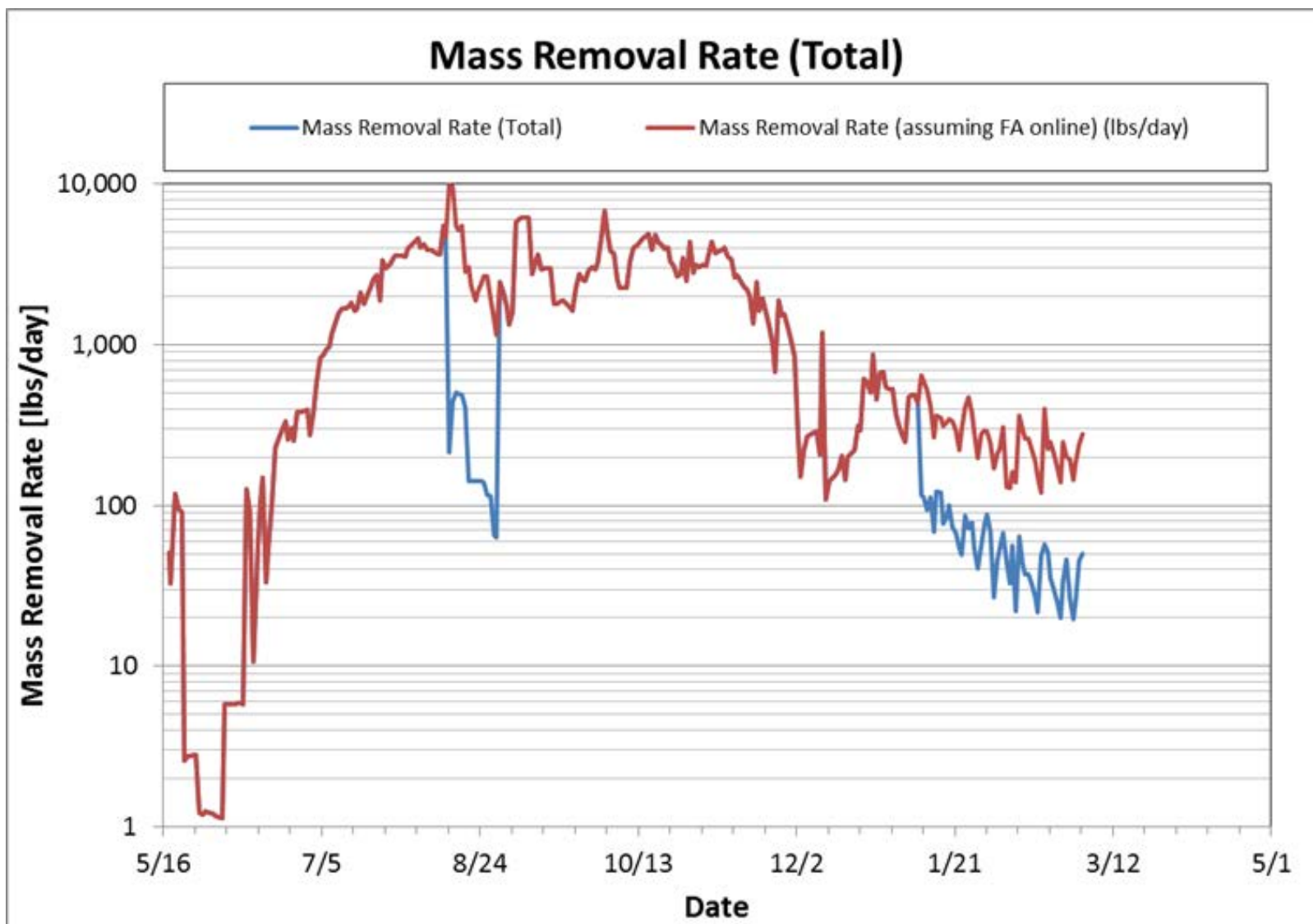
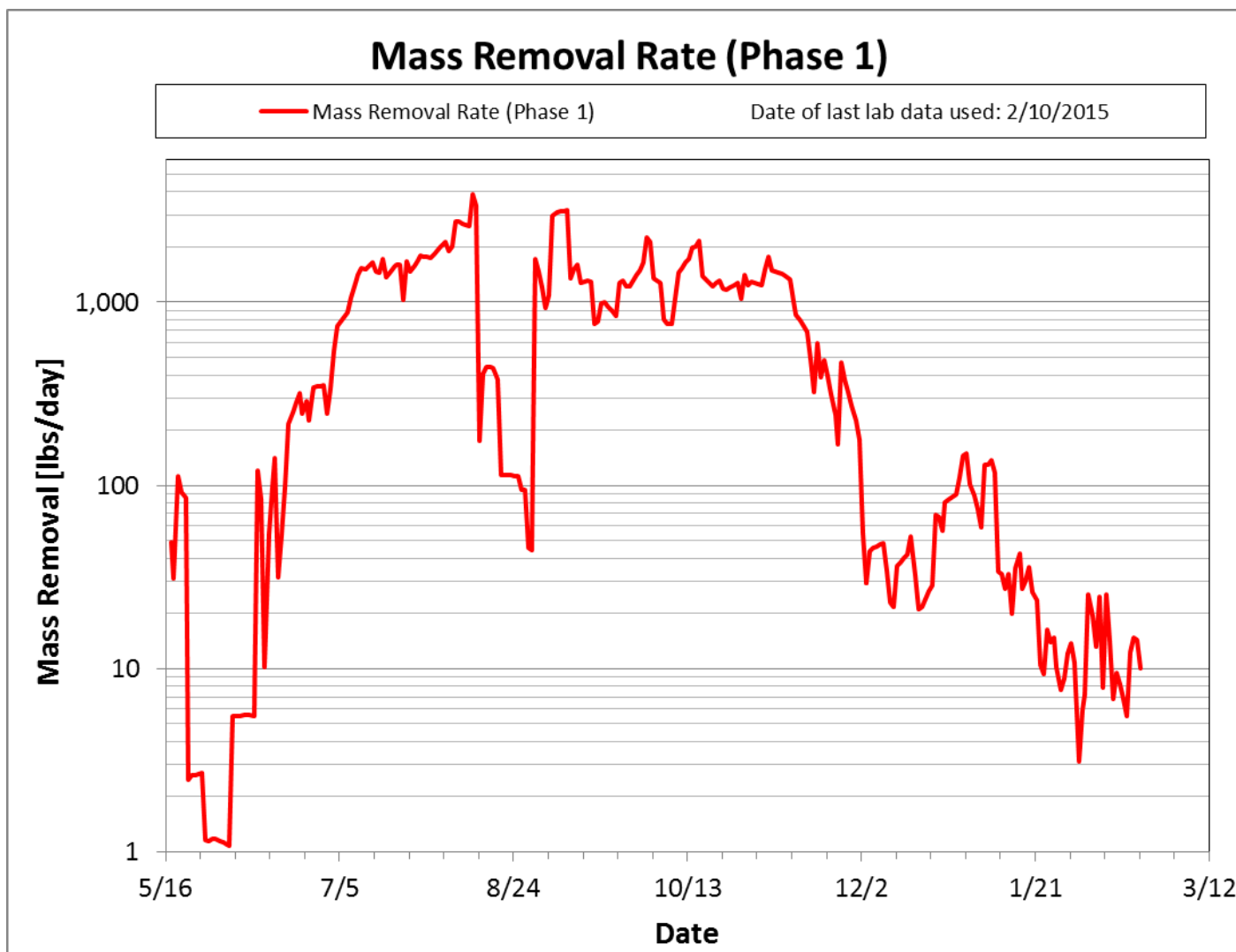
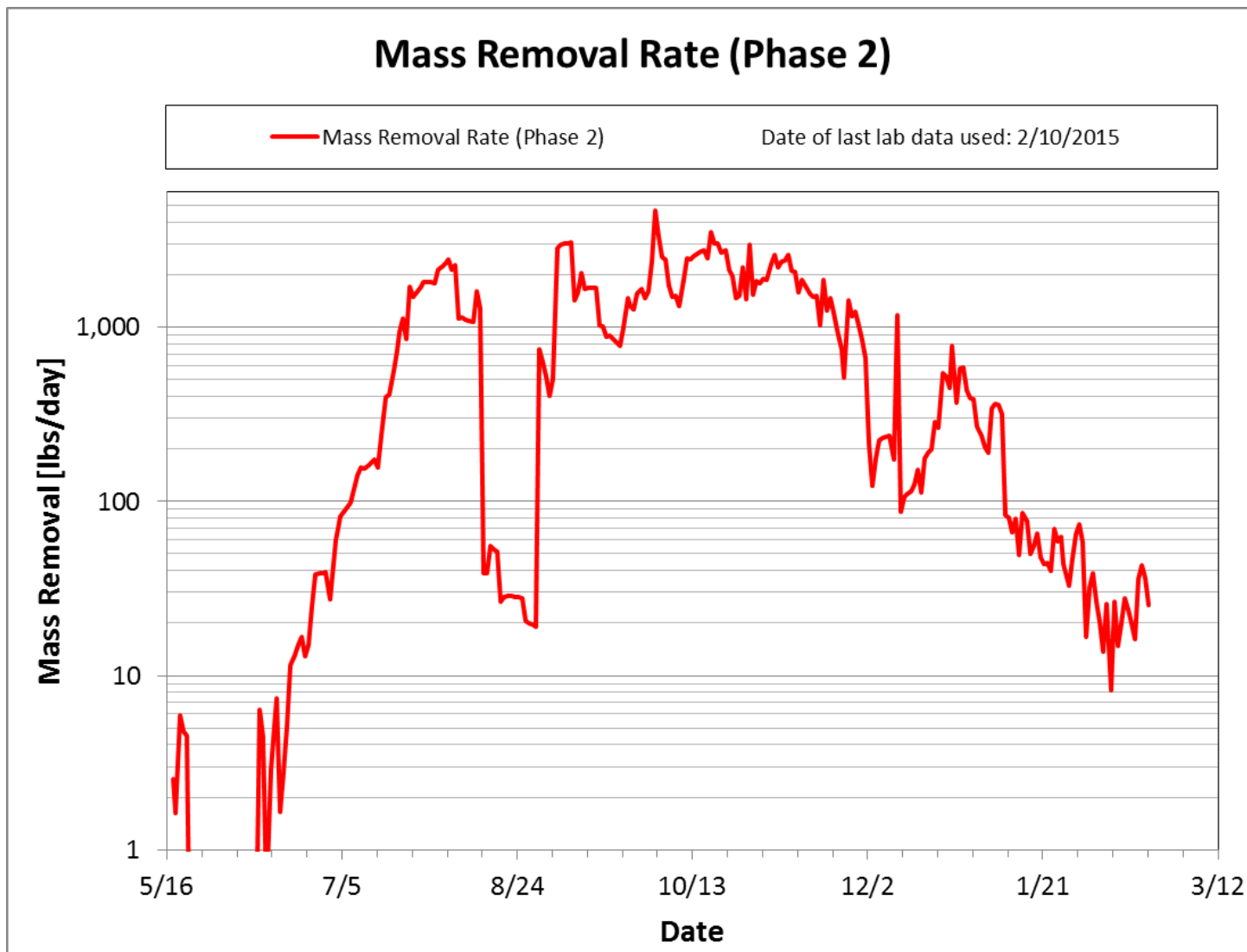


Figure 8 - Phase 1 mass removal rate (assumes all TO-15 reported compounds)



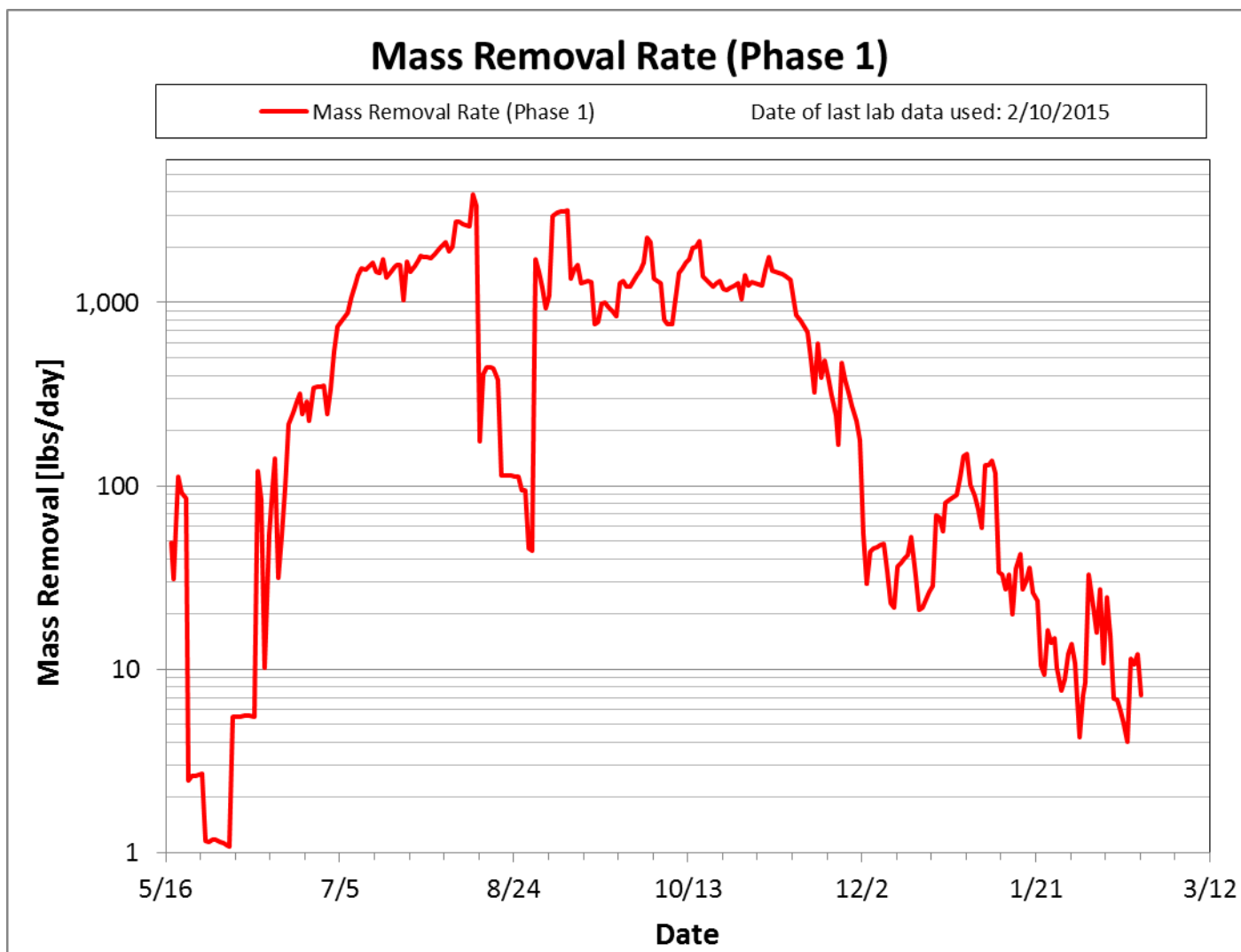
Average removal rate (13-20 February): 10 lbs/day

Figure 9 - Phase 2 mass removal rate (assumes all TO-15 reported compounds)



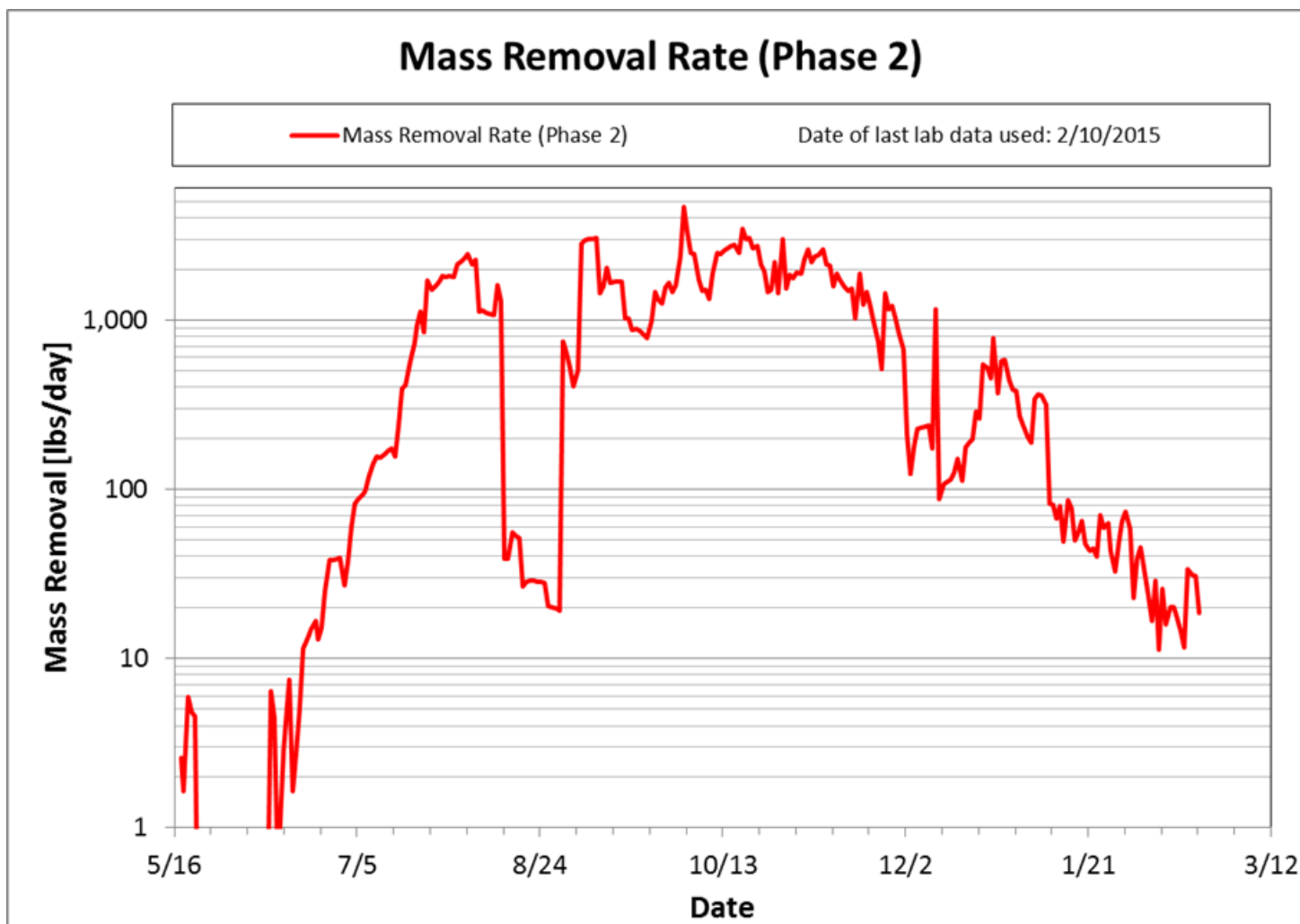
Average removal rate (13-20 February): 29 lbs/day

Figure 10 - Phase 1 mass removal rate (TO-15 reported compounds minus acetone and 2-butanone)



Average removal rate (13-20 February): 8.1 lbs/day

Figure 11 - Phase 2 mass removal rate (TO-15 reported compounds minus acetone and 2-butanone)



Average removal rate (13-20 February): 21.8 lbs/day

**Table 5 - Wellfield PID and VOC mass flux by Phase**

Phase	Sampling Location	7/24/14	8/1/14	8/7/14	9/4/14	9/11/14	9/18/14	9/24/14	10/2/14	10/9/14	10/17/14	10/24/14	10/31/14	11/7/14	11/13/14	11/17/14	11/20/14	11/28/14	12/5/14	12/11/14	12/18/14	12/26/14	12/31/14	1/9/15	1/16/15	1/22/15	1/29/15	2/5/15	2/12/15	2/19/15
1	SV-1	215	100	745	602	720	604	590	1181	550	516	5	770	712	851	845	790	450	360	236	185	177	170	95	238	128	182	179	201	199
	SV-2	742	173	1271	887	872	1129	1318	2987	780	770	1610	1004	931	1179	600	934	660	677	482	377	397	436	300	449	810	404	283	91	187
	SV-3	2588	872	3609	2854	1198	3395	1414	5512	2643	1120	3971	1430	627	99	101	3138	1717	1782	1218	1246	347	1622	725	626	1108	1241	653	86	430
	SV-4	1971	307	2543	1921	1514	2652	1153	4790	1927	3820	3275	2204	2650	3297	1375	2903	1510	2341	1278	979	333	611	585	477	487	446	300	129	264
	SV-5	1817	279	1642	740	444	1407	1197	4790	759	1411	950	1153	802	326	302	490	402	135	243	120	235	29	202	248	198	180	129	131	80
	SV-6	4480	332	1926	956	765	4283	2347	11564	3525	9177	5750	4780	4919	5854	1083	2100	601	435	1271	375	277	197	678	664	1141	699	558	328	518
	SV-8	3222	385	1330	2375	1479	3267	1816	4744	179	172	3815	1881	1850	88	1475	940	401	450	890	150	178	170	110	244	185	235	94	167	166
	SV-9	3245	142	324	1993	1565	2995	1777	11950	2762	4967	3801	2121	2863	3227	1265	801	1209	1040	1480	390	350	340	445	445	365	622	298	274	450
	SV-10	1896	131	2148	1096	1111	2459	1517	4382	1933	1745	3384	2841	1318	4121	1494	1982	1302	1221	3215	500	381	420	400	371	269	99	65	93	182
	SV-11	1016	666	1712	1979	2145	1988	930	2534	1393	2687	1950	1469	1380	596	596	1360	750	641	270	399	332	354	315	495	271	412	346	333	389
	SV-12	80	53	158	139	104	815	1427	3234	682	1102	1090	2100	512	563	206	413	440	426	1413	545	569	490	465	201	74	637	143	65	185
	SV-13	417	211	736	145	170	1452	1476	4291	1109	375	370	985	380	295	315	1210	210	131	432	143	473	445	365	315	139	550	209	187	173
	SV-14	632	452	1526	2636	1450	777	1610	3411	1917	4668	4274	4150	5565	8416	1107	1053	630	500	1288	300	468	570	493	422	352	366	129	243	232
	SV-15	3440	1072	1153	2000	915	2150	2054	608	3265	4890	4801	5780	5000	618	654	1623	730	660	1007	115	490	600	705	872	627	1247	742	500	764
	2 (and between divider line)	SV-7	3843	366	1751	1210	1482	4307	1835	3337	3672	9379	7350	5812	7910	553	3115	6391	2860	2977	2810	1323	554	531	500	514	483	300	129	184
SV-16		3113	885	233	1911	1703	2823	2216	6230	3165	6888	4994	3841	6029	11	2340	6276	3118	3307	7931	1957	1502	1908	1765	2144	3610	3159	821	454	1332
SV-17		3715	429	306	2928	1824	2801	1837	8933	1927	2713	2954	3313	5408	389	1670	10903	1983	1335	409	800	1133	730	116	718	1223	850	712	501	492
SV-18		1760	862	1203	2034	1634	2388	2446	15000	3554	5030	2815	2465	5632	13871	3377	4768	3650	5071	3361	5491	2057	2012	2423	1553	5546	4535	146	1110	2876
SV-19		2258	350	2067	1971	2005	1818	2038	10522	2191	6417	4561	4398	3067	2693	1075	875	925	530	528	315	552	130	515	438	504	401	263	288	259
SV-20		1990	796	1545	2344	1610	2268	2158	15000	2853	2305	2059	343	4053	8642	3534	5500	2725	12650	6352	6520	2084	2492	2750	1673	3511	13673	951	1305	2221
SV-21		1964	487	2295	2077	1855	3458	1755	8561	2756	8053	4661	2119	4298	2631	2264	6000	4186	4440	2002	2870	937	958	808	634	1346	1644	158	449	497
SV-22		2670	980	1606	2222	1892	2466	2448	14750	3344	5023	3578	2236	3582	55	3460	4765	3450	11187	4509	5516	2803	2565	2720	1598	3970	3235	584	792	995
SV-23		2515	671	3248	3158	2165	3233	1532	8102	2973	7684	4880	3933	2707	4560	4005	5367	2993	2598	1326	1154	805	883	517	948	3832	3889	163	1017	1048
SV-24		1412	638	1504	2406	1567	1669	1949	11882	1999	6130	4554	5005	6223	8864	2843	4555	2946	4280	3267	5764	2614	2195	2350	1446	3030	2866	502	957	1553
SV-25		688	220	1261	1035	1059	1350	2418	5725	1542	2247	1873	1743	1925	991	570	1301	740	773	500	445	400	547	410	457	494	448	350	295	370
SV-26		90	185	350	580	573	638	1133	1119	790	3559	4305	4752	4633	1933	865	2742	710	520	642	1710	548	550	420	677	298	410	183	169	277
SV-27		192	151	718	944	789	1117	1518	3922	1256	1485	1650	947	840	1040	313	769	745	620	318	320	277	350	210	289	309	233	241	254	171
SV-28		15	87	77	151	178	310	211	730	335	1250	3624	5592	5447	4380	1438	6351	1440	1100	1588	4527	1575	886	610	759	181	856	300	175	258
SV-29		8	66	55	20	52	130	1	15	35	21	352	255	83	41	1375	43	80	41	52	117	70	61	20	318	62	63	53	34	93
<b>Breakdown of Wellfield VOC Flux by Phase</b>																														
<b>Phase 1:</b>		48%	45%	70%	51%	46%	59%	51%	37%	48%	36%	49%	45%	42%	33%	25%	25%	21%	18%	30%	12%	22%	30%	29%	35%	19%	16%	49%	26%	28%
<b>Phase 2:</b>		52%	55%	30%	49%	54%	41%	50%	63%	52%	64%	51%	55%	58%	67%	75%	75%	79%	82%	70%	88%	78%	70%	71%	65%	81%	84%	51%	74%	72%



Figure 13 - Mass Fraction from Phase 1:Phase 2

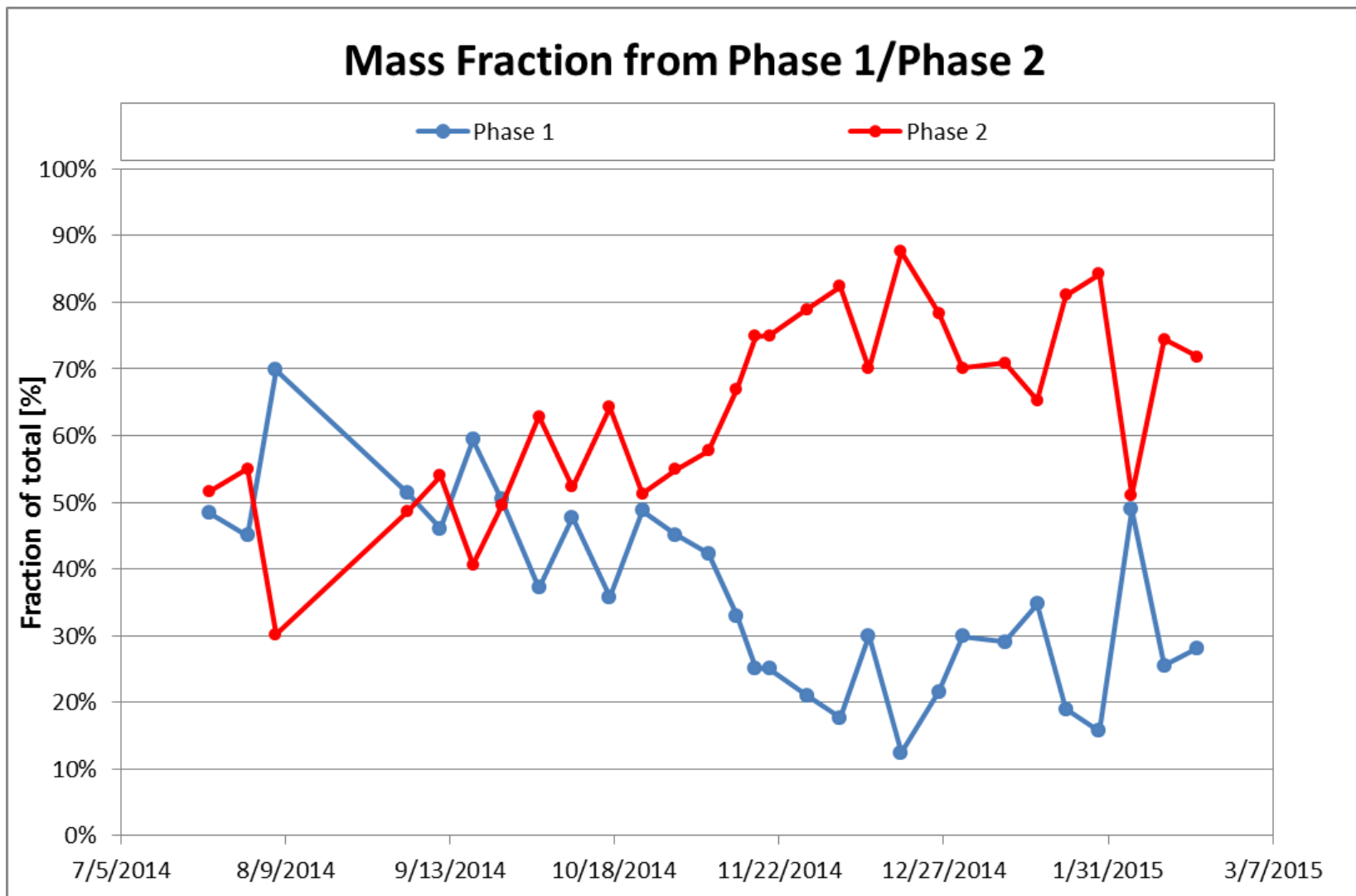










































































Table 6

Vapor Extraction Well Data  
Solvents Recovery Services of New England  
Southington, CT

	VEW-88 ["wc]	VEW-89 ["wc]	VEW-90 ["wc]	VEW-91 ["wc]	VEW-92 ["wc]	VEW-93 ["wc]	VEW-94 ["wc]	VEW-95 ["wc]	VEW-96 ["wc]	VEW-97 ["wc]	VEW-98 ["wc]	VEW-99 ["wc]	SV-1 ["wc]	SV-2 ["wc]	SV-3 ["wc]	SV-4 ["wc]	SV-5 ["wc]
6/5/14 14:25	17	21	9	20	20	19	16	15	21	21	17	17					
6/12/14 13:45	14	18	6	18	17	15	13	10	15	17	14	13					
6/19/14 15:00	11	14	9	14	15	13	12	12	15	15	11	12					
6/20/14 12:39																	
6/26/14 8:50	11	15	10	17	19	15	14	14	19	19	13	13					
7/3/14 14:00	11	15	10	16	18	13	13	13	18	19	13	11					
7/17/14 11:30	10	13	8	15	19	11	11	9	19	19	13	8					
7/24/14 0:00													15.4	13.7	13.9	13.9	14.1
8/1/14 0:00													14.4	14.6	14.4	14.7	14.8
8/7/14 0:00													8.2	8.5	8.5	8.3	8.3
9/4/14 0:00													3.6	4.8	4.8	4.8	4.8
9/11/14 0:00													7.2	7.2	7.2	7.4	7.3
9/18/14 0:00													5.9	5.9	5.8	6	6
9/24/14 0:00													4.4	4.2	4.4	4.4	4.5
10/2/14 0:00													10.2	10.3	10.2	10.3	10.4
10/9/14 0:00													8.5	8.5	8.5	8.4	8.5
10/17/14 0:00													7.5	7.4	7.2	7.1	7.4
10/24/14 0:00													5.2	5.1	5.5	5.4	5.3
10/31/14 0:00													4.6	4.6	4.3	4.4	4.6
11/7/14 0:00													6.7	6.7	6.7	6.6	6.9
11/12/14 0:00																	
11/13/14 0:00													6.1	6.3	5.9	6.1	5.8
11/20/14 0:00													6	5.9	6.2	5.8	5.9
11/22/14 0:00	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5					
11/28/14 0:00													7.1	7.2	7.2	7.1	7.2
12/5/14 0:00													6	6.1	6.4	6.4	6.5
12/11/14 0:00													7.2	7.1	7.3	7.2	7.4
12/18/14 0:00													8.1	8	8.1	8	8.1
12/26/14 0:00													9.1	9.3	9	9	9
12/31/14 0:00													8.6	8.8	8.3	8.7	8.6
1/9/15 0:00													6	5.9	5.9	6.1	6.2
1/16/15 0:00													5.1	5.3	4.9	4.9	5
1/22/15 0:00													4.8	4.6	4.6	4.9	4.8
1/29/15 0:00													8.6	8.3	8.2	8.4	8.4
2/5/15 0:00													19.1	18.5	19.2	19.2	18.9
2/12/15 0:00													8.1	8.2	8	8.4	8.5
2/19/15 0:00													6.2	6.3	6.5	6.5	6.3
2/26/15 0:00													5.8	8.8	8.9	8.9	6.1
3/3/15 0:00													5.6	5.7	5.7	5.4	5.7

Table 6

Vapor Extraction Well Data  
Solvents Recovery Services of New England  
Southington, CT

	SV-6 ["wc]	SV-7 ["wc]	SV-8 ["wc]	SV-9 ["wc]	SV-10 ["wc]	SV-11 ["wc]	SV-12 ["wc]	SV-13 ["wc]	SV-14 ["wc]	SV-15 ["wc]	SV-16 ["wc]	SV-17 ["wc]	SV-18 ["wc]	SV-19 ["wc]	SV-20 ["wc]	SV-21 ["wc]	SV-22 ["wc]
6/5/14 14:25																	
6/12/14 13:45																	
6/19/14 15:00																	
6/20/14 12:39																	
6/26/14 8:50																	
7/3/14 14:00																	
7/17/14 11:30																	
7/24/14 0:00	14.2	14.1	14.8	14.8	14.8	14.8	15.4	15.4	15.4	15.4	14.8	15.4	14.8	14.8	15.4	14.5	15.4
8/1/14 0:00	14.8	14.6	14.9	14.6	14.7	14.7	14.8	14.8	15.1	14.7	14.8	14.7	15.1	14.6	14.7	14.3	14.7
8/7/14 0:00	8.5	8.2	8.3	8.4	8.3	8.3	8.3	8.4	8.5	8.5	8.5	8.4	8.5	8.4	8.2	8.3	8.3
9/4/14 0:00	4.8	4.8	4.8	4.8	3.6	4.8	4.8	4.8	4.8	4.8	4.8	4.8	3.6	4.8	3.6	4.8	2.2
9/11/14 0:00	7.1	7	7.3	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.3	7.4	6.8	7.7	7	7.2
9/18/14 0:00	5.5	5.7	6	6.1	5.8	5.8	6	5.9	5.8	6	6.1	5.9	5.8	6	5.8	5.9	5.7
9/24/14 0:00	4.3	4.3	4.6	4.5	4.5	4.5	4.4	4.5	4.5	4.5	4.5	4.4	4.6	4.4	4.4	4.4	4.4
10/2/14 0:00	10.4	10.3	10.3	10.3	10.3	10.4	10.5	10.3	10.3	10.3	10.4	10.3	10.3	10	10.1	10.4	10.1
10/9/14 0:00	8.4	8.6	8.5	8.5	8.5	8.6	8.3	8.5	8.6	8.5	8.4	8.5	8.4	8.6	8	8.5	8.2
10/17/14 0:00	7.3	7.7	7.6	7.6	7.6	7.5	7.5	7.5	7.3	7.6	7.6	7.3	7.4	7.5	7.1	7.6	7.5
10/24/14 0:00	5.4	5.4	5.3	5.5	5.4	5.5	5.4	5.5	5.5	5.5	5.5	5.3	5.5	5.3	5.5	5.3	5.5
10/31/14 0:00	4.6	4.6	4.6	4.4	4.6	4.4	4.6	4.5	4.5	4.6	4.6	4.6	4.4	4.5	4.5	4.4	4.4
11/7/14 0:00	6.8	6.9	6.9	7	7.2	7.2	7.1	6.8	7	6.8	7	6.8	6.6	7	6.6	6.6	6.6
11/12/14 0:00																	
11/13/14 0:00	6.3	6.2	6.2	6.4	6.5	6.4	6.4	6.1	6.2	6.1	6.2	6.2	6.1	5.9	5.9	5.8	6.1
11/20/14 0:00	5.7	5.9	5.7	6	5.8	5.7	5.6	5.6	5.8	5.7	5.8	5.8	5.7	6	5.6	5.7	5.7
11/22/14 0:00																	
11/28/14 0:00	7.3	7.2	7.2	7.2	7.2	7.3	7.1	7.2	7.1	7.2	7.1	7.3	7.2	7.3	7.1	7.2	7
12/5/14 0:00	6.4	6.1	6.3	6.3	6.2	6.5	6.3	6	6	5.8	6	6.5	5.8	6.5	6.1	6.5	5.9
12/11/14 0:00	7.3	7.3	7.4	7.6	7.5	7.2	7.2	7.2	7.2	7	7	7.5	7.2	7.4	7.2	7.3	7.1
12/18/14 0:00	8.1	8.1	8.1	8.1	8.2	8.1	8	7.9	7.9	7.8	7.9	8.1	7.8	8.1	7.8	8.1	7.8
12/26/14 0:00	9.2	9.1	9.2	9.1	9	9.1	8.9	8.8	9	9	9	9.2	8.8	9	8.9	8.9	8.7
12/31/14 0:00	8.8	8.5	8.5	8.6	8.7	8.6	8.7	8.6	8.7	8.4	8.4	8.6	8.4	8.7	8.6	8.5	8.6
1/9/15 0:00	6.5	6.3	6.3	6	6	6.4	6	6	6.2	5.9	5.6	6.4	6	6.3	6.1	6	5.9
1/16/15 0:00	5.2	5	5.1	5.2	5.1	5.1	5.4	5.4	5.4	5.4	5.5	5	5.5	4.9	5.7	4.6	5.6
1/22/15 0:00	4.9	4.8	4.8	4.6	4.7	4.6	4.8	4.8	4.8	4.7	4.8	4.8	4.9	4.8	4.6	4.9	4.6
1/29/15 0:00	8.2	8.3	8.6	8.2	8.8	8.8	9.1	9	9	8.8	8.9	8.4	9	8.4	8.4	8.3	8.5
2/5/15 0:00	18.7	19.3	19.4	19.5	19.2	19.3	18.9	19.8	19.2	19	19.2	15.7	19.1	18.9	18.1	19.3	17.4
2/12/15 0:00	8.4	8.6	8.6	8.7	8.6	8.5	8.6	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8	8.2	6.6
2/19/15 0:00	6.2	6.1	6.5	6.3	6.2	6.1	6.7	6.3	6.4	6.3	6.2	6.1	6.3	6.4	6	6.1	6.5
2/26/15 0:00	6.3	6.6	6.6	6.7	6.6	6.7	6.8	6.9	6.8	7.1	7	6.3	6.8	6.1	7	6.1	6.9
3/3/15 0:00	5.8	5.9	5.9	5.7	5.8	5.7	5.9	5.6	5.7	5.6	5.8	5.8	5.6	5.9	5.5	5.8	5.4

Table 6

Vapor Extraction Well Data  
Solvents Recovery Services of New England  
Southington, CT

	SV-23 ["wc]	SV-24 ["wc]	SV-25 ["wc]	SV-26 ["wc]	SV-27 ["wc]	SV-28 ["wc]	SV-29 ["wc]
6/5/14 14:25							
6/12/14 13:45							
6/19/14 15:00							
6/20/14 12:39							
6/26/14 8:50							
7/3/14 14:00							
7/17/14 11:30							
7/24/14 0:00	14.8	14.8	14.8	14.5	14.8	14.8	14.3
8/1/14 0:00	14.5	14.6	14.5	14.7	14.5	14.7	15.1
8/7/14 0:00	8.3	8.3	8.3	8.3	8.4	8.3	8.5
9/4/14 0:00	4.8	3.6	4.8	2.6	4.8	3.6	4.8
9/11/14 0:00	7.2	7	7.3	7	7.2	7	7.3
9/18/14 0:00	6	5.8	6	6.1	5.8	5.8	6
9/24/14 0:00	4.3	4.4	4.2	4.5	4.4	4.6	4.6
10/2/14 0:00	10.2	10.1	10.1	10	10.3	10.3	10.3
10/9/14 0:00	8.4	8.3	8.6	8.2	8.1	8.4	8.3
10/17/14 0:00	7.5	7.6	7.5	7.5	7.3	7.5	7.8
10/24/14 0:00	5.4	5.4	5.3	5.7	5.2	5.5	5.6
10/31/14 0:00	4.4	4.4	4.6	4.4	4.5	4.4	4.5
11/7/14 0:00	6.9	6.2	6.4	6.5	7.1	6.6	6.6
11/12/14 0:00							
11/13/14 0:00	5.9	5.8	6.1	5.9	6	6.2	5.8
11/20/14 0:00	6	5.7	6	6	6	5.8	5.7
11/22/14 0:00							
11/28/14 0:00	7.3	7	7.4	6.9	7	7	6.9
12/5/14 0:00	6.5	5.9	6.4	6.2	6.1	6	6.5
12/11/14 0:00	7.4	7.1	7.3	7	7.2	7	7
12/18/14 0:00	8.2	7.8	8.1	8	8.1	8	8.2
12/26/14 0:00	9	8.8	9.2	8.8	9.1	8.8	9.4
12/31/14 0:00	8.6	8.7	8.7	8.7	8.8	8.9	9
1/9/15 0:00	6	6	5.9	6.2	6.1	6	5.8
1/16/15 0:00	5.2	5.6	5.3	5.3	5.6	5.7	6
1/22/15 0:00	4.8	4.3	4.6	4.5	4.9	4.6	4.7
1/29/15 0:00	8.3	8.4	8.4	8.5	8.5	8.7	8.9
2/5/15 0:00	18.8	17.3	18.7	17.1	18.9	9.4	9.8
2/12/15 0:00	8.1	8.5	8.3	8.3	8.2	8.4	8.2
2/19/15 0:00	6.2	6	6.4	6	6.4	6.1	6.6
2/26/15 0:00	6.1	7.3	5.9	6.8	6.8	6.7	6.7
3/3/15 0:00	5.4	5.6	5.8	5.6	5.9	5.6	5.9



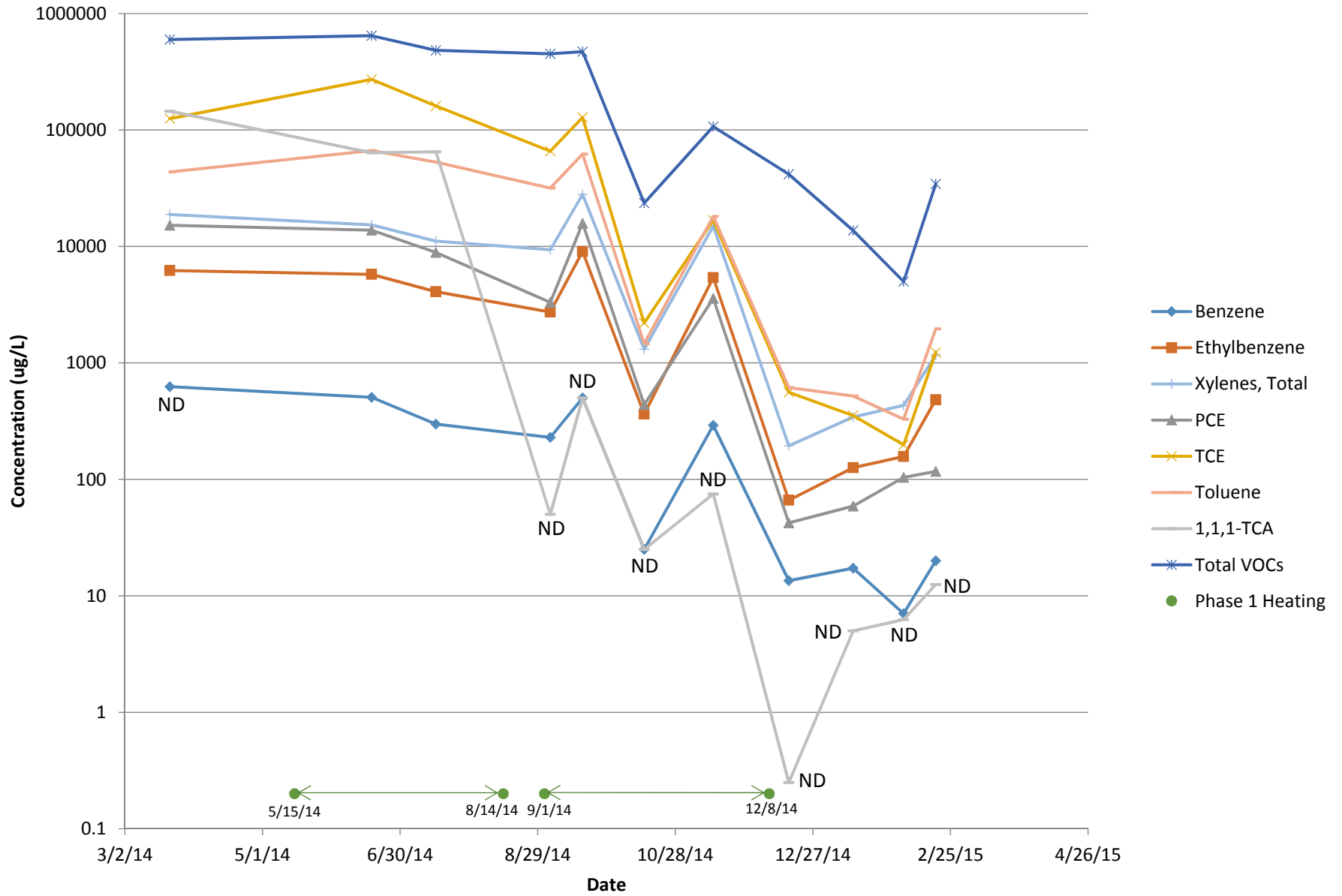
**Groundwater Trend Figures and Data Tables  
Tables + and ,**

# Groundwater Sampling Summary - ISTR Wells

SRSNE Superfund Site  
Southington, Connecticut

## ISTR-1 (Phase 1 Area)

NDs = 1/2 RL

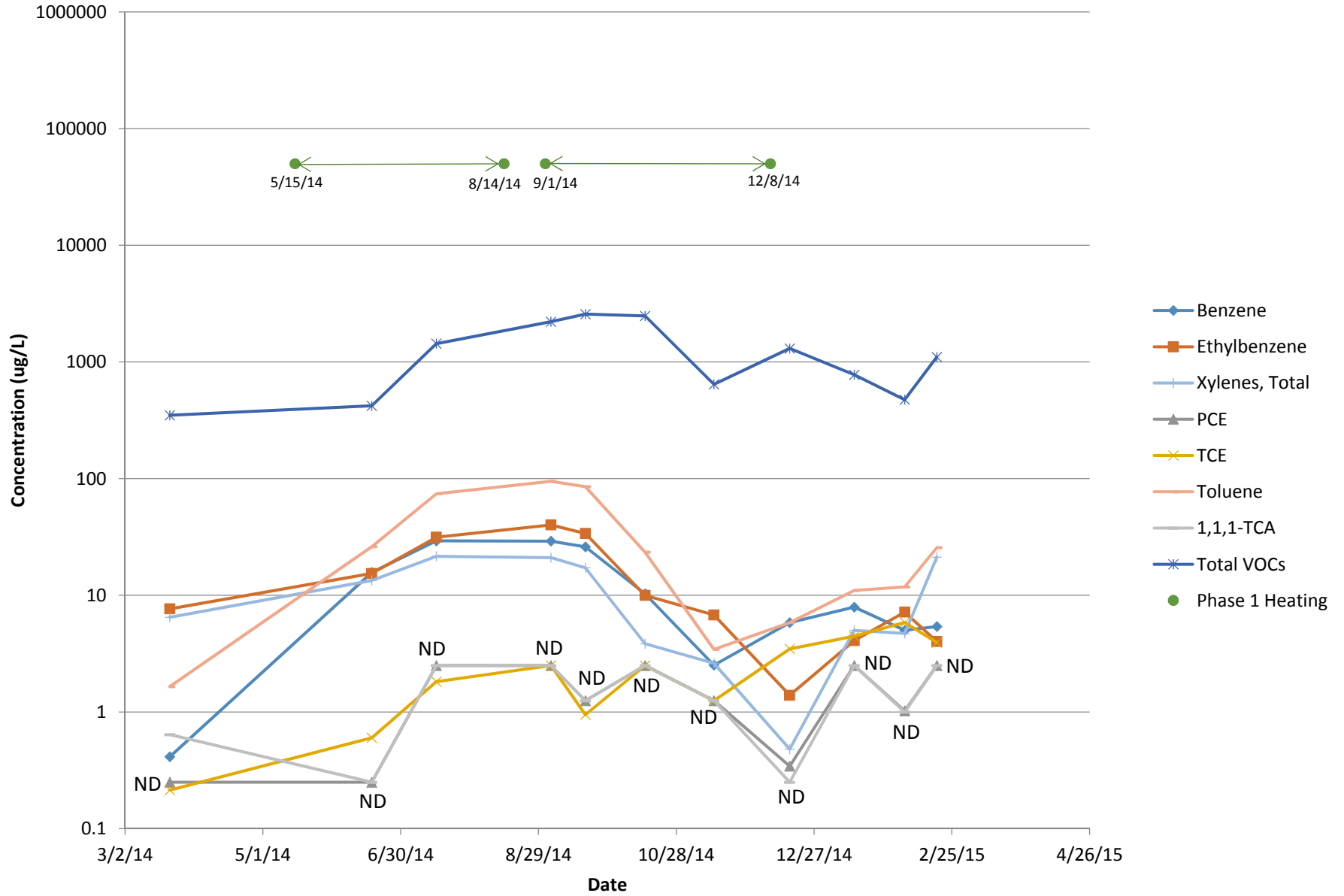


# Groundwater Sampling Summary - ISTR Wells

SRSNE Superfund Site  
Southington, Connecticut

## ISTR-2 (Phase 1 Area)

NDs = 1/2 RL

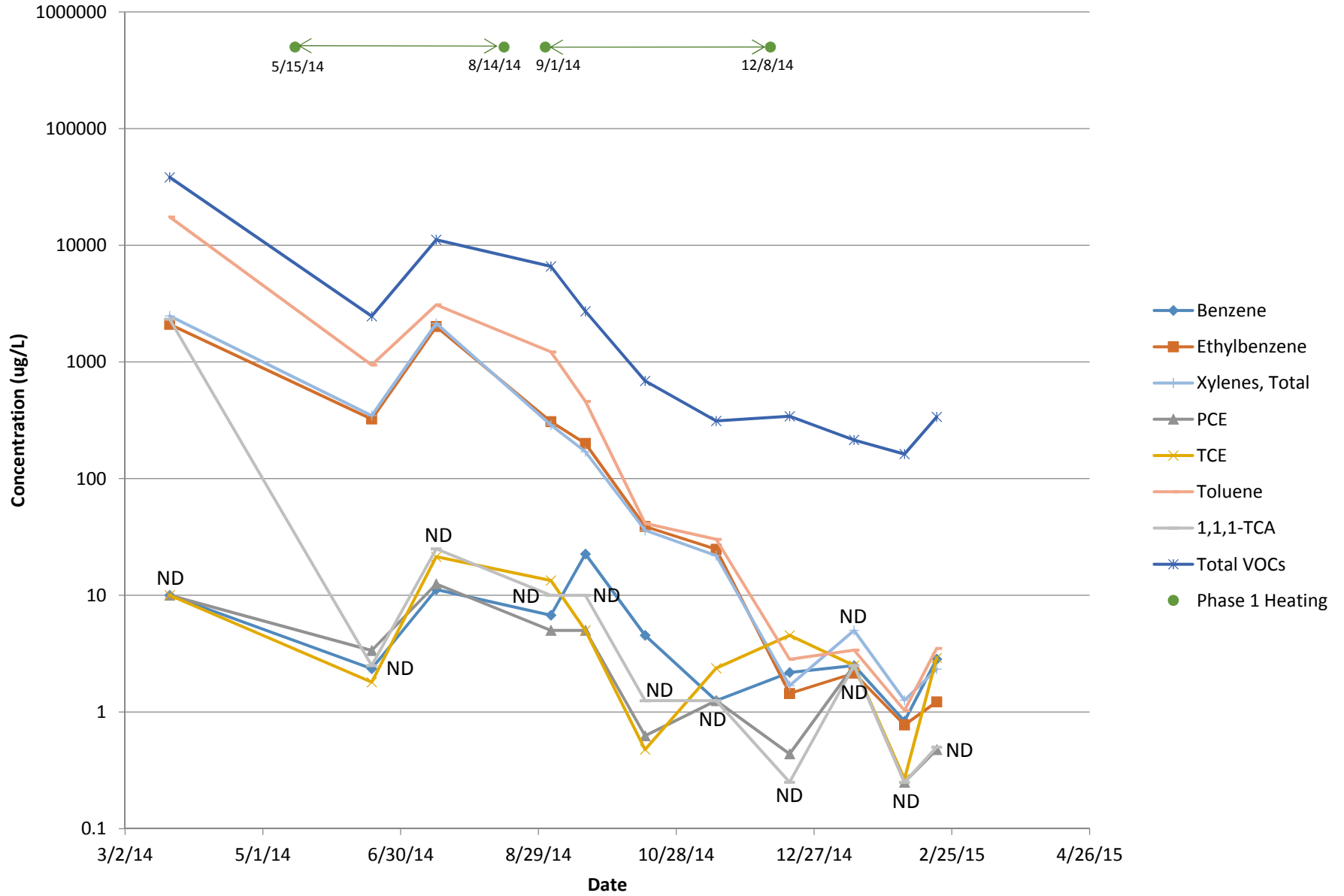


# Groundwater Sampling Summary - ISTR Wells

SRSNE Superfund Site  
Southington, Connecticut

## ISTR-3 (Phase 1 Area)

NDs = 1/2 RL





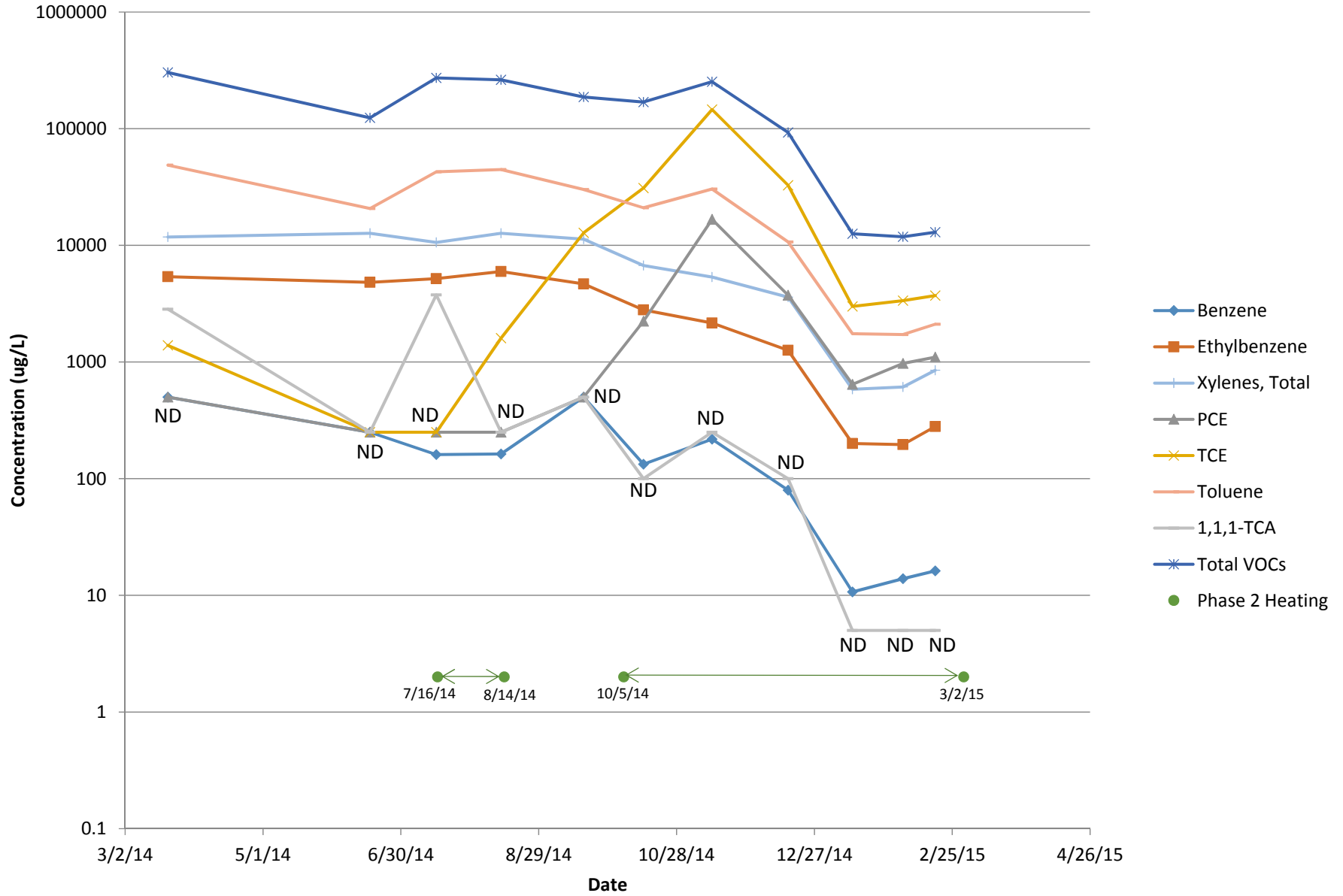


# Groundwater Sampling Summary - ISTR Wells

SRSNE Superfund Site  
Southington, Connecticut

## ISTR-5 (Phase 2 Area)

NDs = 1/2 RL



# Groundwater Sampling Summary - ISTR Wells

SRSNE Superfund Site  
Southington, Connecticut

## ISTR-6 (Phase 2 Area)

NDs = 1/2 RL

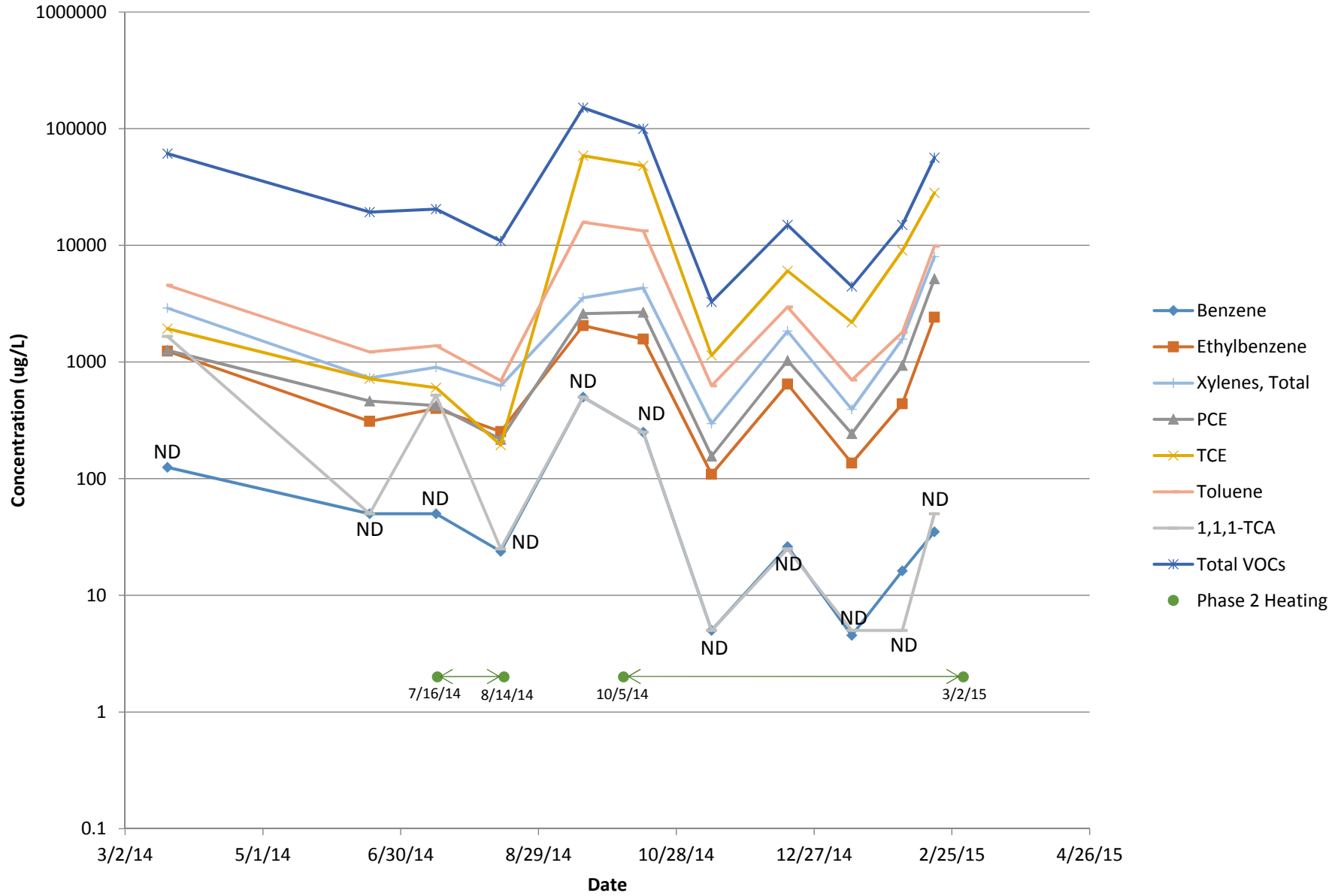


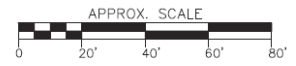
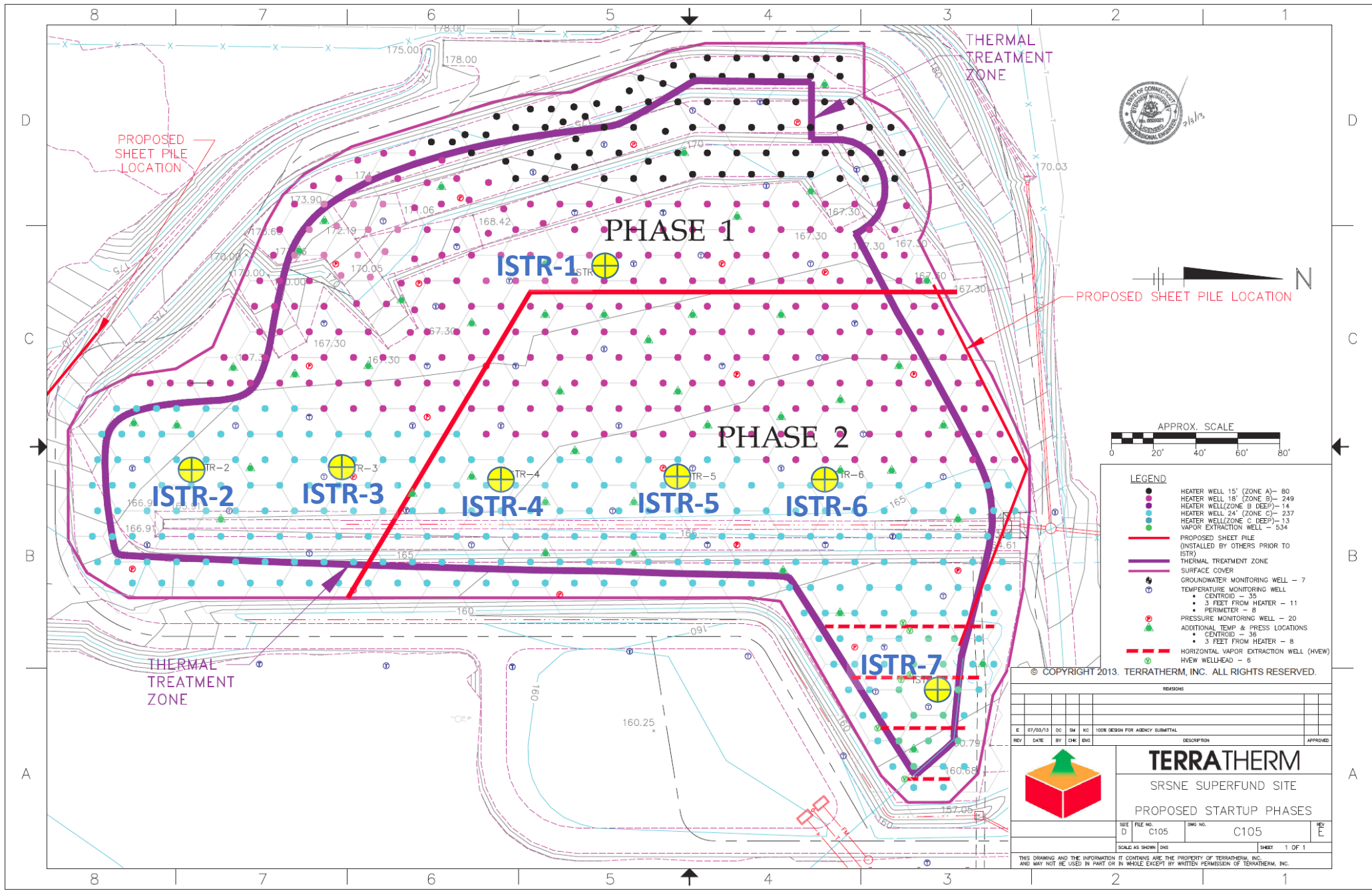
# Groundwater Sampling Summary - ISTR Wells

SRSNE Superfund Site  
Southington, Connecticut

## ISTR-7 (Phase 2 Area)

NDs = 1/2 RL





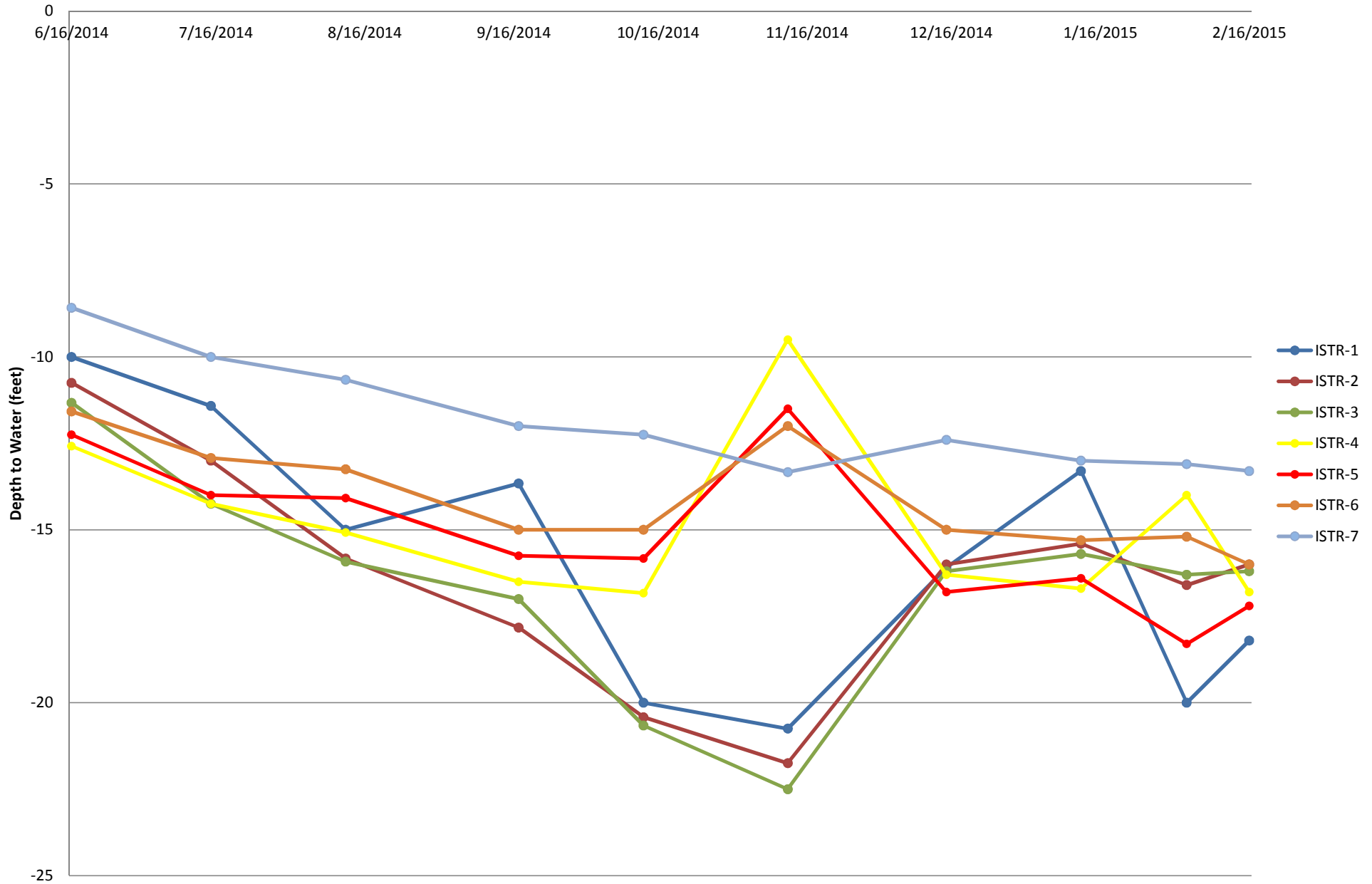
- LEGEND**
- HEATER WELL 15' (ZONE A) - 80
  - HEATER WELL 18' (ZONE B) - 249
  - HEATER WELL (ZONE B DEEP) - 14
  - HEATER WELL 24' (ZONE C) - 237
  - HEATER WELL (ZONE C DEEP) - 13
  - VAPOR EXTRACTION WELL - 534
  - PROPOSED SHEET PILE (INSTALLED BY OTHERS PRIOR TO ISTR)
  - THERMAL TREATMENT ZONE
  - SURFACE COVER
  - ⊕ GROUNDWATER MONITORING WELL - 7
  - ⊖ TEMPERATURE MONITORING WELL
    - CENTROID - 35
    - 3 FEET FROM HEATER - 11
    - PERIMETER - 8
  - ⊙ PRESSURE MONITORING WELL - 30
  - ▲ ADDITIONAL TEMP & PRESS LOCATIONS
    - CENTROID - 36
    - 3 FEET FROM HEATER - 8
  - HORIZONTAL VAPOR EXTRACTION WELL (HVW)
    - HVW WELLHEAD - 6

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REVISIONS				
NO.	DATE	BY	CHK	ENG
1	07/03/13	DC	SM	KC
100% DESIGN FOR AGENCY SUBMITTAL				
DESCRIPTION				APPROVED
<b>TERRATHERM</b> SRsNE SUPERFUND SITE PROPOSED STARTUP PHASES				SHEET 1 OF 1

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# SRSNE Site - ISTR Monitoring Well Groundwater Elevations



















**TABLE +**  
**CALCULATION OF PERCENT OF EFFECTIVE SOLUBILITY FOR MULTIPLE ORGANIC COMPOUNDS**  
**SOLVENTS RECOVERY SERVICE OF NEW ENGLAND, INC. SUPERFUND SITE**  
**SOUTHINGTON, CONNECTICUT**

Compound	Pure-Phase Solubility (Si) mg/L	Reference	ISTR-1 2/17/2015 9:30		ISTR-2 2/18/2015 11:15		ISTR-3 2/18/2015 10:25		ISTR-4 2/18/2015 9:30		ISTR-5 2/17/2015 14:15		ISTR-6 2/17/2015 10:35		ISTR-7 2/17/2015 9:30	
			Conc. (Ci) mg/L	Ci/Si	Conc. (Ci) mg/L	Ci/Si	Conc. (Ci) mg/L	Ci/Si	Conc. (Ci) mg/L	Ci/Si	Conc. (Ci) mg/L	Ci/Si	Conc. (Ci) mg/L	Ci/Si	Conc. (Ci) mg/L	Ci/Si
1,1-dichloroethylene	400	a	0.021	5.25E-05	0.00317	7.93E-06	0.00132	3.30E-06	0.0268	6.70E-05	0.103	2.58E-04	0.00406	1.02E-05	0.306	7.65E-04
1,2,4-trichlorobenzene	19	c	0.0278	1.46E-03												
1,3-dichlorobenzene	111	c														
1,4-dichlorobenzene	81.3	d														
2-butanone (MEK)	268000	a	14	5.22E-05	0.173	6.46E-07	0.0695	2.59E-07	0.37	1.38E-06	1.1	4.10E-06	0.0624	2.33E-07		
2-hexanone	5142	d					0.00226	4.40E-07								
acetone	1000000	d	11.3	1.13E-05	0.848	8.48E-07	0.233	2.33E-07	1.05	1.05E-06	1.89	1.89E-06	0.191	1.91E-07		
benzene	1780	a	0.02	1.12E-05	0.0054	3.03E-06	0.00284	1.60E-06	0.0417	2.34E-05	0.0162	9.10E-06	0.00396	2.22E-06	0.0351	1.97E-05
carbon disulfide	2160	d					0.000724	3.35E-07	0.016	7.41E-06						
cis-1,2-dichloroethylene	3500	a	1.91	5.46E-04	0.00939	2.68E-06	0.00179	5.11E-07	0.205	5.86E-05	0.835	2.39E-04	0.209	5.97E-05	1.87	5.34E-04
ethylbenzene	152	a	0.483	3.18E-03	0.00401	2.64E-05	0.00122	8.03E-06	0.191	1.26E-03	0.28	1.84E-03	0.018	1.18E-04	2.42	1.59E-02
methylene chloride	16700	b	0.043	2.57E-06	0.00387	2.32E-07			0.00408	2.44E-07	0.00782	4.68E-07				
MIBK (4-methyl-2-pentanone)	19000	a	1.34	7.05E-05			0.00313	1.65E-07	0.0248	1.31E-06	0.81	4.26E-05	0.00803	4.23E-07		
naphthalene	31	a	0.0422	1.36E-03	0.00384	1.24E-04	0.00301	9.71E-05	0.00483	1.56E-04	0.0219	7.06E-04				
styrene	300	a	0.0314	1.05E-04					0.0243	8.10E-05	0.0374	1.25E-04			0.535	1.78E-03
tetrachloroethylene	150	a	0.117	7.80E-04			0.000475	3.17E-06	0.0623	4.15E-04	1.1	7.33E-03	0.0168	1.12E-04	5.16	3.44E-02
tetrahydrofuran	1000000	d	0.663	6.63E-07			0.0102	1.02E-08	0.025	2.50E-08	0.03	3.00E-08				
toluene	515	a	1.96	3.81E-03	0.0256	4.97E-05	0.00351	6.82E-06	0.333	6.47E-04	2.11	4.10E-03	0.0614	1.19E-04	9.85	1.91E-02
trans-1,2-dichloroethylene	6300	a	0.0125	1.98E-06							0.0208	3.30E-06	0.00292	4.63E-07		
trichloroethylene	1000	a	1.23	1.23E-03	0.00393	3.93E-06	0.00291	2.91E-06	0.407	4.07E-04	3.71	3.71E-03	0.136	1.36E-04	28.2	2.82E-02
vinyl chloride (chloroethylene)	1100	a	0.0362	3.29E-05					0.0303	2.75E-05	0.0412	3.75E-05	0.00185	1.68E-06		
xylenes	189.3	a'	1.17	6.18E-03	0.0212	1.12E-04	0.00233	1.23E-05	0.179	9.46E-04	0.85	4.49E-03	0.0437	2.31E-04	7.98	4.22E-02
<b>% Effective Solubility</b>			2%		0.03%		0.01%		0.4%		2%		0.1%		14%	
<b>TVOCs, mg/L (QA/QC check)</b>			34.4		1.10		0.338		3.00		13.0		0.759		56.4	

Notes:

% = Sum of Ci/Si ratios, expressed as a percentage (Blasland, Bouck & Lee, Inc., 1998. Remedial Investigation Report. June 1998).

a = Ravi, V, and J.A. Johnson, 1994. VLEACH, A One-Dimensional Finite-Difference Vadose Zone Leaching Model, Version 2.1, developed for USEPA Robert S. Kerr Laboratory, Ada, Oklahoma.

a' = same as above, average value for M-, O-, and P-xylenes

b = USEPA, 1992. Handbook of RCRA Ground-Water Monitoring Constituents: Chemical and Physical Properties, 40CFR Part 264, Appendix IX.

c = Cohen R.M. and J.W. Mercer, 1993. DNAPL Site Evaluation. C. K. Smoley, Boca Raton, Florida. 1993.

d = Syracuse Research Corporation PhysProp Database, 2014. <http://esc.syrres.com/fatepointer/search.asp>

**Table , - Equilibrium Pore-Water Concentrations at Interim NAPL Cleanup Levels, Average Post-ISTR, and CSL-050 Soil Concentrations  
Solvents Recovery Services of New England, Inc. (SRSNE) Superfund Site  
Southington, Connecticut**

**Estimation of Pore Water Concentration and NAPL-filled Pore Space from Total Concentration of Chemical in Soil**

**Groundwater Concentrations at Interim NAPL Cleanup Levels in Soils**

	Toluene	EthylBNZ	Xylenes	PCE	TCE	1,1,1 TCA	<-- input data
Ct =	48	59	70	46	222	221	<-- mg/kg
%moist =	0.15	0.15	0.15	0.15	0.15	0.15	<-- mass fraction
n =	0.32	0.32	0.32	0.32	0.32	0.32	(calc)
pb =	1.81	1.81	1.81	1.81	1.81	1.81	(calc)
Koc =	1700	164	240	240	126	151	<-- cm <sup>3</sup> /g
TOC =	2040	2040	2040	2040	2040	2040	<-- mg/kg
fOC =	0.00204	0.00204	0.00204	0.00204	0.00204	0.00204	(calc)
nW =	0.32	0.32	0.32	0.32	0.32	0.32	(calc)
Hc =	0.27	0.32	0.30	0.75	0.42	0.17	<-- dimensionless
nA =	0	0	0	0	0	0	<-- volume fraction
Csol =	515	152	189	150	1000	950	<-- mg/kg
pNAPL =	0.8669	0.867	0.8684	1.623	1.464	1.32	<-- g/mL or kg/L
-	-	-	-	-	-	-	-
<b>Cw =</b>	<b>13.17</b>	<b>115.45</b>	<b>105.09</b>	<b>69.06</b>	<b>512.10</b>	<b>456.13</b>	<b>&lt;-- mg/L</b>
Cs =	45.676	38.626	51.454	33.813	131.630	140.506	<-- mg/kg
nNAPL =	000.0E+0	000.0E+0	000.0E+0	000.0E+0	000.0E+0	000.0E+0	<-- volume fraction

**Groundwater Concentrations at Average Post-ISTR Soil Concentrations**

	Toluene	EthylBNZ	Xylenes	PCE	TCE	1,1,1 TCA	<-- input data
Ct =	0.734	1.44	3.76	0.937	0.181	0	<-- mg/kg
%moist =	0.15	0.15	0.15	0.15	0.15	0.15	<-- mass fraction
n =	0.32	0.32	0.32	0.32	0.32	0.32	(calc)
pb =	1.81	1.81	1.81	1.81	1.81	1.81	(calc)
Koc =	1700	164	240	240	126	151	<-- cm <sup>3</sup> /g
TOC =	2040	2040	2040	2040	2040	2040	<-- mg/kg
fOC =	0.00204	0.00204	0.00204	0.00204	0.00204	0.00204	(calc)
nW =	0.32	0.32	0.32	0.32	0.32	0.32	(calc)
Hc =	0.27	0.32	0.30	0.75	0.42	0.17	<-- dimensionless
nA =	0	0	0	0	0	0	<-- volume fraction
Csol =	515	152	189	150	1000	950	<-- mg/kg
pNAPL =	0.8669	0.867	0.8684	1.623	1.464	1.32	<-- g/mL or kg/L
-	-	-	-	-	-	-	-
<b>Cw =</b>	<b>0.20</b>	<b>2.82</b>	<b>5.65</b>	<b>1.41</b>	<b>0.42</b>	<b>0.00</b>	<b>&lt;-- mg/L</b>
Cs =	0.698	0.943	2.764	0.689	0.107	0.000	<-- mg/kg
nNAPL =	000.0E+0	000.0E+0	000.0E+0	000.0E+0	000.0E+0	000.0E+0	<-- volume fraction

**Groundwater Concentrations at Highest CSL-050 Soil Concentration**

	Toluene	EthylBNZ	Xylenes	PCE	TCE	1,1,1 TCA	<-- input data
Ct =	10	6.5	22.8	15	18	0	<-- mg/kg
%moist =	0.15	0.15	0.15	0.15	0.15	0.15	<-- mass fraction
n =	0.32	0.32	0.32	0.32	0.32	0.32	(calc)
pb =	1.81	1.81	1.81	1.81	1.81	1.81	(calc)
Koc =	1700	164	240	240	126	151	<-- cm <sup>3</sup> /g
TOC =	2040	2040	2040	2040	2040	2040	<-- mg/kg
fOC =	0.00204	0.00204	0.00204	0.00204	0.00204	0.00204	(calc)
nW =	0.32	0.32	0.32	0.32	0.32	0.32	(calc)
Hc =	0.27	0.32	0.30	0.75	0.42	0.17	<-- dimensionless
nA =	0	0	0	0	0	0	<-- volume fraction
Csol =	515	152	189	150	1000	950	<-- mg/kg
pNAPL =	0.8669	0.867	0.8684	1.623	1.464	1.32	<-- g/mL or kg/L
-	-	-	-	-	-	-	-
<b>Cw =</b>	<b>2.74</b>	<b>12.72</b>	<b>34.23</b>	<b>22.52</b>	<b>41.52</b>	<b>0.00</b>	<b>&lt;-- mg/L</b>
Cs =	9.516	4.255	16.759	11.026	10.673	0.000	<-- mg/kg
nNAPL =	000.0E+0	000.0E+0	000.0E+0	000.0E+0	000.0E+0	000.0E+0	<-- volume fraction

For saturated conditions:

Kd =	3.47	0.3346	0.49	0.49	0.26	0.31
R =	20.7	2.8958	3.8	3.8	2.5	2.7

**PERTINENT EQUATIONS:**

$$M_{total} = (M_{soil} + M_{water} + M_{air} + M_{NAPL})$$

$$Ct = (M_{soil} + M_{water} + M_{air} + M_{NAPL}) / pb$$

$$Ct = [(Cw)(Koc)(fOC)(pb) + (Cw)(nW) + (Cw)(Hc)(nA) + (pNAPL)(nNAPL)] / pb$$

- Ct = measured total soil concentration (ug/g or mg/kg, dry weight)
- Cw = chemical concentration in pore water (mg/L or ug/cm<sup>3</sup>)
- Koc = organic carbon based partition coefficient (cm<sup>3</sup>/g)
- fOC = fraction of organic carbon in soil (dimensionless)
- pb = dry bulk density of soil sample (g/cm<sup>3</sup>)
- nW = water-filled porosity (volume fraction)
- Hc = Henry's Law constant (dimensionless)
- nA = air-filled porosity (volume fraction)
- pNAPL = density of chemical NAPL (g/cm<sup>3</sup> or g/mL or kg/L)
- Csol = chemical aqueous solubility limit (mg/L or ug/cm<sup>3</sup>)
- Cs = chemical concentration sorbed to soil (mg/kg, dry weight)
- nNAPL = NAPL-filled porosity (volume fraction)
- Kd = soil-water partition coeff., Koc x fOC (cm<sup>3</sup>/g)
- R = retardation factor, 1 + (pb x Kd) / n (dimensionless)

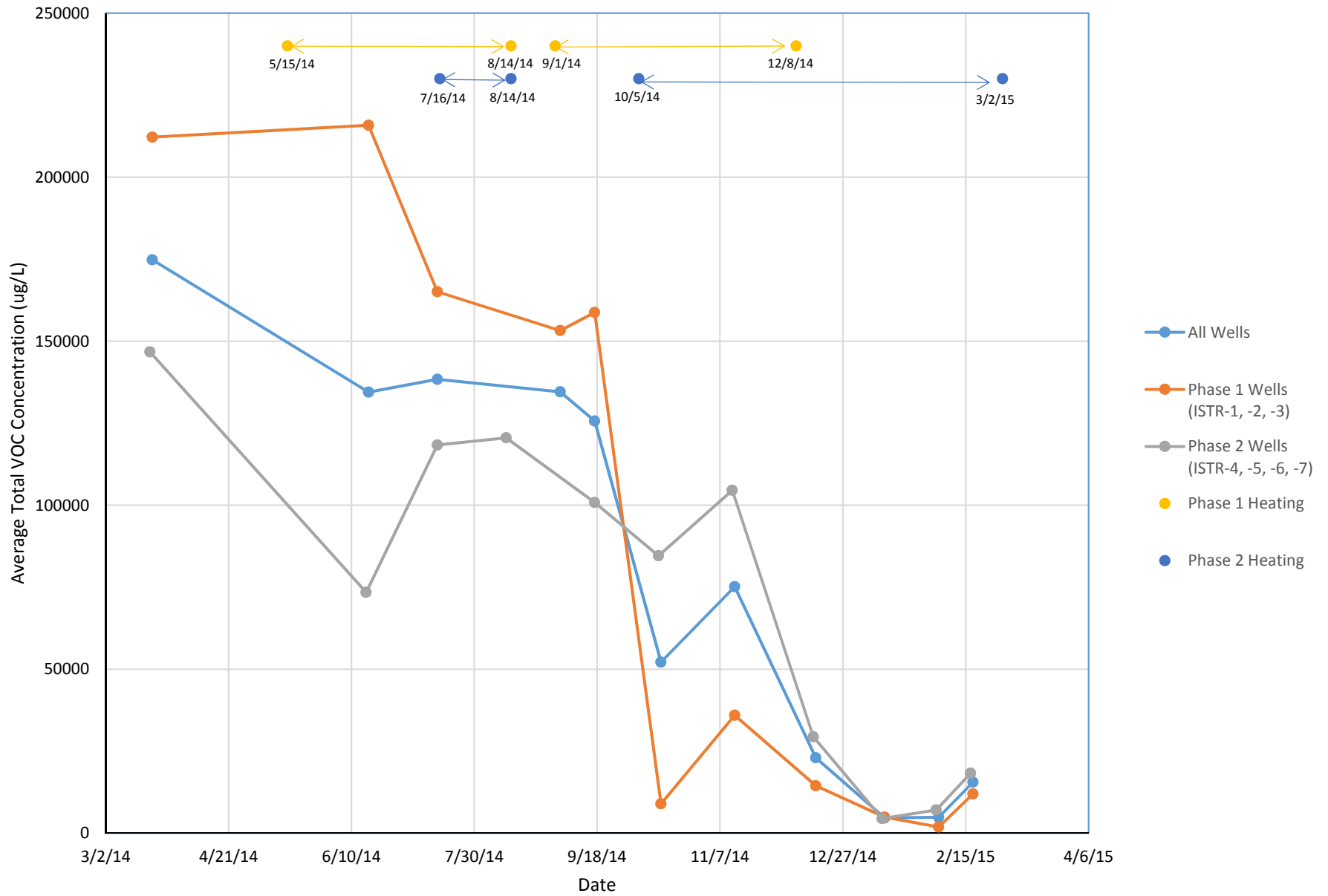
Soil-Water-Air-NAPL PARTitioning

SWANPART.WK1 by M.J. Gefell, March 1993

Figure 14

Groundwater Sampling Summary - ISTR Wells  
SRSNE Superfund Site  
Southington, Connecticut

Average Total VOC Concentrations vs. Time







## **Demobilization Plan and Schedule**

## Memorandum

To: Jessie McCusker, *de maximis, inc.*

CC: Bruce Thompson, *de maximis, inc.*; Tim Mahoney, TerraTherm, Inc.

From: Robin Swift, Senior Project Manager

Date: 1 April 2015

**Re: *Draft ISTR Demobilization Plan***

---

TerraTherm, Inc. (TT) has prepared a demobilization plan to assist the team with understanding the sequence of events, anticipated activities, and the preliminary schedule associated with demobilizing the In-Situ Thermal Remediation (ISTR) equipment from the SRSNE site. The plan is summarized below, and supported by the following attachments:

- **Attachment A** includes baseline PCB wipe data results for samples collected to data. These samples were collected to assist with the demobilization planning process.
- **Attachment B** includes a draft description of the decontamination approach, including decontamination pad details, anticipated wipe sample locations and procedures, and disposition approach for the various materials.
- **Attachment C** is a preliminary schedule of demobilization activities.
- **Attachment D** includes estimates of the expected material disposal quantities.
- **Attachment E** is our Standard Operating Guideline for PCB wipe sampling.

Please note that this plan is our current understanding of the demobilization efforts and is subject to change due to site conditions, staff availability, weather, etc. Additionally, changes to these suggested approaches may occur once the vacuum system is shutdown and the process equipment and interconnecting piping can be dismantled and visually inspected.

In general, we plan to start demobilization efforts in the wellfield and work our way towards the process equipment. Due to internal damage to piping and hoses, the wellfield will be dismantled and staged in rolloffs for offsite disposal. The process equipment will be dismantled, decontaminated with a steam cleaner, sampled for PCBs, and if results are below criteria, approved to demobilize from the site.

Sections of the wellfield where temperatures are below that of steam (100°C), will start with jumper cable removal, heater and liner removal, heater box removal, manifold removal, then

cable removal. Currently, the entire wellfield is below steam temperature with the exception of two thermocouple arrays, TMP-29 and -39, located in the middle of the wellfield, along the Phase 1/Phase 2 divider line. In conjunction with this aboveground infrastructure removal, the team will focus on crating spare parts that were not in contact with site contaminants and ship them to the office. They will also focus on dismantling now ancillary equipment, such as the oxidizer, water softener shed, rental generator, and air compressors, and demobilize them from the site.

Once infrastructure from the wellfield is removed, our focus will be twofold: 1) we will work with a subcontracted drilling company (currently believed to be ADT) to cut the stickups approximately 2 ft below grade or pull up and grout, and 2) dismantling and steam cleaning of the process equipment. Wipe samples will be collected on the process equipment, as identified in the attached Demobilization Plan. Equipment will remain onsite pending analytical results.

The final step will be to disconnect power to the site, and demobilize remaining equipment and materials.

**Attachment A**

Results of Preliminary PCB Wipe  
Sampling

SRSNE Superfund Site  
Southington, Connecticut

**Results of Preliminary PCB Wipe Sampling for ISTR System Components**

Sample ID	Sample Date	Sample Location	Total PCB Concentration (ug/100cm <sup>2</sup> )
VEW-375	1/14/2015	inside of VEW riser pipe	491
SP-SV23	1/14/2015	inside vapor leg 23	108
Condensate Header	1/14/2015	inside condensate header	305
OWS In	1/14/2015	at inlet to oil-water separator	142
OWS Out	1/14/2015	at outlet to oil-water separator	114
Oxidizer In	2/4/2015	at inlet to thermal oxidizer	8.6
Oxidizer Out	2/4/2015	oxidizer scrubber sump	ND (1)

**Notes:**

1. Wipe samples collected by TerraTherm and analyzed by Accutest Laboratories of Marlborough, MA.

**Technical Report for**

**TerraTherm, Inc.**

**SRSNE Southington, CT**

**13-101;1200-100 PO#31946**

**Accutest Job Number: MC36403**

**Sampling Date: 01/14/15**

**Report to:**

**TerraTherm, Inc.**  
**151 Suffolk Lane**  
**Gardner, MA 01440**  
**afortune@terra therm.com; pwood@terra therm.com;**  
**nstone@terra therm.com**  
**ATTN: Alyson Fortune**

**Total number of pages in report: 20**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

  
**Reza Fand**  
**Lab Director**

**Client Service contact: Matthew Morrell 508-481-6200**

Certifications: MA (M-MA136,SW846 NELAC) CT (PH-0109) NH (250210) RI (00071) ME (MA00136) FL (E87579) NY (11791) NJ (MA926) PA (6801121) ND (R-188) CO MN (11546AA) NC (653) IL (002337) WI (399080220) DoD ELAP (L-A-B L2235)

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Test results relate only to samples analyzed.

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## Sample Summary

TerraTherm, Inc.

**Job No:** MC36403

SRSNE Southington, CT

Project No: 13-101;1200-100 PO#31946

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
MC36403-1	01/14/15	12:50 DL	01/14/15	WIPE	Wipe Sample	VEW-375
MC36403-2	01/14/15	12:55 DL	01/14/15	WIPE	Wipe Sample	SP-SV23
MC36403-3	01/14/15	13:00 DL	01/14/15	WIPE	Wipe Sample	CONDENSATE HEADER
MC36403-4	01/14/15	12:50 EA	01/14/15	WIPE	Wipe Sample	OWS IN
MC36403-5	01/14/15	12:50 EA	01/14/15	WIPE	Wipe Sample	OWS OUT





## SAMPLE DELIVERY GROUP CASE NARRATIVE

**Client:** TerraTherm, Inc.

**Job No** MC36403

**Site:** SRSNE Southington, CT

**Report Date** 1/19/2015 3:03:39 PM

5 Sample(s) were collected on 01/14/2015 and were received at Accutest on 01/14/2015 properly preserved, at 0.9 Deg. C and intact. These Samples received an Accutest job number of MC36403. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

### Extractables by GC By Method SW846 8082A

**Matrix:** WIPE

**Batch ID:** OP41664

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- MC36403-1,2,3,4,5 for Decachlorobiphenyl, Tetrachloro-m-xylene: Outside control limits due to dilution.
- MC36403-3 for Tetrachloro-m-xylene: Outside control limits due to possible matrix interference. Sample results confirmed by reanalysis.
- MC36403-2,4,5 for Tetrachloro-m-xylene: Outside control limits due to possible matrix interference.

The Accutest Laboratories of New England certifies that all analysis were performed within method specification. It is further recommended that this report to be used in its entirety. The Accutest Laboratories of NE, Laboratory Director or assignee as verified by the signature on the cover page has authorized the release of this report(MC36403).

## Summary of Hits

**Job Number:** MC36403  
**Account:** TerraTherm, Inc.  
**Project:** SRSNE Southington, CT  
**Collected:** 01/14/15



Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
<b>MC36403-1</b>	<b>VEW-375</b>					
Aroclor 1254		491	100		ug/wipe	SW846 8082A
<b>MC36403-2</b>	<b>SP-SV23</b>					
Aroclor 1254		108	100		ug/wipe	SW846 8082A
<b>MC36403-3</b>	<b>CONDENSATE HEADER</b>					
Aroclor 1254		305	100		ug/wipe	SW846 8082A
<b>MC36403-4</b>	<b>OWS IN</b>					
Aroclor 1254		142	100		ug/wipe	SW846 8082A
<b>MC36403-5</b>	<b>OWS OUT</b>					
Aroclor 1254		114	100		ug/wipe	SW846 8082A

Sample Results

---

Report of Analysis

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## Report of Analysis

<b>Client Sample ID:</b> VEW-375		<b>Date Sampled:</b> 01/14/15
<b>Lab Sample ID:</b> MC36403-1		<b>Date Received:</b> 01/14/15
<b>Matrix:</b> WIPE - Wipe Sample		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8082A SW846 3511		
<b>Project:</b> SRSNE Southington, CT		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	BK45516.D	1	01/16/15	NK	01/16/15	OP41664	GBK1416
Run #2	BK45538.D	100	01/19/15	NK	01/16/15	OP41664	GBK1417

	Initial Weight	Final Volume
Run #1	1 wipes	10.0 ml
Run #2	1 wipes	10.0 ml

## CT Polychlorinated Biphenyls RCP List

CAS No.	Compound	Result	RL	Units	Q
12674-11-2	Aroclor 1016	ND	1.0	ug/wipe	
11104-28-2	Aroclor 1221	ND	1.0	ug/wipe	
11141-16-5	Aroclor 1232	ND	1.0	ug/wipe	
53469-21-9	Aroclor 1242	ND	1.0	ug/wipe	
12672-29-6	Aroclor 1248	ND	1.0	ug/wipe	
11097-69-1	Aroclor 1254	491 <sup>a</sup>	100	ug/wipe	
11096-82-5	Aroclor 1260	ND	1.0	ug/wipe	
37324-23-5	Aroclor 1262	ND	1.0	ug/wipe	
11100-14-4	Aroclor 1268	ND	1.0	ug/wipe	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	69%	0% <sup>b</sup>	42-137%
877-09-8	Tetrachloro-m-xylene	90%	0% <sup>b</sup>	42-137%
2051-24-3	Decachlorobiphenyl	117%	0% <sup>b</sup>	51-166%
2051-24-3	Decachlorobiphenyl	137%	0% <sup>b</sup>	51-166%

(a) Result is from Run# 2

(b) Outside control limits due to dilution.

ND = Not detected  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> SP-SV23		<b>Date Sampled:</b> 01/14/15
<b>Lab Sample ID:</b> MC36403-2		<b>Date Received:</b> 01/14/15
<b>Matrix:</b> WIPE - Wipe Sample		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8082A SW846 3511		
<b>Project:</b> SRSNE Southington, CT		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	BK45517.D	1	01/16/15	NK	01/16/15	OP41664	GBK1416
Run #2	BK45539.D	100	01/19/15	NK	01/16/15	OP41664	GBK1417

Run #	Initial Weight	Final Volume
Run #1	1 wipes	10.0 ml
Run #2	1 wipes	10.0 ml

### CT Polychlorinated Biphenyls RCP List

CAS No.	Compound	Result	RL	Units	Q
12674-11-2	Aroclor 1016	ND	1.0	ug/wipe	
11104-28-2	Aroclor 1221	ND	1.0	ug/wipe	
11141-16-5	Aroclor 1232	ND	1.0	ug/wipe	
53469-21-9	Aroclor 1242	ND	1.0	ug/wipe	
12672-29-6	Aroclor 1248	ND	1.0	ug/wipe	
11097-69-1	Aroclor 1254	108 <sup>a</sup>	100	ug/wipe	
11096-82-5	Aroclor 1260	ND	1.0	ug/wipe	
37324-23-5	Aroclor 1262	ND	1.0	ug/wipe	
11100-14-4	Aroclor 1268	ND	1.0	ug/wipe	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	134%	0% <sup>b</sup>	42-137%
877-09-8	Tetrachloro-m-xylene	176% <sup>c</sup>	0% <sup>b</sup>	42-137%
2051-24-3	Decachlorobiphenyl	103%	0% <sup>b</sup>	51-166%
2051-24-3	Decachlorobiphenyl	116%	0% <sup>b</sup>	51-166%

- (a) Result is from Run# 2
- (b) Outside control limits due to dilution.
- (c) Outside control limits due to possible matrix interference.

ND = Not detected  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

4.2  
4

## Report of Analysis

<b>Client Sample ID:</b> CONDENSATE HEADER	<b>Date Sampled:</b> 01/14/15
<b>Lab Sample ID:</b> MC36403-3	<b>Date Received:</b> 01/14/15
<b>Matrix:</b> WIPE - Wipe Sample	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8082A SW846 3511	
<b>Project:</b> SRSNE Southington, CT	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	BK45518.D	1	01/16/15	NK	01/16/15	OP41664	GBK1416
Run #2	BK45540.D	100	01/19/15	NK	01/16/15	OP41664	GBK1417

Run #	Initial Weight	Final Volume
Run #1	1 wipes	10.0 ml
Run #2	1 wipes	10.0 ml

### CT Polychlorinated Biphenyls RCP List

CAS No.	Compound	Result	RL	Units	Q
12674-11-2	Aroclor 1016	ND	1.0	ug/wipe	
11104-28-2	Aroclor 1221	ND	1.0	ug/wipe	
11141-16-5	Aroclor 1232	ND	1.0	ug/wipe	
53469-21-9	Aroclor 1242	ND	1.0	ug/wipe	
12672-29-6	Aroclor 1248	ND	1.0	ug/wipe	
11097-69-1	Aroclor 1254	305 <sup>a</sup>	100	ug/wipe	
11096-82-5	Aroclor 1260	ND	1.0	ug/wipe	
37324-23-5	Aroclor 1262	ND	1.0	ug/wipe	
11100-14-4	Aroclor 1268	ND	1.0	ug/wipe	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	30% <sup>c</sup>	0% <sup>b</sup>	42-137%
877-09-8	Tetrachloro-m-xylene	35% <sup>c</sup>	0% <sup>b</sup>	42-137%
2051-24-3	Decachlorobiphenyl	58%	0% <sup>b</sup>	51-166%
2051-24-3	Decachlorobiphenyl	51%	0% <sup>b</sup>	51-166%

(a) Result is from Run# 2

(b) Outside control limits due to dilution.

(c) Outside control limits due to possible matrix interference. Sample results confirmed by reanalysis.

ND = Not detected  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

4.3  
4

## Report of Analysis

<b>Client Sample ID:</b> OWS IN	<b>Date Sampled:</b> 01/14/15
<b>Lab Sample ID:</b> MC36403-4	<b>Date Received:</b> 01/14/15
<b>Matrix:</b> WIPE - Wipe Sample	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8082A SW846 3511	
<b>Project:</b> SRSNE Southington, CT	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	BK45519.D	1	01/16/15	NK	01/16/15	OP41664	GBK1416
Run #2	BK45541.D	100	01/19/15	NK	01/16/15	OP41664	GBK1417

Run #	Initial Weight	Final Volume
Run #1	1 wipes	10.0 ml
Run #2	1 wipes	10.0 ml

### CT Polychlorinated Biphenyls RCP List

CAS No.	Compound	Result	RL	Units	Q
12674-11-2	Aroclor 1016	ND	1.0	ug/wipe	
11104-28-2	Aroclor 1221	ND	1.0	ug/wipe	
11141-16-5	Aroclor 1232	ND	1.0	ug/wipe	
53469-21-9	Aroclor 1242	ND	1.0	ug/wipe	
12672-29-6	Aroclor 1248	ND	1.0	ug/wipe	
11097-69-1	Aroclor 1254	142 <sup>a</sup>	100	ug/wipe	
11096-82-5	Aroclor 1260	ND	1.0	ug/wipe	
37324-23-5	Aroclor 1262	ND	1.0	ug/wipe	
11100-14-4	Aroclor 1268	ND	1.0	ug/wipe	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	82%	0% <sup>b</sup>	42-137%
877-09-8	Tetrachloro-m-xylene	197% <sup>c</sup>	0% <sup>b</sup>	42-137%
2051-24-3	Decachlorobiphenyl	68%	0% <sup>b</sup>	51-166%
2051-24-3	Decachlorobiphenyl	78%	0% <sup>b</sup>	51-166%

- (a) Result is from Run# 2
- (b) Outside control limits due to dilution.
- (c) Outside control limits due to possible matrix interference.

ND = Not detected  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

4.4  
4

## Report of Analysis

<b>Client Sample ID:</b> OWS OUT		<b>Date Sampled:</b> 01/14/15
<b>Lab Sample ID:</b> MC36403-5		<b>Date Received:</b> 01/14/15
<b>Matrix:</b> WIPE - Wipe Sample		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8082A SW846 3511		
<b>Project:</b> SRSNE Southington, CT		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	BK45520.D	1	01/16/15	NK	01/16/15	OP41664	GBK1416
Run #2	BK45542.D	100	01/19/15	NK	01/16/15	OP41664	GBK1417

Run #	Initial Weight	Final Volume
Run #1	1 wipes	10.0 ml
Run #2	1 wipes	10.0 ml

### CT Polychlorinated Biphenyls RCP List

CAS No.	Compound	Result	RL	Units	Q
12674-11-2	Aroclor 1016	ND	1.0	ug/wipe	
11104-28-2	Aroclor 1221	ND	1.0	ug/wipe	
11141-16-5	Aroclor 1232	ND	1.0	ug/wipe	
53469-21-9	Aroclor 1242	ND	1.0	ug/wipe	
12672-29-6	Aroclor 1248	ND	1.0	ug/wipe	
11097-69-1	Aroclor 1254	114 <sup>a</sup>	100	ug/wipe	
11096-82-5	Aroclor 1260	ND	1.0	ug/wipe	
37324-23-5	Aroclor 1262	ND	1.0	ug/wipe	
11100-14-4	Aroclor 1268	ND	1.0	ug/wipe	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	81%	0% <sup>b</sup>	42-137%
877-09-8	Tetrachloro-m-xylene	144% <sup>c</sup>	0% <sup>b</sup>	42-137%
2051-24-3	Decachlorobiphenyl	79%	0% <sup>b</sup>	51-166%
2051-24-3	Decachlorobiphenyl	92%	0% <sup>b</sup>	51-166%

- (a) Result is from Run# 2
- (b) Outside control limits due to dilution.
- (c) Outside control limits due to possible matrix interference.

ND = Not detected  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

4.5  
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## Misc. Forms

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## Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody
- RCP Form
- Sample Tracking Chronicle

**CHAIN OF CUSTODY**

495 Technology Center West  
Building One, Marlborough, MA 01752  
508-481-6200 FAX: 508-481-7753

Accutest Job #: *MC 36403*  
Accutest Control #:

Client Information				Facility Information					Analytical Information										
Name TerraTherm		Project Name Southington PCB Wipes																	
Address 151 Suffolk Lane		Location Southington, CT																	
City Gardner	Project No. 13-101; 1200-100																		
State MA	Zip 01460	Send Report to: <i>afortune@terratherm.com</i>																	
Phone #: 978-730-1241	FAX #:																		
		Collection		Matrix		# of bottles		Preservation											
Field ID / Point of Collection	Date	Time	Sampled By			voc	NaOH	IN03	H2SO4	None									
<i>-1</i> VEW - 375	1/14/15	12:50	DL	Wipe	1									X					
<i>-2</i> SP - SV23	1/14/15	12:55	DL	Wipe	1									X					
<i>-3</i> Condensate Header	1/14/15	13:00	DL	Wipe	1									X					
<i>-4</i> OWS In	1/14/15	12:50	EA	Wipe	1									X					
<i>-5</i> OWS Out	1/14/15	12:50	EA	Wipe	1									X					
Turnaround Information				Data Deliverable Information					Comments / Remarks										
<input checked="" type="checkbox"/> 10 Day STD <input type="checkbox"/> 5 Day STD (By Contract only) <input type="checkbox"/> 5 Day Rush <input type="checkbox"/> 3 Day Rush <input type="checkbox"/> 2 Day Rush <input type="checkbox"/> 1 Day Rush <p><b>RUSH!</b> Approved By:</p>				<input checked="" type="checkbox"/> Comm A <input type="checkbox"/> Comm B <input type="checkbox"/> Full T1 <input type="checkbox"/> Other <p>EDD Format: <i>EQUIS EZ</i> (1 file)</p>					<input checked="" type="checkbox"/> CT RCP <input type="checkbox"/> MA MCP <input type="checkbox"/> NYASP CAT A <input type="checkbox"/> NYASP CAT B <p>Please copy Nikole Stone (nstone@terratherm.com) on results. TerraTherm PO# <i>Loc 13E</i></p>										
<p>Sample Custody must be documented below each time samples change possession, including courier delivery.</p>																			
Relinquished by Sampler:		Date Time:		Received By:		Relinquished By:		Date Time:		Received By:		Relinquished By:		Date Time:		Received By:			
<i>K. Stone</i>		<i>1-14-15 1:15</i>		<i>B. Stone</i>		<i>B. Stone</i>		<i>1-14-15 1:30</i>		<i>B. Stone</i>		<i>B. Stone</i>		<i>1-14-15</i>		<i>B. Stone</i>			
3				3		4				4		4							
5				5		Seal #		Preserved				On Ice:		<input checked="" type="checkbox"/> <i>0.9</i>					

5.1  
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## Accutest Laboratories Sample Receipt Summary

**Accutest Job Number:** MC36403      **Client:** TERRATHERM      **Project:** SOIUTHINGTON  
**Date / Time Received:** 1/14/2015 6:00:00 PM      **Delivery Method:** \_\_\_\_\_      **Airbill #'s:** \_\_\_\_\_  
**Cooler Temps (Initial/Adjusted):** #1: (0.9/0.9):\_

<u>Cooler Security</u>	<u>Y or N</u>		<u>Y or N</u>	
1. Custody Seals Present:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. COC Present:	<input checked="" type="checkbox"/> <input type="checkbox"/>
2. Custody Seals Intact:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. Smpl Dates/Time OK	<input checked="" type="checkbox"/> <input type="checkbox"/>

<u>Cooler Temperature</u>	<u>Y or N</u>	
1. Temp criteria achieved:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Thermometer ID:	G1;	
3. Cooler media:	Ice (Bag)	
4. No. Coolers:	1	

<u>Quality Control Preservation</u>	<u>Y</u>	<u>or</u>	<u>N</u>	<u>N/A</u>
1. Trip Blank present / cooler:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2. Trip Blank listed on COC:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3. Samples preserved properly:	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
4. VOCs headspace free:	<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>

<u>Sample Integrity - Documentation</u>	<u>Y or N</u>	
1. Sample labels present on bottles:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Container labeling complete:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Sample container label / COC agree:	<input checked="" type="checkbox"/>	<input type="checkbox"/>

<u>Sample Integrity - Condition</u>	<u>Y or N</u>	
1. Sample recvd within HT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. All containers accounted for:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Condition of sample:	Intact	

<u>Sample Integrity - Instructions</u>	<u>Y</u>	<u>or</u>	<u>N</u>	<u>N/A</u>
1. Analysis requested is clear:	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
2. Bottles received for unspecified tests	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
3. Sufficient volume recvd for analysis:	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
4. Compositing instructions clear:	<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>
5. Filtering instructions clear:	<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>

Comments

5.1  
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**Reasonable Confidence Protocol  
Laboratory Analysis  
QA/QC Certification Form**

Laboratory Name: **Accutest New England** Client: **TerraTherm, Inc.**

Project Location: **SRSNE Southington, CT** Project Number: **13-101**

Sampling Date(s): **1/14/2015**

Laboratory Sample ID(s): **MC36403-1, MC36403-2, MC36403-3, MC36403-4, MC36403-5**

Methods: **SW846 8082A**

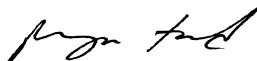
1	For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed, including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CTDEP method-specific Reasonable Confidence Protocol documents)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1A	Where all the method specified preservation and holding time requirements met?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1B	VPH and EPH methods only: Was the VPH or EPH method conducted without significant modifications (See section 11.3 of respective methods)	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
2	Were all samples received by the laboratory in a condition consistent with that described on the associated chain-of-custody document(s)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
3	Were samples received at an appropriate temperature (<6° C)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
4	Were all QA/QC performance criteria specified in the CTDEP Reasonable Confidence Protocol documents achieved?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
5	a) Were reporting limits specified or referenced on the chain-of-custody?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
	b) Were these reporting limits met?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
6	For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
7	Are project-specific matrix spikes and laboratory duplicates included in this data set?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

**Note: For all questions to which the response was "No" (with the exception of question #7), additional information must be provided in an attached narrative. If the answer to question #1, #1A or #1B is "No", the data package does not meet the requirements for "Reasonable Confidence".**

**I, the undersigned, attest under pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete.**

Authorized

Signature:



Position: Lab Director

Printed Name: Reza Tand

Accutest New England

Date: 1/19/2015

### Internal Sample Tracking Chronicle

TerraTherm, Inc.

Job No: MC36403

SRSNE Southington, CT  
 Project No: 13-101;1200-100 PO#31946

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
MC36403-1 Collected: 14-JAN-15 12:50 By: DL Received: 14-JAN-15 By: SAP VEW-375						
MC36403-1	SW846 8082A	16-JAN-15 21:07	NK	16-JAN-15 AZ		P8082RCP
MC36403-1	SW846 8082A	19-JAN-15 08:52	NK	16-JAN-15 AZ		P8082RCP
MC36403-2 Collected: 14-JAN-15 12:55 By: DL Received: 14-JAN-15 By: SAP SP-SV23						
MC36403-2	SW846 8082A	16-JAN-15 21:19	NK	16-JAN-15 AZ		P8082RCP
MC36403-2	SW846 8082A	19-JAN-15 09:10	NK	16-JAN-15 AZ		P8082RCP
MC36403-3 Collected: 14-JAN-15 13:00 By: DL Received: 14-JAN-15 By: SAP CONDENSATE HEADER						
MC36403-3	SW846 8082A	16-JAN-15 21:32	NK	16-JAN-15 AZ		P8082RCP
MC36403-3	SW846 8082A	19-JAN-15 09:22	NK	16-JAN-15 AZ		P8082RCP
MC36403-4 Collected: 14-JAN-15 12:50 By: EA Received: 14-JAN-15 By: SAP OWS IN						
MC36403-4	SW846 8082A	16-JAN-15 21:44	NK	16-JAN-15 AZ		P8082RCP
MC36403-4	SW846 8082A	19-JAN-15 09:34	NK	16-JAN-15 AZ		P8082RCP
MC36403-5 Collected: 14-JAN-15 12:50 By: EA Received: 14-JAN-15 By: SAP OWS OUT						
MC36403-5	SW846 8082A	16-JAN-15 21:56	NK	16-JAN-15 AZ		P8082RCP
MC36403-5	SW846 8082A	19-JAN-15 09:46	NK	16-JAN-15 AZ		P8082RCP

## GC Semi-volatiles

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### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Surrogate Recovery Summaries

## Method Blank Summary

**Job Number:** MC36403  
**Account:** TERRTMAG TerraTherm, Inc.  
**Project:** SRSNE Southington, CT

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP41664-MB	BK45506.D	1	01/16/15	NK	01/16/15	OP41664	GBK1416

The QC reported here applies to the following samples:

Method: SW846 8082A

MC36403-1, MC36403-2, MC36403-3, MC36403-4, MC36403-5

CAS No.	Compound	Result	RL	Units	Q
12674-11-2	Aroclor 1016	ND	1.0	ug/wipe	
11104-28-2	Aroclor 1221	ND	1.0	ug/wipe	
11141-16-5	Aroclor 1232	ND	1.0	ug/wipe	
53469-21-9	Aroclor 1242	ND	1.0	ug/wipe	
12672-29-6	Aroclor 1248	ND	1.0	ug/wipe	
11097-69-1	Aroclor 1254	ND	1.0	ug/wipe	
11096-82-5	Aroclor 1260	ND	1.0	ug/wipe	
37324-23-5	Aroclor 1262	ND	1.0	ug/wipe	
11100-14-4	Aroclor 1268	ND	1.0	ug/wipe	

CAS No.	Surrogate Recoveries		Limits
877-09-8	Tetrachloro-m-xylene	76%	42-137%
877-09-8	Tetrachloro-m-xylene	78%	42-137%
2051-24-3	Decachlorobiphenyl	74%	51-166%
2051-24-3	Decachlorobiphenyl	84%	51-166%

# Blank Spike Summary

**Job Number:** MC36403  
**Account:** TERRTMAG TerraTherm, Inc.  
**Project:** SRSNE Southington, CT

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP41664-BS	BK45507.D	1	01/16/15	NK	01/16/15	OP41664	GBK1416

The QC reported here applies to the following samples:

Method: SW846 8082A

MC36403-1, MC36403-2, MC36403-3, MC36403-4, MC36403-5

CAS No.	Compound	Spike ug/wipe	BSP ug/wipe	BSP %	Limits
12674-11-2	Aroclor 1016	4	3.0	75	52-130
11104-28-2	Aroclor 1221		ND		50-150 <sup>a</sup>
11141-16-5	Aroclor 1232		ND		50-150 <sup>a</sup>
53469-21-9	Aroclor 1242		ND		50-150 <sup>a</sup>
12672-29-6	Aroclor 1248		ND		50-150 <sup>a</sup>
11097-69-1	Aroclor 1254		ND		50-150 <sup>a</sup>
11096-82-5	Aroclor 1260	4	2.7	68	58-138
37324-23-5	Aroclor 1262		ND		50-150 <sup>a</sup>
11100-14-4	Aroclor 1268		ND		50-150 <sup>a</sup>

CAS No.	Surrogate Recoveries	BSP	Limits
877-09-8	Tetrachloro-m-xylene	81%	42-137%
877-09-8	Tetrachloro-m-xylene	81%	42-137%
2051-24-3	Decachlorobiphenyl	79%	51-166%
2051-24-3	Decachlorobiphenyl	85%	51-166%

(a) Advisory control limits.

\* = Outside of Control Limits.



# Semivolatile Surrogate Recovery Summary

**Job Number:** MC36403  
**Account:** TERRTMAG TerraTherm, Inc.  
**Project:** SRSNE Southington, CT

<b>Method:</b> SW846 8082A	<b>Matrix:</b> WIPE
----------------------------	---------------------

Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1 <sup>a</sup>	S1 <sup>b</sup>	S2 <sup>a</sup>	S2 <sup>b</sup>
MC36403-1	BK45538.D	0* <sup>c</sup>	0* <sup>c</sup>	0* <sup>c</sup>	0* <sup>c</sup>
MC36403-1	BK45516.D	69	90	117	137
MC36403-2	BK45539.D	0* <sup>c</sup>	0* <sup>c</sup>	0* <sup>c</sup>	0* <sup>c</sup>
MC36403-2	BK45517.D	134	176* <sup>d</sup>	103	116
MC36403-3	BK45540.D	0* <sup>c</sup>	0* <sup>c</sup>	0* <sup>c</sup>	0* <sup>c</sup>
MC36403-3	BK45518.D	30* <sup>e</sup>	35* <sup>e</sup>	58	51
MC36403-4	BK45541.D	0* <sup>c</sup>	0* <sup>c</sup>	0* <sup>c</sup>	0* <sup>c</sup>
MC36403-4	BK45519.D	82	197* <sup>d</sup>	68	78
MC36403-5	BK45542.D	0* <sup>c</sup>	0* <sup>c</sup>	0* <sup>c</sup>	0* <sup>c</sup>
MC36403-5	BK45520.D	81	144* <sup>d</sup>	79	92
OP41664-BS	BK45507.D	81	81	79	85
OP41664-MB	BK45506.D	76	78	74	84

Surrogate Compounds	Recovery Limits
S1 = Tetrachloro-m-xylene	42-137%
S2 = Decachlorobiphenyl	51-166%

- (a) Recovery from GC signal #1
- (b) Recovery from GC signal #2
- (c) Outside control limits due to dilution.
- (d) Outside control limits due to possible matrix interference.
- (e) Outside control limits due to possible matrix interference. Sample results confirmed by reanalysis.

Technical Report for

TerraTherm, Inc.

SRSNE Southington, CT

13-101

Accutest Job Number: MC36747

Sampling Date: 02/04/15

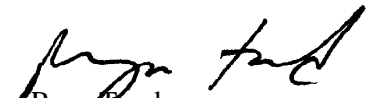
Report to:

TerraTherm, Inc.  
151 Suffolk Lane  
Gardner, MA 01440  
afortune@terra therm.com; pwood@terra therm.com;  
nstone@terra therm.com  
ATTN: Alyson Fortune

Total number of pages in report: **18**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.



Reza Fand  
Lab Director

Client Service contact: Matthew Morrell 508-481-6200

Certifications: MA (M-MA136,SW846 NELAC) CT (PH-0109) NH (250210) RI (00071) ME (MA00136) FL (E87579) NY (11791) NJ (MA926) PA (6801121) ND (R-188) CO MN (11546AA) NC (653) IL (002337) WI (399080220) DoD ELAP (L-A-B L2235)

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Test results relate only to samples analyzed.

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## Sample Summary

TerraTherm, Inc.

Job No: MC36747

SRSNE Southington, CT  
Project No: 13-101

Sample Number	Collected Date	Time By	Received	Matrix Code Type	Client Sample ID
MC36747-1	02/04/15	14:30 EA	02/04/15	WIPE Wipe Sample	OXIDIZER IN
MC36747-2	02/04/15	14:35 EA	02/04/15	WIPE Wipe Sample	OXIDIZER OUT



## SAMPLE DELIVERY GROUP CASE NARRATIVE

**Client:** TerraTherm, Inc.

**Job No** MC36747

**Site:** SRSNE Southington, CT

**Report Date** 2/12/2015 11:56:36 AM

2 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 02/04/2015 and were received at Accutest on 02/04/2015 properly preserved, at 1.5 Deg. C and intact. These Samples received an Accutest job number of MC36747. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

### Extractables by GC By Method SW846 8082A

<b>Matrix:</b> WIPE	<b>Batch ID:</b> OP41958
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- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

The Accutest Laboratories of New England certifies that all analysis were performed within method specification. It is further recommended that this report to be used in its entirety. The Accutest Laboratories of NE, Laboratory Director or assignee as verified by the signature on the cover page has authorized the release of this report(MC36747).

## Summary of Hits

**Job Number:** MC36747  
**Account:** TerraTherm, Inc.  
**Project:** SRSNE Southington, CT  
**Collected:** 02/04/15



Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
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**MC36747-1      OXIDIZER IN**

Aroclor 1254	8.6	1.0			ug/wipe	SW846 8082A
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**MC36747-2      OXIDIZER OUT**

No hits reported in this sample.

Sample Results

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Report of Analysis

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## Report of Analysis

<b>Client Sample ID:</b> OXIDIZER IN	<b>Date Sampled:</b> 02/04/15
<b>Lab Sample ID:</b> MC36747-1	<b>Date Received:</b> 02/04/15
<b>Matrix:</b> WIPE - Wipe Sample	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8082A SW846 3580A	
<b>Project:</b> SRSNE Southington, CT	

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	BK46195.D	1	02/07/15	NK	02/06/15	OP41958	GBK1435
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	1 wipes	10.0 ml
Run #2		

### CT Polychlorinated Biphenyls RCP List

CAS No.	Compound	Result	RL	Units	Q
12674-11-2	Aroclor 1016	ND	1.0	ug/wipe	
11104-28-2	Aroclor 1221	ND	1.0	ug/wipe	
11141-16-5	Aroclor 1232	ND	1.0	ug/wipe	
53469-21-9	Aroclor 1242	ND	1.0	ug/wipe	
12672-29-6	Aroclor 1248	ND	1.0	ug/wipe	
11097-69-1	Aroclor 1254	8.6	1.0	ug/wipe	
11096-82-5	Aroclor 1260	ND	1.0	ug/wipe	
37324-23-5	Aroclor 1262	ND	1.0	ug/wipe	
11100-14-4	Aroclor 1268	ND	1.0	ug/wipe	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	85%		42-137%
877-09-8	Tetrachloro-m-xylene	83%		42-137%
2051-24-3	Decachlorobiphenyl	87%		51-166%
2051-24-3	Decachlorobiphenyl	91%		51-166%

ND = Not detected  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound



## Report of Analysis

<b>Client Sample ID:</b> OXIDIZER OUT		<b>Date Sampled:</b> 02/04/15
<b>Lab Sample ID:</b> MC36747-2		<b>Date Received:</b> 02/04/15
<b>Matrix:</b> WIPE - Wipe Sample		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8082A SW846 3580A		
<b>Project:</b> SRSNE Southington, CT		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	BK46196.D	1	02/07/15	NK	02/06/15	OP41958	GBK1435
Run #2							

Run #1	Initial Weight	Final Volume
Run #1	1 wipes	10.0 ml
Run #2		

### CT Polychlorinated Biphenyls RCP List

CAS No.	Compound	Result	RL	Units	Q
12674-11-2	Aroclor 1016	ND	1.0	ug/wipe	
11104-28-2	Aroclor 1221	ND	1.0	ug/wipe	
11141-16-5	Aroclor 1232	ND	1.0	ug/wipe	
53469-21-9	Aroclor 1242	ND	1.0	ug/wipe	
12672-29-6	Aroclor 1248	ND	1.0	ug/wipe	
11097-69-1	Aroclor 1254	ND	1.0	ug/wipe	
11096-82-5	Aroclor 1260	ND	1.0	ug/wipe	
37324-23-5	Aroclor 1262	ND	1.0	ug/wipe	
11100-14-4	Aroclor 1268	ND	1.0	ug/wipe	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	79%		42-137%
877-09-8	Tetrachloro-m-xylene	77%		42-137%
2051-24-3	Decachlorobiphenyl	83%		51-166%
2051-24-3	Decachlorobiphenyl	85%		51-166%

ND = Not detected  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

4.2  
4

## Misc. Forms

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5

## Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody
- RCP Form
- Sample Tracking Chronicle
- QC Evaluation: CT RCP Limits



## Accutest Laboratories Sample Receipt Summary

**Accutest Job Number:** MC36747      **Client:** TERRATHERM      **Project:** SRSNE 13-101  
**Date / Time Received:** 2/4/2015 7:40:00 PM      **Delivery Method:** \_\_\_\_\_      **Airbill #'s:** \_\_\_\_\_  
**Cooler Temps (Initial/Adjusted):** #1: (1.5/1.5);

<u>Cooler Security</u>	<u>Y or N</u>		<u>Y or N</u>	
1. Custody Seals Present:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. COC Present:	<input checked="" type="checkbox"/> <input type="checkbox"/>
2. Custody Seals Intact:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. Smpl Dates/Time OK	<input checked="" type="checkbox"/> <input type="checkbox"/>

<u>Cooler Temperature</u>	<u>Y or N</u>	
1. Temp criteria achieved:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Thermometer ID:	G1;	
3. Cooler media:	Ice (Bag)	
4. No. Coolers:	1	

<u>Quality Control Preservation</u>	<u>Y</u>	<u>or</u>	<u>N</u>	<u>N/A</u>
1. Trip Blank present / cooler:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2. Trip Blank listed on COC:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3. Samples preserved properly:	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
4. VOCs headspace free:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

<u>Sample Integrity - Documentation</u>	<u>Y or N</u>	
1. Sample labels present on bottles:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Container labeling complete:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Sample container label / COC agree:	<input checked="" type="checkbox"/>	<input type="checkbox"/>

<u>Sample Integrity - Condition</u>	<u>Y or N</u>	
1. Sample recvd within HT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. All containers accounted for:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Condition of sample:	Intact	

<u>Sample Integrity - Instructions</u>	<u>Y</u>	<u>or</u>	<u>N</u>	<u>N/A</u>
1. Analysis requested is clear:	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
2. Bottles received for unspecified tests	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
3. Sufficient volume recvd for analysis:	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
4. Compositing instructions clear:	<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>
5. Filtering instructions clear:	<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>

Comments

5.1  
5

**Reasonable Confidence Protocol  
Laboratory Analysis  
QA/QC Certification Form**

**Laboratory Name:** Accutest New England **Client:** TerraTherm, Inc.  
**Project Location:** SRSNE Southington, CT **Project Number:** 13-101  
**Sampling Date(s):** 2/4/2015  
**Laboratory Sample ID(s):** MC36747-1, MC36747-2

**Methods:** SW846 8082A

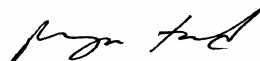
1	For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed, including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CTDEP method-specific Reasonable Confidence Protocol documents)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1A	Where all the method specified preservation and holding time requirements met?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1B	VPH and EPH methods only: Was the VPH or EPH method conducted without significant modifications (See section 11.3 of respective methods)	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
2	Were all samples received by the laboratory in a condition consistent with that described on the associated chain-of-custody document(s)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
3	Were samples received at an appropriate temperature (<6° C)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
4	Were all QA/QC performance criteria specified in the CTDEP Reasonable Confidence Protocol documents achieved?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
5	a) Were reporting limits specified or referenced on the chain-of-custody?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
	b) Were these reporting limits met?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
6	For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
7	Are project-specific matrix spikes and laboratory duplicates included in this data set?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

**Note: For all questions to which the response was "No" (with the exception of question #7), additional information must be provided in an attached narrative. If the answer to question #1, #1A or #1B is "No", the data package does not meet the requirements for "Reasonable Confidence".**

**I, the undersigned, attest under pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete.**

Authorized

Signature:



Position: Lab Director

Printed Name: Reza Tand  
Accutest New England

Date: 2/12/2015

### Internal Sample Tracking Chronicle

TerraTherm, Inc.

Job No: MC36747

SRSNE Southington, CT  
 Project No: 13-101

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
MC36747-1 Collected: 04-FEB-15 14:30 By: EA Received: 04-FEB-15 By: OXIDIZER IN						
MC36747-1	SW846 8082A	07-FEB-15 14:15	NK	06-FEB-15	AW	P8082RCP
MC36747-2 Collected: 04-FEB-15 14:35 By: EA Received: 04-FEB-15 By: OXIDIZER OUT						
MC36747-2	SW846 8082A	07-FEB-15 14:31	NK	06-FEB-15	AW	P8082RCP

5.3  
5

# QC Evaluation: CT RCP Limits

**Job Number:** MC36747  
**Account:** TerraTherm, Inc.  
**Project:** SRSNE Southington, CT  
**Collected:** 02/04/15

QC Sample ID	CAS#	Analyte	Sample Result Type	Result Type	Units	Limits
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No Exceptions found.

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\* Sample used for QC is not from job MC36747

## GC Semi-volatiles

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### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Surrogate Recovery Summaries



# Method Blank Summary

**Job Number:** MC36747  
**Account:** TERRTMAG TerraTherm, Inc.  
**Project:** SRSNE Southington, CT

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP41958-MB	BK46193.D	1	02/07/15	NK	02/06/15	OP41958	GBK1435

The QC reported here applies to the following samples:

Method: SW846 8082A

MC36747-1, MC36747-2

CAS No.	Compound	Result	RL	Units	Q
12674-11-2	Aroclor 1016	ND	1.0	ug/wipe	
11104-28-2	Aroclor 1221	ND	1.0	ug/wipe	
11141-16-5	Aroclor 1232	ND	1.0	ug/wipe	
53469-21-9	Aroclor 1242	ND	1.0	ug/wipe	
12672-29-6	Aroclor 1248	ND	1.0	ug/wipe	
11097-69-1	Aroclor 1254	ND	1.0	ug/wipe	
11096-82-5	Aroclor 1260	ND	1.0	ug/wipe	
37324-23-5	Aroclor 1262	ND	1.0	ug/wipe	
11100-14-4	Aroclor 1268	ND	1.0	ug/wipe	

CAS No.	Surrogate Recoveries		Limits
877-09-8	Tetrachloro-m-xylene	92%	42-137%
877-09-8	Tetrachloro-m-xylene	90%	42-137%
2051-24-3	Decachlorobiphenyl	95%	51-166%
2051-24-3	Decachlorobiphenyl	98%	51-166%

# Blank Spike Summary

**Job Number:** MC36747  
**Account:** TERRTMAG TerraTherm, Inc.  
**Project:** SRSNE Southington, CT

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP41958-BS	BK46194.D	1	02/07/15	NK	02/06/15	OP41958	GBK1435

The QC reported here applies to the following samples:

Method: SW846 8082A

MC36747-1, MC36747-2

CAS No.	Compound	Spike ug/wipe	BSP ug/wipe	BSP %	Limits
12674-11-2	Aroclor 1016	4	3.4	85	52-130
11104-28-2	Aroclor 1221		ND		50-150 <sup>a</sup>
11141-16-5	Aroclor 1232		ND		50-150 <sup>a</sup>
53469-21-9	Aroclor 1242		ND		50-150 <sup>a</sup>
12672-29-6	Aroclor 1248		ND		50-150 <sup>a</sup>
11097-69-1	Aroclor 1254		ND		50-150 <sup>a</sup>
11096-82-5	Aroclor 1260	4	3.5	88	58-138
37324-23-5	Aroclor 1262		ND		50-150 <sup>a</sup>
11100-14-4	Aroclor 1268		ND		50-150 <sup>a</sup>

CAS No.	Surrogate Recoveries	BSP	Limits
877-09-8	Tetrachloro-m-xylene	90%	42-137%
877-09-8	Tetrachloro-m-xylene	91%	42-137%
2051-24-3	Decachlorobiphenyl	93%	51-166%
2051-24-3	Decachlorobiphenyl	96%	51-166%

(a) Advisory control limits.

\* = Outside of Control Limits.

# Semivolatile Surrogate Recovery Summary

**Job Number:** MC36747  
**Account:** TERRTMAG TerraTherm, Inc.  
**Project:** SRSNE Southington, CT

<b>Method:</b> SW846 8082A	<b>Matrix:</b> WIPE
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Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1 <sup>a</sup>	S1 <sup>b</sup>	S2 <sup>a</sup>	S2 <sup>b</sup>
MC36747-1	BK46195.D	85	83	87	91
MC36747-2	BK46196.D	79	77	83	85
OP41958-BS	BK46194.D	90	91	93	96
OP41958-MB	BK46193.D	92	90	95	98

Surrogate Compounds	Recovery Limits
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S1 = Tetrachloro-m-xylene	42-137%
S2 = Decachlorobiphenyl	51-166%

- (a) Recovery from GC signal #1
- (b) Recovery from GC signal #2

6.3.1  
6

**Attachment B**

ISTR Component Decontamination  
and Disposition Procedures

## **ISTR Component Decontamination and Disposition Procedures**

All personnel performing decontamination activities must wear poly-coated Tyvek and Neoprene over gloves with Nitrile under gloves at a minimum. Personnel performing decontamination activities in the decontamination pad area must wear face shields, goggles, and heavy PVC over gloves in place of the Neoprene over gloves while using a steam cleaner/or pressure washer.

1. Following completion of the ISTD treatment period, the treatment system will be shut down, and the vapor and liquid conveyance piping and treatment equipment will be dismantled and either decontaminated with a steam cleaner prior to demobilization or staged in a rolloff for offsite disposal by others. Note that due to the staged treatment and shutoff of the wellfield, sections of the wellfield may be dismantled while others are still online.
2. Flex hoses, piping, wellheads, etc. will be drummed (or staged in a rolloff) for offsite disposal by others.
3. All steam cleaning activities must take place in a properly bermed/contained area with a sump so that collected decontamination fluids can be treated through the aboveground liquid train and/or drummed. Construction of the containment area is discussed below.
4. Following steam cleaning decontamination of the process equipment (disassembled to access all areas), filter media (demister pad, etc.), all disassembled piping and equipment will be staged on the equipment pad on poly liner and covered by a poly liner as practical until wipe sample data results are received confirming adequate decontamination.

### **Specifications for the Decontamination Pad**

TerraTherm will construct one or more decontamination pads, or use the existing equipment pad, for field cleaning of process equipment and wellfield components.

All equipment awaiting decontamination will be stockpiled on a poly lined section of the process equipment pad.

If constructed, the decontamination pad will meet the following minimum specifications:

- The pad should be constructed in an area known or believed to be free of surface contamination.
- The frame of the pad will be constructed out of stacked layers of 2x4's with an overlay of 3 sheets of 6 mil poly liner.
- The pad shall be filled with clean water and tested for leaks.
- If possible, the pad should be constructed on a level, paved surface and should facilitate the removal of wastewater. This may be accomplished by either constructing the pad with one corner lower than the rest, or by creating a sump or pit in one corner or along one side. Any sump or pit should also be lined.
- Sawhorses, racks or 4x4 timber pads should be constructed to hold equipment up off of the poly sheets while being cleaned and should be high enough above ground to prevent equipment from being splashed.
- Water should be removed from the decontamination pad frequently.
- To the extent possible, decontamination fluids will be pumped from the pad through the TerraTherm aboveground liquid treatment system (i.e., oil water separator, bag filters,

clay and carbon vessels), which will remain online after wellfield vacuum shutdown and until decontamination of other components has been completed. Similar to thermal operations, decontamination fluids processed through the system will be discharged to the POTW. Effluent water samples will be collected post carbon on a weekly basis and analyzed for the following parameters:

- Day 1: EPA 624 VOCs including MtBE, EPA 625 SVOCs, O&G, PCBs, TSS, and pH.
- Weekly thereafter: EPA 624 VOCs including MtBE, TSS and pH.
- TerraTherm's aboveground treatment system will be dismantled once other ISTR components have been cleaned and the associated liquids have been processed by the system. Cleaning fluids generated by the subsequent decontamination of the liquid treatment system components (e.g., oil water separator) will be collected, drummed, and characterized for offsite disposal.
- A smaller temporary pad should be built as a holding point for items that have been cleaned and need to be dried.
- At the completion of site activities, the decontamination pad should be broken down. If a pit or sump was used they shall be backfilled with the appropriate material

Once all equipment, piping and tools have been decontaminated, wipe samples will be collected according to the following protocol:

Wipe sampling (as defined in 40 CFR §761.123) will be performed on process equipment following steam cleaning, if applicable, at the following locations. Other locations may be sampled once the equipment has been disassembled and can be visually assessed.

#### **Anticipated Locations of Wipe Sample Points**

1. Moisture Separator – Two samples will be collected, one from the demister pad and the second from the bottom of the separator.
2. Thermal Oxidizer – One sample has been collected at the inlet to the oxidizer; and a second sample was collected from the scrubber sump. Due to the refractory lining of the oxidizer and piping, steam cleaning was not performed prior to sample collection. Data results for both samples were below 10 µg/100 cm<sup>2</sup>. Data results are included as an attachment to the decontamination plan.
3. Heat Exchanger – One sample will be collected on the surface of the heat exchanger that was exposed to the exhaust stream of the thermal oxidizer. Should results of this sample exceed regulatory thresholds, an additional sample will be collected on the heat exchanger as well as one sample within the downstream process piping and the inlet of the scrubber. Due to the refractory lining of the oxidizer and piping, steam cleaning will not be performed prior to sample collection.
4. Oil Water Separators – Two samples will be collected: one from the high water mark that may have been subject to LNAPL, and the second from the bottom of the vessel that may have been exposed to DNAPL.
5. Vapor Chiller - One sample will be collected from the inlet.
6. Moisture Separators – Two samples will be collected: one from the demister pad and the second from the bottom of the separator.
7. Duct Heater – One sample will be collected from the inlet to the heater.
8. Carbon Vessels – One sample will be collected from the inlet to the liquid and vapor carbon vessels.

## PCB Wipe Sampling Procedure

Wipe sampling follows the procedures in the US EPA's PCB spill cleanup guidance.<sup>1</sup> The lab will provide a 4 oz. soil jar with 5 mL of hexane inside the jar along with the 1" x 1" gauze. They will also provide one 10 cm x 10 cm wipe cardboard template (applicable for flat surfaces to show a 100 cm<sup>2</sup> area).

1. While wearing a new/clean pair of Nitrile (or other suitable) gloves, remove the cap from the sampling vial.
2. Remove the gauze from the sampling vial (the gauze will be pre-soaked with hexane).
3. Immediately begin applying the gauze using a gloved hand and, applying pressure, wipe the marked area completely twice, from left to right and then from top to bottom.
4. Let the gauze air dry.



5. Fold the dry gauze (sampled side inward) and return it to the sample vial.
6. Cap the sample vial.
7. Remove and discard the gloves.
8. Label the vial and fill out sampling details on the sampling forms.
9. Fill out chain of custody forms and prepare the sample for storage and shipping. Samples should be stored on ice until picked up by the laboratory courier or shipped on ice overnight to the laboratory for analysis.

## Equipment and Material Disposition

The following list identifies system components and other materials that are to be scrapped and/or disposed): Estimated disposal quantities were provided under separate cover.

- Carbon steel pipe, including horizontal VEW pipe, fiberglass, fittings, etc. from the wellfield will be scrapped and/or disposed. It is our current belief that all materials in the wellfield will be disposed (i.e., nothing salvageable).
- 10,000 lbs of vapor carbon currently online to be vacuumed out for disposal (prior profile/analytical to be used).

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<sup>1</sup> WIPE SAMPLING AND DOUBLE WASH/RINSE CLEANUP AS RECOMMENDED BY THE ENVIRONMENTAL PROTECTION AGENCY PCB SPILL CLEANUP POLICY, April 18, 1991. Available online: <http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/wipe-samp.pdf> (link current as of 10/26/12)

- 1,100 lbs of liquid carbon and 2,000 lbs of clay currently online to be vacuumed out for disposal (prior profile/analytical to be used).
- Flex hoses to be decontaminated to the extent practical and drummed for disposal.
- PPE used to date and during decontamination activities that comes in contact with site fluids will be drummed for disposal.
- Decontamination fluids will be processed through the TerraTherm water treatment train described above and discharged to the POTW.

The following list identifies wellfield components that have not come into contact with vapor or liquid process streams and are planned to be disposed of as regular construction wastes:

- Pipe insulation not in contact with site fluids to be discarded in roll off (expected to be approximately one dumpster)
- General construction debris not in contact with site fluids such as plywood, lumber, unused cement bags, etc. (expected to be less than one dumpster)

At this time, we are unable to estimate the total volume of grossly contaminated waste that will be generated as components will need to be inspected as the ISTD system is disassembled. As indicated above, we have provided under separate cover, estimates for waste resulting from dismantling of the wellfield.

Heaters and liners will be removed from the wells and visually inspected for any signs of corrosion or possible contact to site contaminants. Due to the high operating temperatures of the heaters (~1300 F) and liners and the protection from site contaminants by the heater can, no further decontamination will be performed unless visual inspection suggests otherwise. Depending on the number of potentially impacted heaters/liners, decontamination via steam cleaning or sand blasting will be performed. Exact method of decontamination will not be determined until the number of potentially impacted materials can be identified. If less than approximately 10% of the total material is impacted, material will be staged in rolloffs for later disposal by others.

### **Wipe Sample Results**

Results of wipe samples will be compared with the decontamination standard for unrestricted use of less than or equal to 10 micrograms PCBs per 100 square centimeters ( $\leq 10 \mu\text{g}/100 \text{ cm}^2$ ). Should results exceed the unrestricted use standard, the subject equipment may be subject to further decontamination by steam cleaner (with subsequent re-sampling), or the Self-Implementing Decontamination Procedures documented in Section (c) of §761.79. Alternately, should subject equipment or piping be selected for disposal at a recycling facility, the facility will conform to the requirements in §761.72 and wipe test samples will be collected to confirm that results are  $\leq 10 \mu\text{g}/100 \text{ cm}^2$ .



**Attachment C**

Preliminary Demobilization Schedule



**Attachment D**

Estimated Material Quantities for  
Disposal

**Estimated Volume and Weight of Wellfield Materials to be Disposed**

Material	Quantities and Dimensions				Airspace Volume (CY) <sup>1</sup>	Weight (ton)
Fiberglass Pipe	Qty (LF)	Area (sq ft)	Wt (lb/LF)			
4"	1867	0.111	2.64		7.68	2.46
6"	1647	0.25	3.35		15.25	2.76
8"	771	0.444	4.85		12.68	1.87
12"	40	1	9.73		1.48	0.19
HEWs	Qty (LF)	Area (sq ft)	Wt (lb/LF)			
3" Sch. 40 SS, slotted	260	0.0625	7.5		0.60	0.98
Wellfield Steel	Qty (#)	Length each (ft)	Wt (lb/LF)	Area (sq ft)		
2" stickup	826	5	3.656	0.0278	4.25	7.55
3" heater cans	607	3	7.58	0.0625	4.22	6.90
Tee assembly	Qty (#)	~Wt (each) (lb)	~Vol (cu ft, each)			
	607	15	0.5		11.24	4.55
Hoses	Qty (#)	Wt/hose (lb)	LF/hose	Area (sq ft)		
2"	607	6	6	0.0278	3.75	1.82
Subtotal:					61.14	29.09
Contingency (%):					30	30
Total:					79.48	37.81
# of Rolloffs at 20CY each:					4	
# of Rolloffs at 17 tons each <sup>2</sup> :						3

**Notes:**

1. Volume estimates represent the airspace occupied by the material in a disposal container, not the physical volume of the material itself.
2. Assumes all materials can be commingled for disposal purposes.
3. Quantities are based on the following numbers of wellfield items:
  - 607 - 3" heater cans
  - 607 - 2" Vapor extraction well risers
  - 99 - 2" Temperature and Pressure Monitoring Points (TMPs)
  - 120 - 2" Pressure Monitoring Points (PMPs)

**Attachment E**

PCB Wipe Sampling SOG

## ***PCB Wipe Sampling***

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### **1. PURPOSE AND APPLICABILITY**

The purpose of this Standard Operating Guideline (SOG) is to ensure that TerraTherm, Inc. (TerraTherm) follows a consistent program in the performance of Polychlorinated Biphenyls (PCB) wipe sampling, when such sampling is required. This SOG is specifically intended for collecting wipe samples from location(s) along the thermal treatment system equipment train (after demobilization/decontamination, or if equipment is otherwise removed/disposed from the site) and analyzing the samples for PCBs.

TerraTherm may be responsible for verifying the cleanliness of treatment equipment, after exposure to PCBs and subsequent decontamination procedures. The project-specific Work Plan, Sampling and Analytical Plan (SAP), and/or Quality Assurance Project Plan (QAPP) will outline specific approved sampling locations for wipe samples. This SOG applies to all major TerraTherm projects where PCBs are present in the target treatment zone, and to personnel responsible for performing or overseeing sampling activities. All work must be done in accordance with the project-specific Work Plan, SAP, and/or QAPP procedures.

Sampling locations will vary from project to project, based on many factors including: the type of equipment used, whether the potentially contaminated surfaces are porous or non-porous, or whether the equipment is to be re-used at another job site or disposed/recycled. In general, PCBs will accumulate as dense non-aqueous phase liquids (DNAPLs) or deposits at any condensation step in the treatment process. Typical areas where elevated residual PCB levels typically are detected include the oil/water separator, heat exchangers, moisture knockout tanks, vapor or liquid piping, blowers, etc. Again, the anticipated location of potential PCB exposure in the treatment system equipment train will depend on the specific treatment system configuration.

In general, wipe samples are collected by wiping a 100 square centimeter (cm<sup>2</sup>) surface using a special PCB wipe test kit provided by a laboratory. Analysis of the wipe samples for total PCBs will be performed by a certified laboratory, following EPA method 8082 (reports PCB aroclors) or EPA 680 (PCB homologs), or other method as defined in the SAP/QAPP. Total PCB concentration must be less than 10 µg/wipe (10 µg/100cm<sup>2</sup>) for unrestricted re-use of equipment per §761.123.

This SOG outlines the methodology of such sampling to help ensure consistency from one project to the next and to ensure that sampling is performed in accordance with industry standard methods. It is recognized, however, that project specific goals may differ, and that sampling methodologies may change accordingly to some degree. It is the ultimate responsibility of the Project Manager to ensure that the site-specific wipe sampling plan meets both corporate and client requirements prior to sample submittal to the laboratory for analysis.

### **2. RESPONSIBILITY**

The Site Supervisor will conduct inspections of the sampling procedures established by this SOG. The purpose of the inspection is to verify that the procedures and the requirements of this SOG are being followed. Any deviations or inadequacies that are identified during the inspection will be documented and immediately corrected.



## ***PCB Wipe Sampling***

While the Project Manager is ultimately responsible for this work, he/she will often delegate the task of laboratory coordination to the Data Quality Discipline Lead or Project Chemist. In this case, the Data Quality Discipline Lead and/or Project Chemist will coordinate the sampling event with the laboratory and the field team, and assist with evaluating the results of the wipe tests.

### **3. REQUIRED MATERIALS**

- PCB wipe test kit (example shown in Figure 1), as provided by the certified analytical laboratory, containing:
  - Sterile gauze pads (typically 3"x3");
  - Hexane (enough for approximately 5 ml per wipe, contained in small container with minimal headspace if pads are not pre-moistened); and,
  - Unpreserved sample jars to contain the gauze after wiping.
- Insulated cooler for sample transport;
- Ice or blue ice packs for sample preservation after collection; and,
- Laboratory Chain of Custody form.

### **4. METHOD**

#### **4.1. Health and Safety Considerations**

Hexane is used to moisten the gauze for wiping surfaces. This solvent is a flammable liquid and vapor. Care should be taken to conduct wipe sampling in a well-ventilated area away from any ignition sources. Hexane is given a National Fire Protection Agency (NFPA) health rating of "2", meaning that the substance is moderately toxic or hazardous material. Nitrile gloves should be worn when handling this chemical, and care should be taken to avoid breathing vapors. See the attached Safety Data Sheet for hexane in Attachment 1.

#### **4.2. Sample Collection**

Wipe samples shall be collected using materials provided by a certified analytical laboratory. The following procedure will be followed:

- Provide access to the area to be sampled (open access hole/port, if sample is collected from inside a pipe, blower, small tank etc.).
- Don a fresh pair of Nitrile gloves. Do this for each sample collected to prevent cross contamination.
- Open one sterile gauze pad or remove a pre-soaked pad from the sample jar (Note that some laboratories will provide gauze pads pre-soaked in hexane in sample jars [best to only be used immediately after preparation], while some laboratories will provide sterile gauze pads and a separate jar of hexane).
- If the gauze pad is not already provided pre-soaked, moisten the pad with approximately 5 mL of hexane. Kits may come with a pipet to facilitate wetting the gauze. If no pipet is present, pads may be



## ***PCB Wipe Sampling***

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moistened by inverting the jar of hexane onto the pad until approximately 5 mL of hexane has been absorbed.

- Note: Re-cap the vial of hexane immediately after wetting the gauze. Do not leave the cap off of the hexane vial between samples, as hexane will evaporate very quickly.
- Immediately wipe the selected 100 cm<sup>2</sup> area (as defined in the project-specific Work Plan, SAP, and/or QAPP), applying pressure to the surface being wiped. 100 cm<sup>2</sup> approximately corresponds to a 16 in<sup>2</sup> area, or an area 4 inches by 4 inches wide. Note that the standard size of a gauze pad used for this work is 3 inches by 3 inches; thus, you are only wiping an area slightly larger than the wipe itself. If desired, to aid in estimating the wipe area, the lab or office may provide a stencil showing the 100cm<sup>2</sup> size. It is not recommended to physically mark the wipe area, as those materials (e.g. Sharpie) may interfere with the PCB analysis. If the surface is easily accessible, wiping may be done using a gloved hand. If the surface is less accessible, some type of accessory (e.g., extension pole) may be used to reach the surface (e.g., bottom of tank). *Please note that all TerraTherm policies regarding confined space entry apply - refer to the site-specific HASP.*
  - Do NOT wipe a larger area greater than 100 cm<sup>2</sup> (4" x 4") unless specifically instructed by the Project Manager (e.g. for a composite sample).
- Let the gauze air dry in a protected, ventilated area.
- Fold the dry gauze (sampled side inward) and return it to the sample vial. Cap the sample vial.
- Remove and discard the Nitrile gloves.
- Label the vial and fill out sampling details on the chain of custody form.
- Place the appropriate Quality Assurance/Quality Control (QA/QC) samples in the cooler, as required by the project-specific Work Plan, SAP, QAPP, and/or the Project Manager.
- Best sample collection practices dictate that samples should be placed in a cooler and kept cold at 4°C; however, if samples are to be analyzed soon (i.e. within the same day), the cold storage requirements may be relaxed as long as sample integrity is maintained.<sup>1</sup>
- Samples should be shipped overnight via FedEx/UPS, hand delivered to the laboratory, or picked up by laboratory courier.

### **4.3. Decontamination**

Decontamination is not applicable since a new sterile gauze pad and new aliquot of hexane is used for each sample. Care should be taken to don a new pair of nitrile gloves for each sample, as to prevent cross-contamination between locations.

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<sup>1</sup> Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup, EPA-560/5-86-0174, May 1986.





## ***PCB Wipe Sampling***

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### **4.4. Quality Assurance/Quality Control (QA/QC) Samples**

QA/QC samples may include field duplicates (two separate wipe samples collected side by side at the same location on the same piece of equipment) or field blanks (a gauze pad soaked in hexane, but not wiped, then placed in the sample jar). Refer to the project-specific Work Plan, SAP and/or QAPP procedures for more information about project-specific QA/QC samples.

### **5. SAMPLE RELATED FORMS**

Laboratory Chain of Custody (COC) form.

### **6. REFERENCES**

Wipe Sampling and Double Wash/Rinse Cleanup as Recommended by the Environmental Protection Agency PCB Spill Cleanup Policy, Dated June 23, 1987 (Revised and Clarified on April 18, 1991). Available online here: <http://www.epa.gov/osw/hazard/tsd/pcbs/pubs/wipe-samp.pdf> (last accessed January 17, 2014)

40 CFR Part 761—Polychlorinated Bi-Phenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions. Subpart M—Determining a PCB Concentration for Purposes of Abandonment or Disposal of Natural Gas Pipeline: Selecting Sample Sites, Collecting Surface Samples, and Analyzing Standard PCB Wipe Samples. Available online here: <http://www.epa.gov/osw/hazard/tsd/pcbs/pubs/2005-761.pdf> (last accessed January 17, 2014)

Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup, EPA-560/5-86-0174, May 1986. Available online here: <http://www.epa.gov/osw/hazard/tsd/pcbs/pubs/gridsampling.pdf> (last accessed January 17, 2014)



## PCB Wipe Sampling

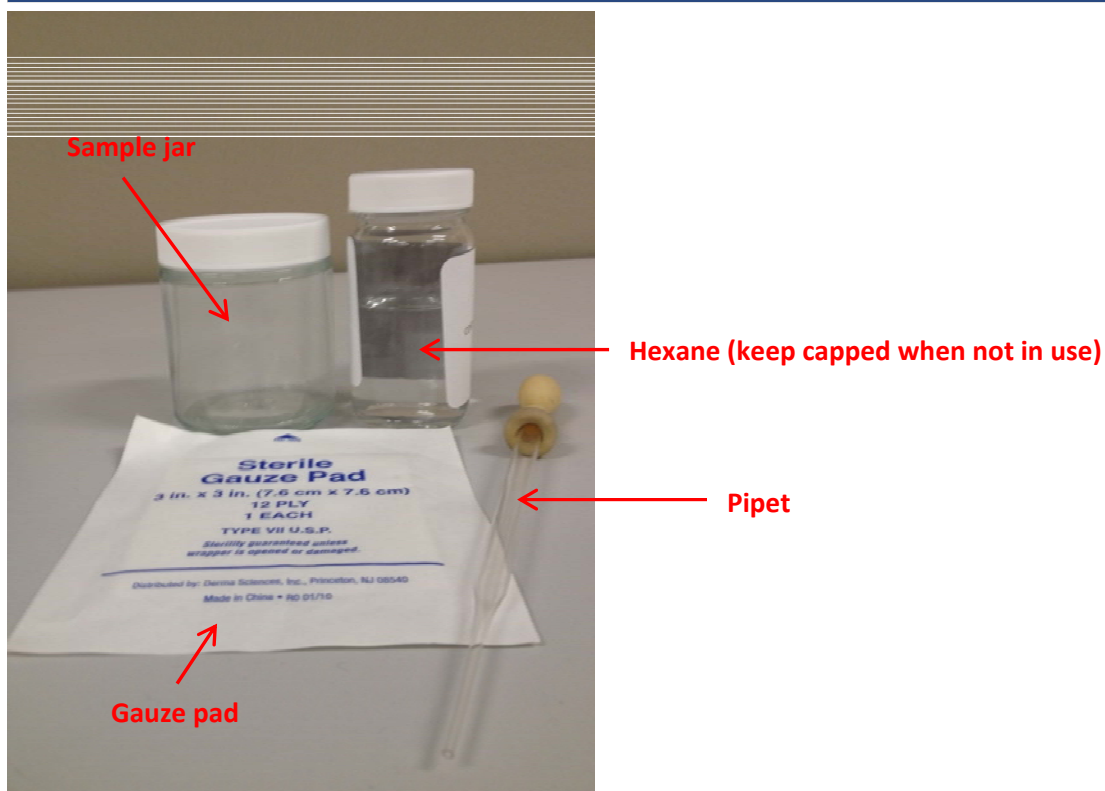


Figure 1. Typical PCB wipe sampling kit components



**TERRATHERM**

No. SOG-SA-105

***PCB Wipe Sampling***

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**Attachment 1. Hexane Safety Data Sheet (SDS)**

### 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Hexane

Product Number : 296090  
Brand : Sigma-Aldrich

Supplier : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA

Telephone : +1 800-325-5832  
Fax : +1 800-325-5052  
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation  
Product Safety - Americas Region  
1-800-521-8956

### 2. HAZARDS IDENTIFICATION

#### Emergency Overview

##### OSHA Hazards

Flammable liquid, Target Organ Effect, Irritant, Teratogen

##### Target Organs

Peripheral nervous system., Kidney, Testes.

##### GHS Classification

Flammable liquids (Category 2)  
Skin irritation (Category 2)  
Eye irritation (Category 2B)  
Reproductive toxicity (Category 2)  
Specific target organ toxicity - single exposure (Category 2)  
Specific target organ toxicity - single exposure (Category 3)  
Aspiration hazard (Category 1)  
Acute aquatic toxicity (Category 2)

##### GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H225 Highly flammable liquid and vapour.  
H304 May be fatal if swallowed and enters airways.  
H315 + H320 Causes skin and eye irritation.  
H336 May cause drowsiness or dizziness.  
H361 Suspected of damaging fertility or the unborn child.  
H371 May cause damage to organs.  
H401 Toxic to aquatic life.

Precautionary statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.  
P281 Use personal protective equipment as required.  
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.  
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P331 Do NOT induce vomiting.

#### HMIS Classification

Health hazard: 2  
Chronic Health Hazard: \*  
Flammability: 3  
Physical hazards: 0

#### NFPA Rating

Health hazard: 2  
Fire: 3  
Reactivity Hazard: 0

#### Potential Health Effects

**Inhalation** May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.  
**Skin** May be harmful if absorbed through skin. Causes skin irritation.  
**Eyes** Causes eye irritation.  
**Ingestion** May be harmful if swallowed. Aspiration hazard if swallowed - can enter lungs and cause damage.

---

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : n-Hexane  
Formula : C<sub>6</sub>H<sub>14</sub>  
Molecular Weight : 86.18 g/mol

Component	Concentration
<b>n-Hexane</b>	
CAS-No.	110-54-3
EC-No.	203-777-6
Index-No.	601-037-00-0

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### 4. FIRST AID MEASURES

#### General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

#### If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

#### In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

#### In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

#### If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

---

### 5. FIREFIGHTING MEASURES

#### Conditions of flammability

Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.

**Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Special protective equipment for firefighters**

Wear self contained breathing apparatus for fire fighting if necessary.

**Hazardous combustion products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides

**Further information**

Use water spray to cool unopened containers.

**6. ACCIDENTAL RELEASE MEASURES****Personal precautions**

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

**Environmental precautions**

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

**Methods and materials for containment and cleaning up**

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

**7. HANDLING AND STORAGE****Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Flash back possible over considerable distance. Container explosion may occur under fire conditions. Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

**Conditions for safe storage**

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Basis
n-Hexane	110-54-3	TWA	50 ppm	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Central Nervous System impairment Eye irritation Peripheral neuropathy Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption			
		TWA	50 ppm 180 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits
		TWA	500 ppm 1,800 mg/m <sup>3</sup>	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	The value in mg/m <sup>3</sup> is approximate.			
		TWA	50 ppm 180 mg/m <sup>3</sup>	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

## Personal protective equipment

### Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

### Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

#### Immersion protection

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: > 480 min

Material tested: Camatril® (Aldrich Z677442, Size M)

#### Splash protection

Material: Nitrile rubber

Minimum layer thickness: 0.2 mm

Break through time: > 30 min

Material tested: Dermatril® P (Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

### Eye protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

### Skin and body protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

### Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

### Appearance

Form	liquid
Colour	colourless

### Safety data

pH	7.0
Melting point/freezing point	Melting point/range: -95 °C (-139 °F)
Boiling point	69 °C (156 °F)
Flash point	-26.0 °C (-14.8 °F) - closed cup
Ignition temperature	234 °C (453 °F)
Autoignition temperature	234.0 °C (453.2 °F)
Lower explosion limit	1.2 %(V)

Upper explosion limit	7.7 %(V)
Vapour pressure	341.3 hPa (256.0 mmHg) at 37.7 °C (99.9 °F) 176.0 hPa (132.0 mmHg) at 20.0 °C (68.0 °F)
Density	0.659 g/mL at 25 °C (77 °F)
Water solubility	insoluble
Partition coefficient: n-octanol/water	log Pow: 3.90 - 4.11
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	15.8

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## 10. STABILITY AND REACTIVITY

### Chemical stability

Stable under recommended storage conditions.

### Possibility of hazardous reactions

Vapours may form explosive mixture with air.

### Conditions to avoid

Exposure to moisture may affect product quality.

Heat, flames and sparks. Extremes of temperature and direct sunlight.

### Materials to avoid

Oxidizing agents

### Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - no data available

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## 11. TOXICOLOGICAL INFORMATION

### Acute toxicity

#### Oral LD50

LD50 Oral - rat - 25,000 mg/kg

#### Inhalation LC50

LC50 Inhalation - rat - 4 h - 48000 ppm

#### Dermal LD50

no data available

#### Other information on acute toxicity

no data available

### Skin corrosion/irritation

no data available

### Serious eye damage/eye irritation

Eyes - rabbit - Mild eye irritation

### Respiratory or skin sensitization

no data available

### Germ cell mutagenicity

no data available

### Carcinogenicity

Carcinogenicity - rat - Inhalation



Tumorigenic: Carcinogenic by RTECS criteria. Tumorigenic Effects: Testicular tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

### Reproductive toxicity

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals. Suspected human reproductive toxicant Suspected of damaging fertility.

### Teratogenicity

no data available

### Specific target organ toxicity - single exposure (Globally Harmonized System)

May cause drowsiness or dizziness.

### Specific target organ toxicity - repeated exposure (Globally Harmonized System)

Ingestion - May cause damage to organs through prolonged or repeated exposure. - Nervous system

### Aspiration hazard

May be fatal if swallowed and enters airways.

### Potential health effects

<b>Inhalation</b>	May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.
<b>Ingestion</b>	May be harmful if swallowed. Aspiration hazard if swallowed - can enter lungs and cause damage.
<b>Skin</b>	May be harmful if absorbed through skin. Causes skin irritation.
<b>Eyes</b>	Causes eye irritation.

### Signs and Symptoms of Exposure

Prolonged or repeated contact with skin may cause: defatting, Dermatitis, Contact with eyes can cause: Redness, Blurred vision, Provokes tears., Effects due to ingestion may include: Gastrointestinal discomfort, Central nervous system depression, Lung irritation, chest pain, pulmonary edema, giddiness, slowed reaction time, slurred speech, Headache, Dizziness, Drowsiness, Unconsciousness

### Synergistic effects

no data available

### Additional Information

RTECS: MN9275000

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## 12. ECOLOGICAL INFORMATION

### Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 2.5 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 3,878.00 mg/l - 48 h
Toxicity to algae	EC50 - Chlorella vulgaris (Fresh water algae) - 12,840.00 mg/l - 3 h EC50 - SKELETOMA - 0.30 mg/l - 8 h

### Persistence and degradability

no data available

**Bioaccumulative potential**

no data available

**Mobility in soil**

no data available

**PBT and vPvB assessment**

no data available

**Other adverse effects**

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life.

**13. DISPOSAL CONSIDERATIONS****Product**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

**Contaminated packaging**

Dispose of as unused product.

**14. TRANSPORT INFORMATION****DOT (US)**

UN number: 1208 Class: 3 Packing group: II  
 Proper shipping name: Hexanes  
 Reportable Quantity (RQ): 5000 lbs  
 Marine pollutant: No  
 Poison Inhalation Hazard: No

**IMDG**

UN number: 1208 Class: 3 Packing group: II EMS-No: F-E, S-D  
 Proper shipping name: HEXANES  
 Marine pollutant: No

**IATA**

UN number: 1208 Class: 3 Packing group: II  
 Proper shipping name: Hexanes

**15. REGULATORY INFORMATION****OSHA Hazards**

Flammable liquid, Target Organ Effect, Irritant, Teratogen

**SARA 302 Components**

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313 Components**

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
n-Hexane	110-54-3	2007-07-01

**SARA 311/312 Hazards**

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**

	CAS-No.	Revision Date
n-Hexane	110-54-3	2007-07-01

**Pennsylvania Right To Know Components**

	CAS-No.	Revision Date
n-Hexane	110-54-3	2007-07-01

## New Jersey Right To Know Components

n-Hexane

CAS-No.  
110-54-3

Revision Date  
2007-07-01

### California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.


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## 16. OTHER INFORMATION

### Further information

Copyright 2012 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only. The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See [www.sigma-aldrich.com](http://www.sigma-aldrich.com) and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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		<b>TerraTherm, Inc.</b> 151 Suffolk Lane Gardner, MA 01440 978.343.1200	
<b>Guidance #</b>	<b>SOG-SA-105</b>	<b>Revision #</b>	<b>0</b>
<b>Review #1</b>	Alyson Fortune	<b>Review #2</b>	Devon Phelan
<b>Effective Date</b>	<b>January 2014</b>	<b>Approved By:</b>	

