

# BOS Meeting 3/23/15



## Beede Waste Oil Superfund Site

Superfund Process and Update of  
Remedial Actions for

Thermal - Phase 1

Steam Enhanced Soil Treatment

# Agenda



- Introductions
- Site Setting and History
- Cleanup Remedy
- Public Water Supply and Intersection Improvements
- Groundwater Treatment System update
- Soils cleanup: Thermal Overview, update and schedule
- Questions?

# Introductions



## US EPA – Lead Agency

- Cheryl Sprague, Project Manager
- Rodney Elliot, Community Relations

## NHDES – State Oversight

- Ken Richards, Project Manager
- Sanborn Head Associates: Chip Crocetti

## Beede Site Group

- Mike Skinner, Project Coordinator
- Woodard & Curran: Supervising Contractor
  - Peter Nangeroni, Project Manager
- Cedarview: Construction Manager
  - Scott Freeman

# Site Setting and History



- Currently a 40-acre site located in a residential neighborhood
- 1926 – Parcel 1-Robert Beede started operation as a waste oil recycling facility.
- 1950s – Parcel 1 –large underground and numerous above ground tanks are placed on site to store waste oils. Parcel 2 - Sand and gravel operations began.

# Site Setting and History



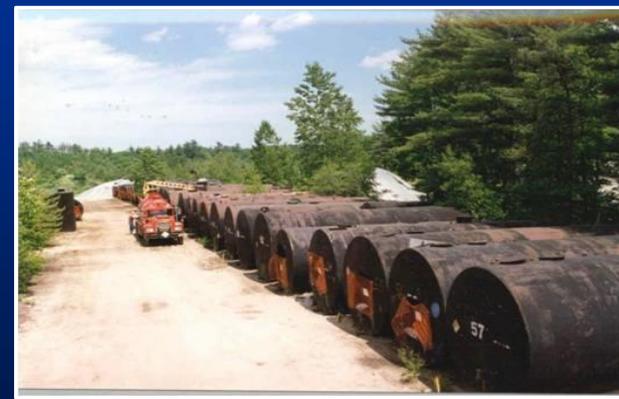
- 1960s through the 1980's - 1-acre unlined lagoon is used on-site, additional tanks added to store used, recycled, waste oils and virgin oil.
- 1980 through 1995 – NHDES conducted investigations and enforcement actions.
- December 1996 – Listed on Superfund NPL.



# 1996-1997 Removal Actions

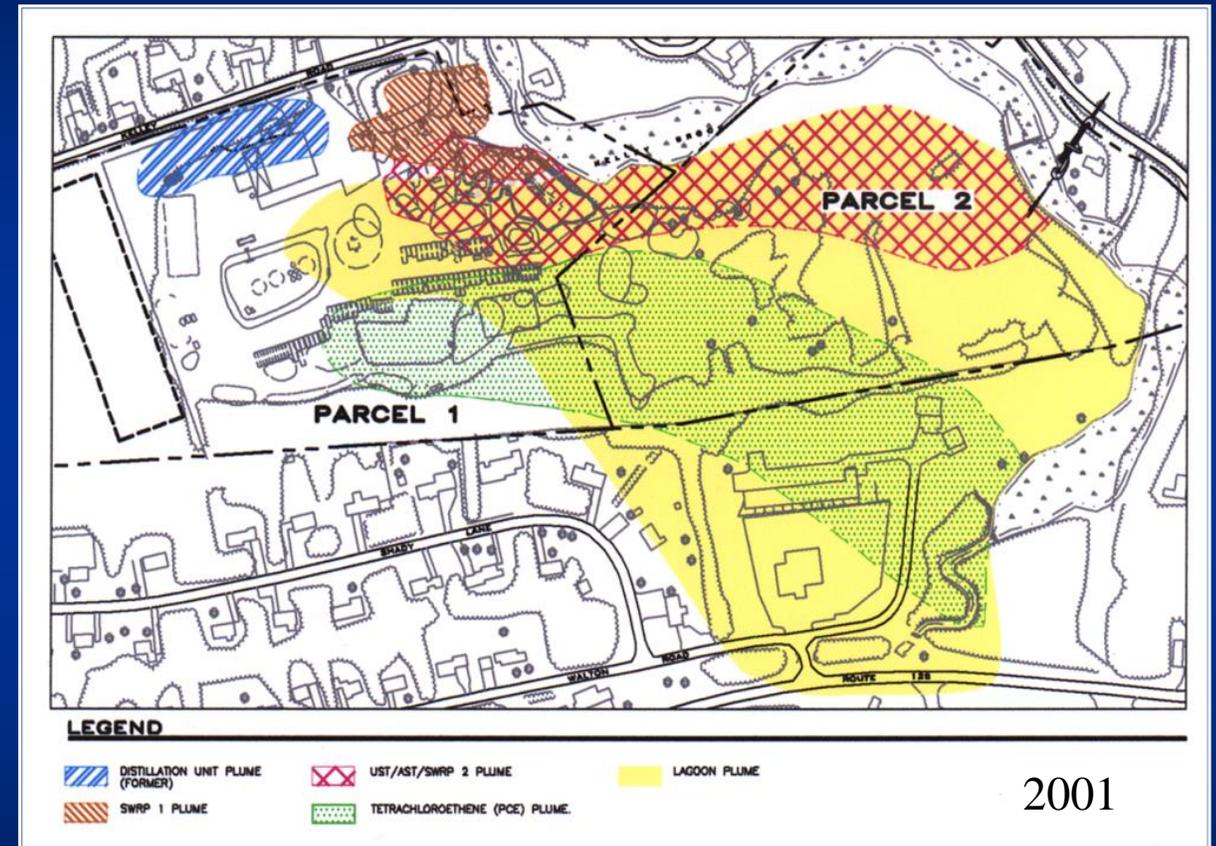


- Purpose was to mitigate immediate threats and stabilize site conditions.
- Performed by USEPA and NHDES from July 1996 to November 1997.
  - Removed 1.1 million gallons of waste oil, sludge and water from 100 Above Ground Storage Tanks “ASTs” ;
  - Removed 800 drums.
  - Installed booms/sorbent pads to limit oil seeping into Kelley Brook.

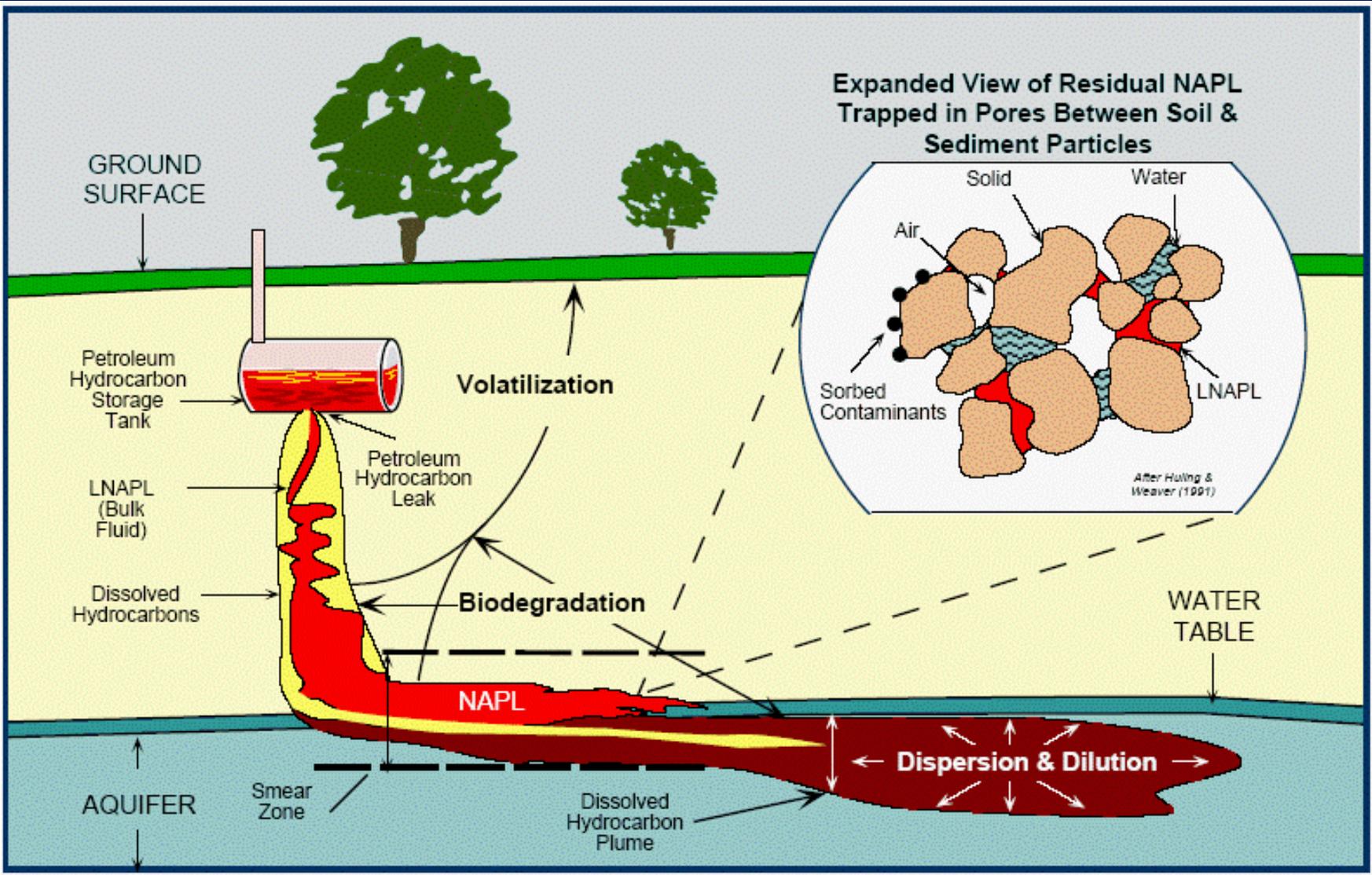


# 1996-2001 Remedial Investigations

- Site was contaminated primarily with waste oils that seeped into the ground from a variety of sources, including the former unlined lagoon, USTs, ASTs, and numerous drums.
- Chlorinated and petroleum-related compounds (VOCs) migrated off-site and contaminated residential wells.
- Approximately 3 acres of Light non-Aqueous Phase Liquid “LNAPL”.



# Migration of Oils into Subsurface



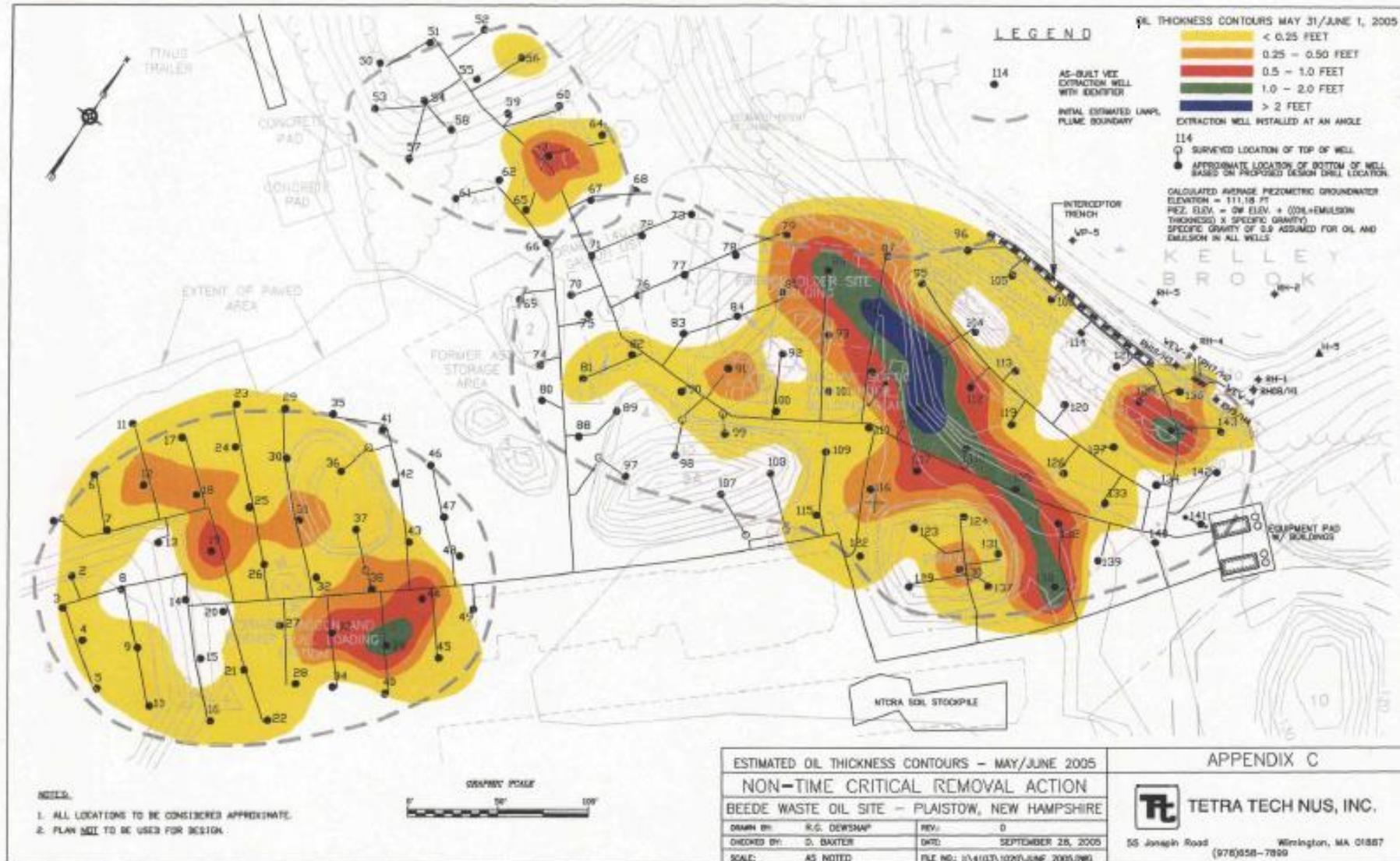
# 2001-2005 Vacuum-Enhanced LNAPL Extraction System



Removed  
over 90,000  
gallons of  
Waste Oil  
(LNAPL)



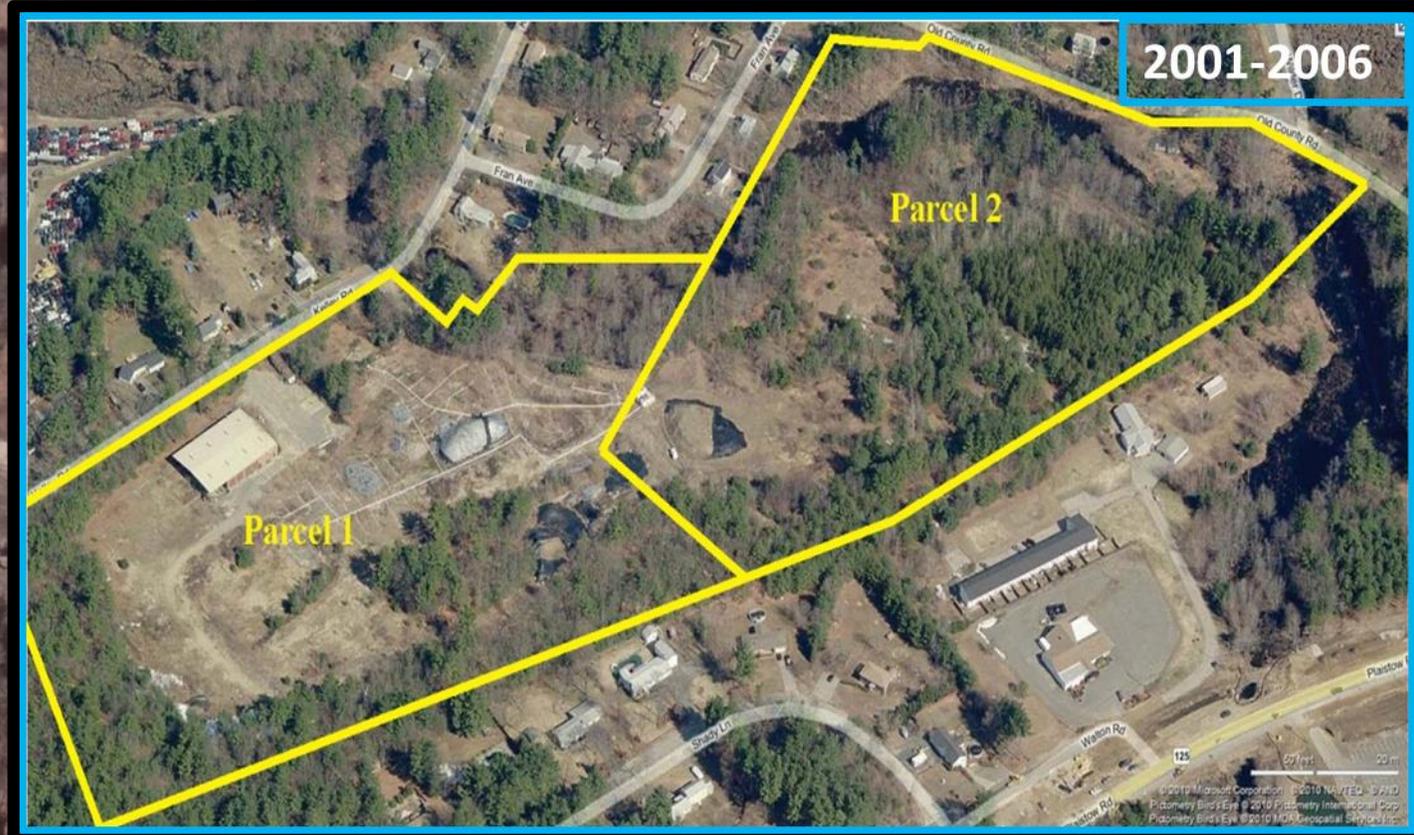
# Parcel 1 Areas with Residual Oils in Deep Soils



1996



2001-2006



# 2004 EPA Cleanup Remedy

- Cleanup is intended to result in the site meeting residential reuse standards for shallow surface soil (less than 10 ft bgs) and the return of groundwater to drinking water standards.
- Cleanup to proceed sequentially

- **Groundwater:**

Management of Migration “MOM” -130 gpm groundwater extraction and treatment system with on-site discharge of treated water.

Includes Long-term monitoring of groundwater and surface water.

- 2012 – Waterline

# 2004 EPA Cleanup Remedy

## Soils: Cleanup to be implemented in 3 Phases

**Thermal treatment of Residual Materials using steam enhanced vacuum extraction**

**Phase 1 (April 2015):** within deeper soils of the former lagoon area

**Phase 2: (2017):** within deeper soils of the former tank storage area

- Combination of Phase 1 and Phase 2 will address 70,000 yd<sup>3</sup> of contaminated soil ( greater than 10 ft bgs), removing contaminants which could continue to leach into the groundwater

# 2004 EPA Cleanup Remedy

## Soils: Cleanup to be implemented in 3 Phases

### Excavation and Off-site Disposal of Contaminated Shallow Soils

**Phase 3 (2017-2018):** Excavation and off-site disposal of approximately 77,000 yd<sup>3</sup> of the contaminated shallow soils (top 10 feet) within Parcel 1, including all remaining soil piles, landfill materials and contaminated sediments; followed by backfill with clean fill and grading.

# Early Work

- Prior to starting any major site remedial work, 2 projects were completed to eliminate exposure to contaminated drinking water and provide safe site access
- A new public water supply was installed and provided to all neighbors who had wells that were contaminated and had treatment systems
- A new intersection and access were constructed so trucks and other construction vehicles did not have to go on neighborhood roads.

# ROD - Groundwater Treatment System

## Objectives

- Reduce Plume Migration
- Prevent New Exposure to Plume (down gradient drinking water wells)\*
- Improve Groundwater Quality

## Details

- Seven extraction wells
  - Average of 130 gpm / Maximum of 160 gpm
- Microfiltration treatment of metals (iron, manganese and arsenic)
- Advanced oxidation of VOCs, 1,4-dioxane
- Discharge of Groundwater to Rapid Infiltration Basins (RIB) and Injection wells
- Remote monitoring and controls
- Geothermal heating of treatment building

*\* All contaminated drinking wells have been replaced with a public water supply*



# Groundwater System Status

- Summer/ Fall 2012 –new access route and intersection constructed
- Winter 2012 – Water treatment building constructed
- 2013 – Treatment system installation
- December 2, 2013 – System start-up
- **Treated approximately 69.3 million gallons** (through the end of Feb 2015)
- **Meeting discharge standards**
- **Extensive ongoing monitoring programs**



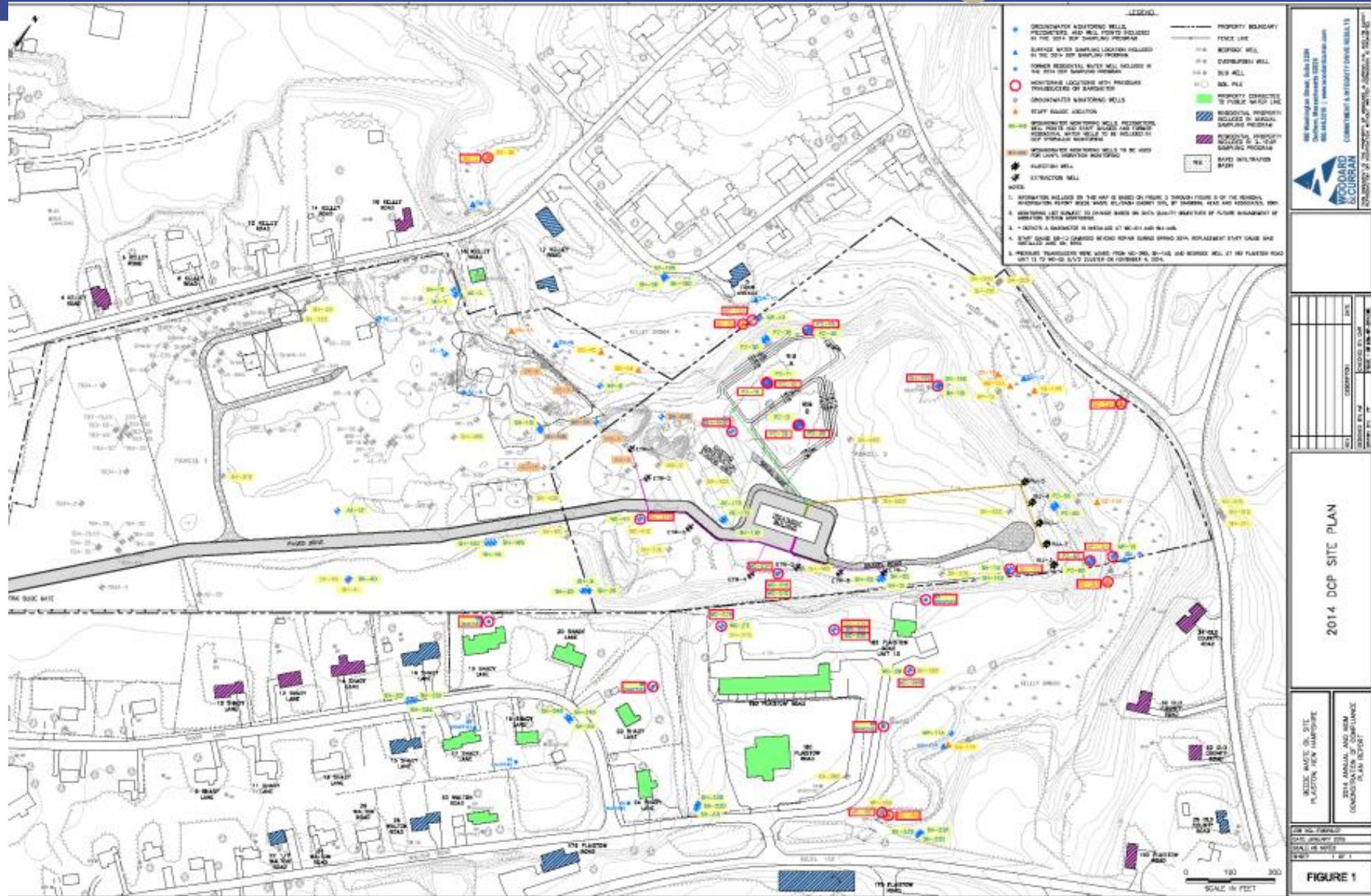
# Hydraulic Monitoring

## Groundwater MOM DCP Hydraulic Monitoring Programs

	Locations	Transducers (15-min)
Hydraulic Capture of VOC Plume	116	15
Residential Well Hydraulic Monitoring	24	7
LNAPL Migration Monitoring	8	None
Slope Stability Monitoring	24	None
Kelley Brook Hydraulic Monitoring	25	8

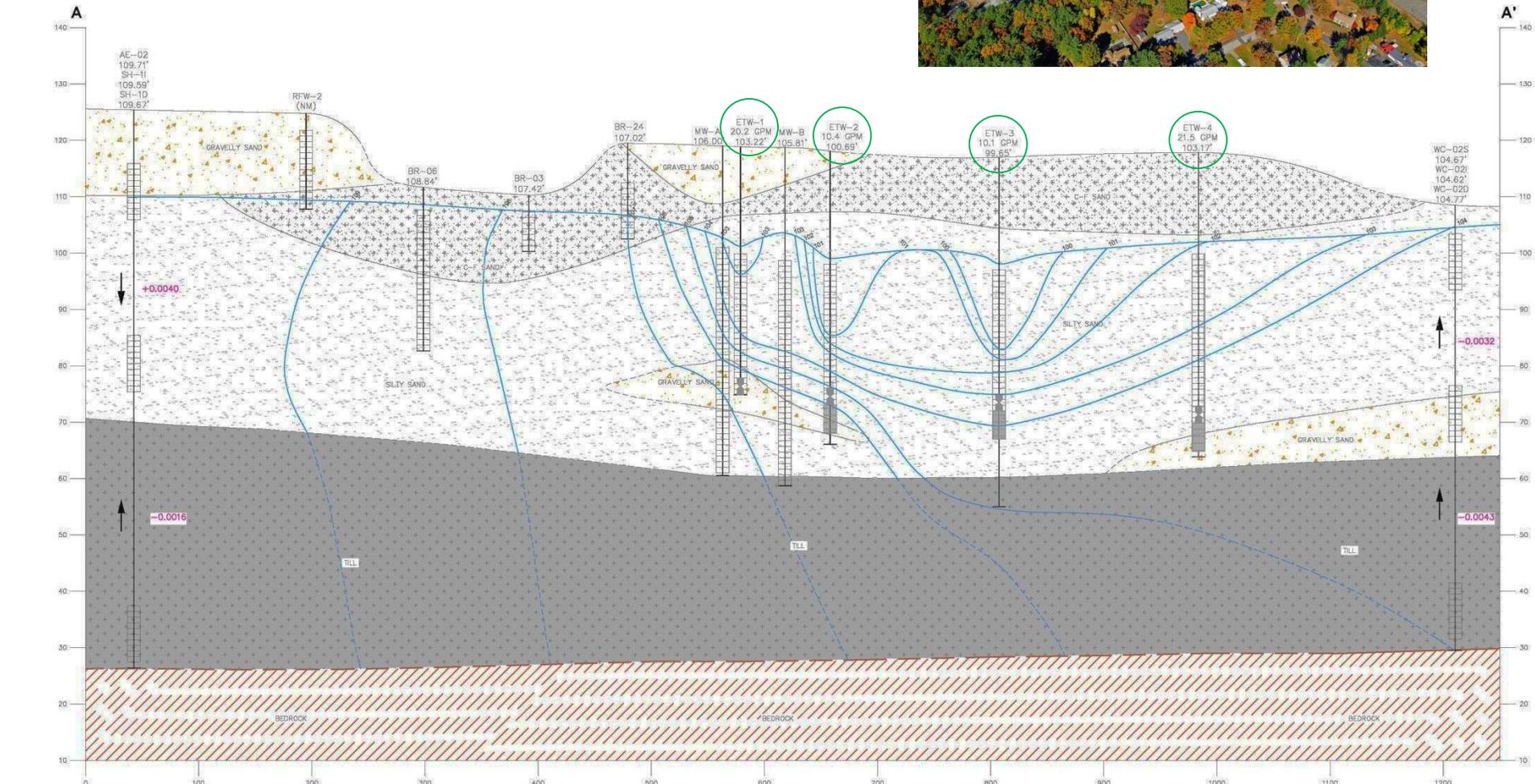
*\*\*Locations shown on next slide*

# 2014 DCP Monitoring

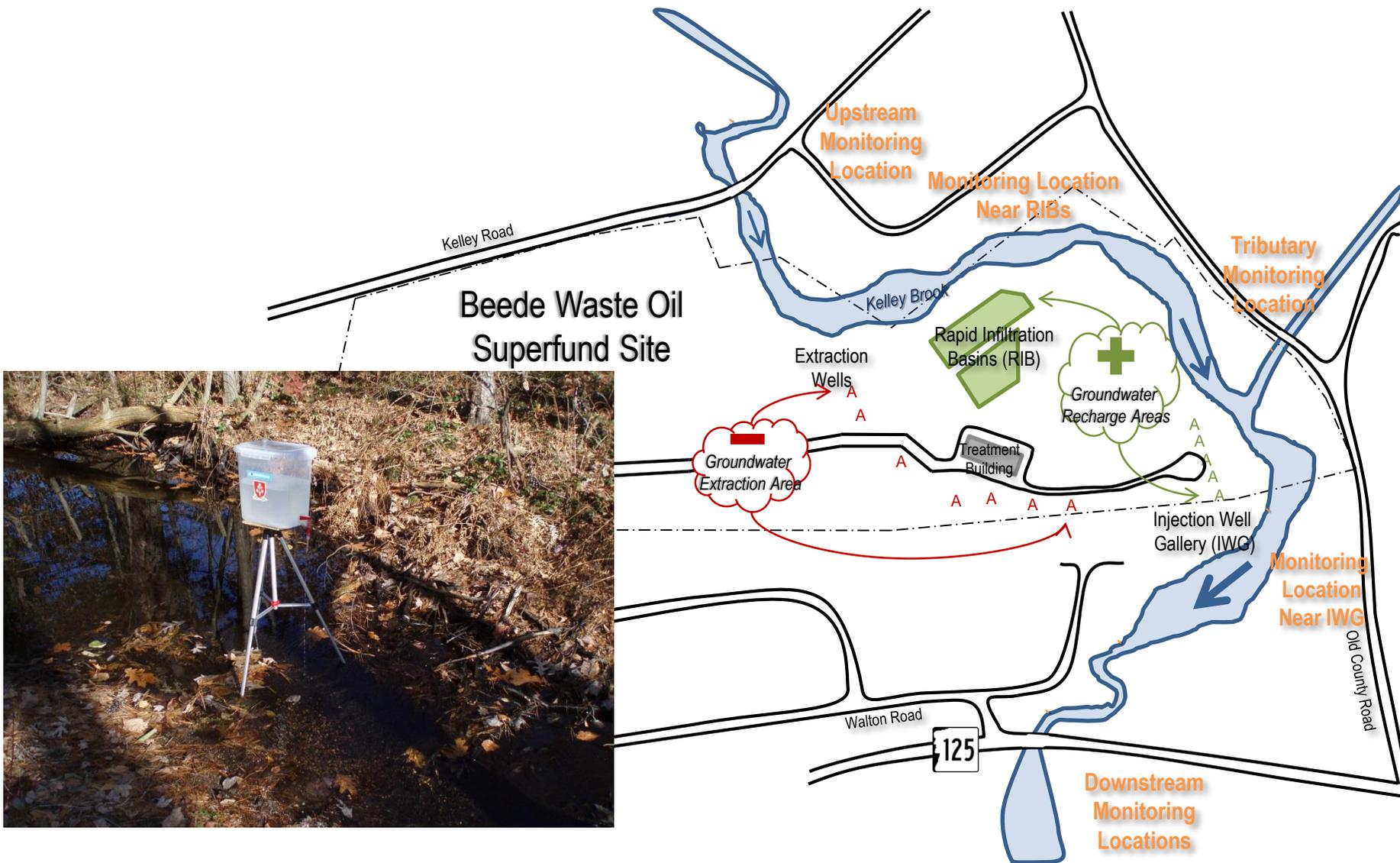


# Hydraulics

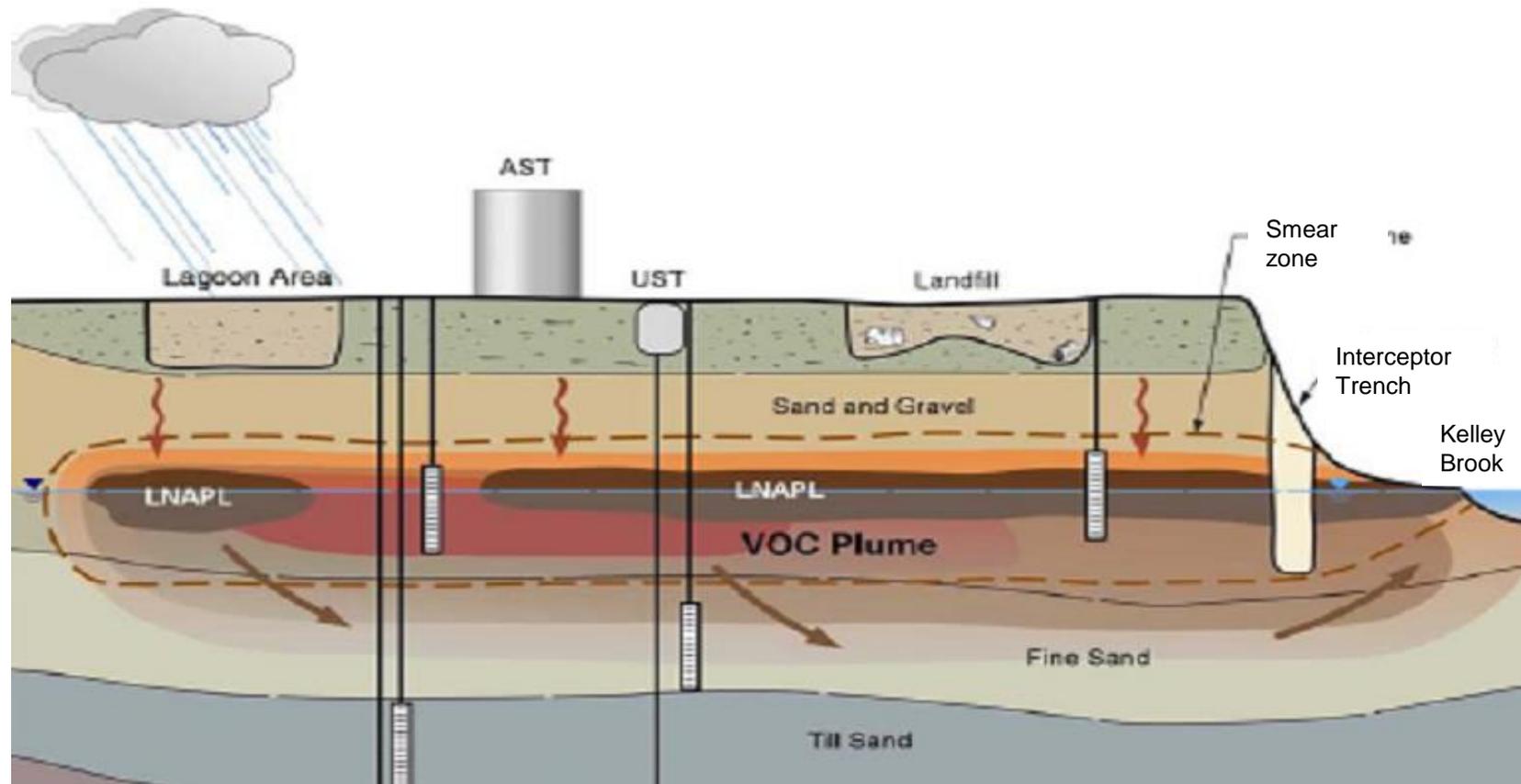
## Hydraulic Capture of the VOC Plume



# Hydraulics – Kelley Brook Monitoring



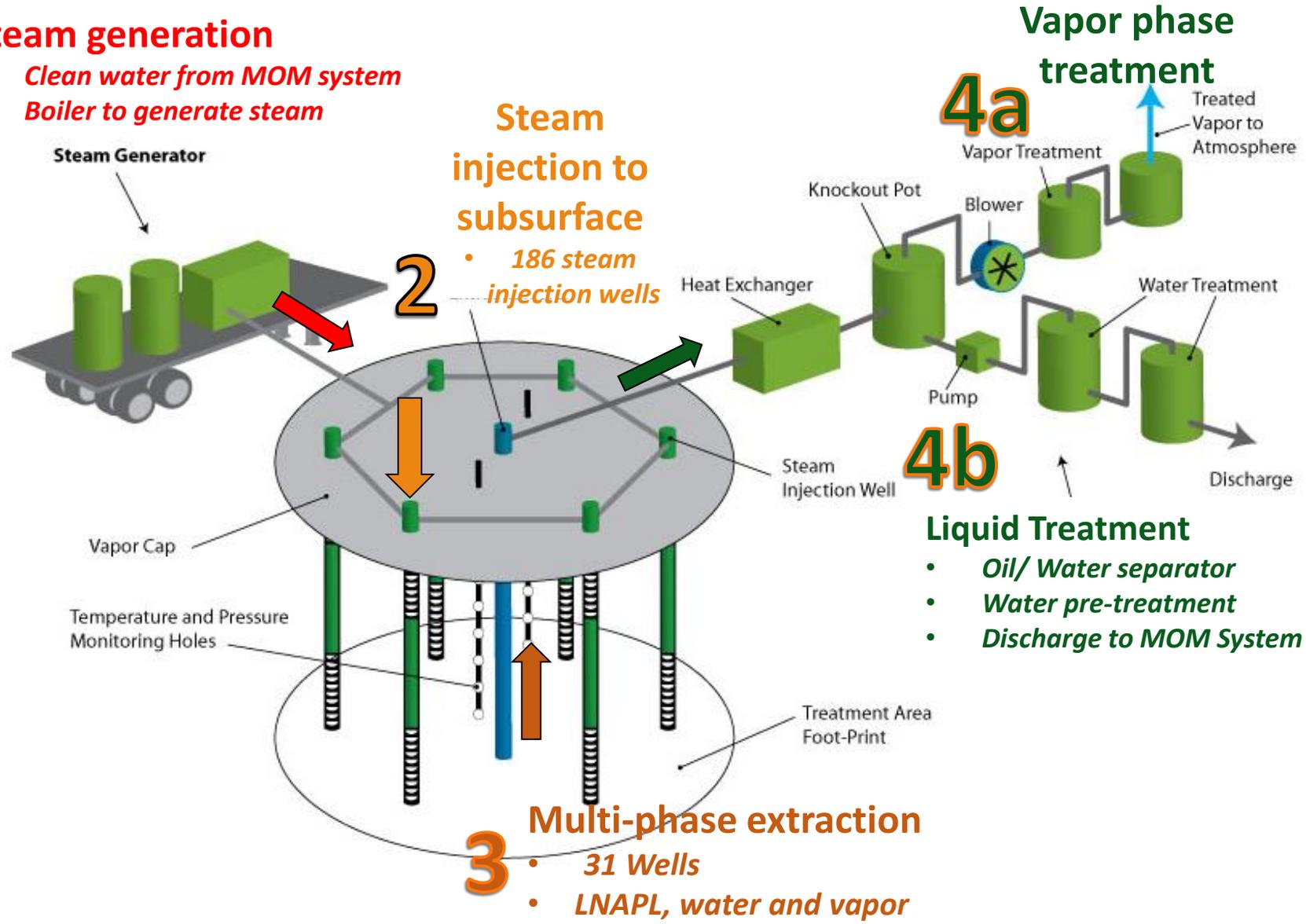
# Conceptual Site Model – Cross Section



# SEE In-situ Thermal Remediation

## 1 Steam generation

- Clean water from MOM system
- Boiler to generate steam



## 2 Steam injection to subsurface

- 186 steam injection wells

## 3 Multi-phase extraction

- 31 Wells
- LNAPL, water and vapor

## Vapor phase treatment

4a

Vapor Treatment

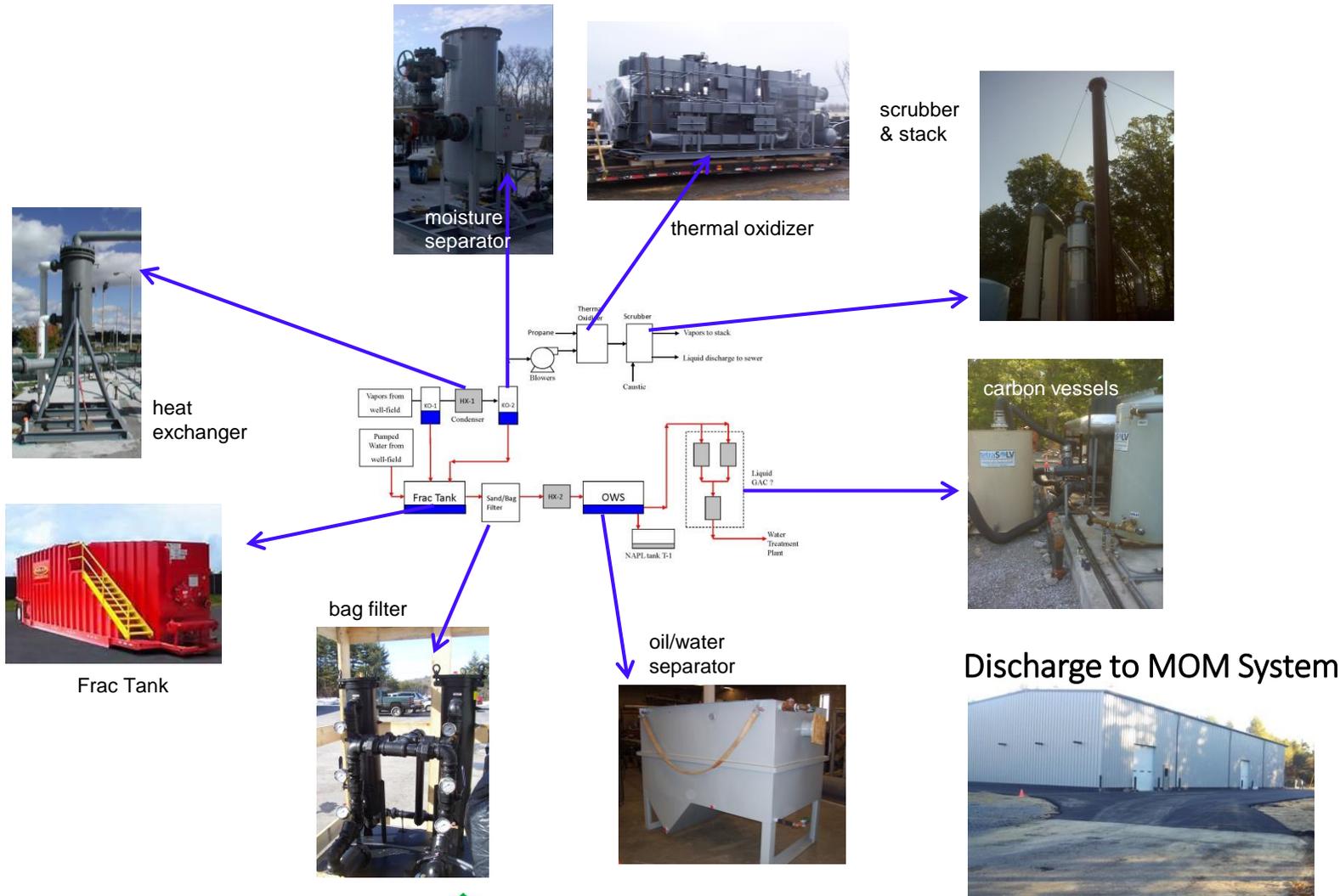
Treated Vapor to Atmosphere

4b

## Liquid Treatment

- Oil/ Water separator
- Water pre-treatment
- Discharge to MOM System

# Treatment Equipment



# Beede Waste Oil Superfund Site

March 2015



# Thermal Status

- Work Completed:
  - Phase 1 Well field installed
  - New gas line and electric lines installed
  - Equipment pad poured
- Equipment installation – started mid-February 2015
- Operations start-up Spring 2015
- estimated operation of 150 days)

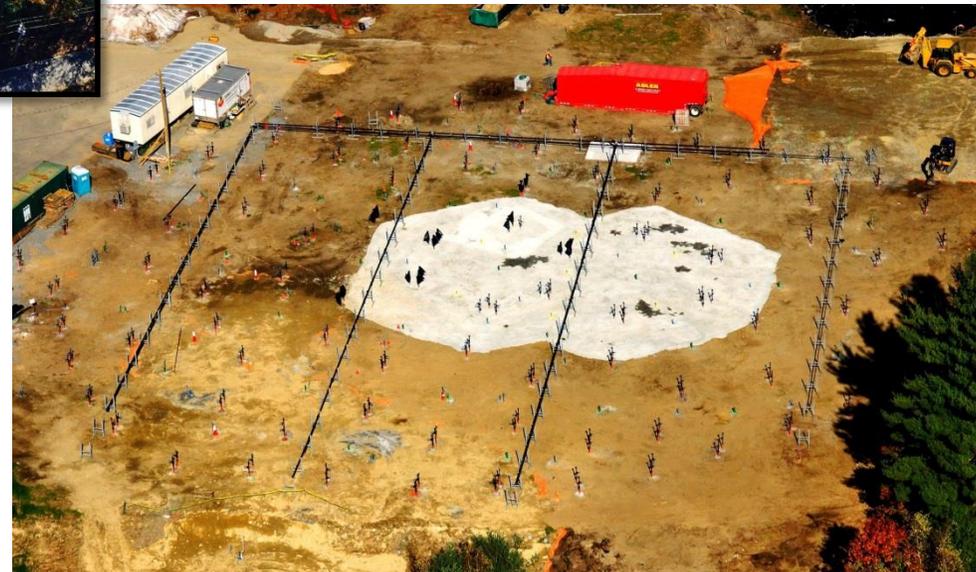
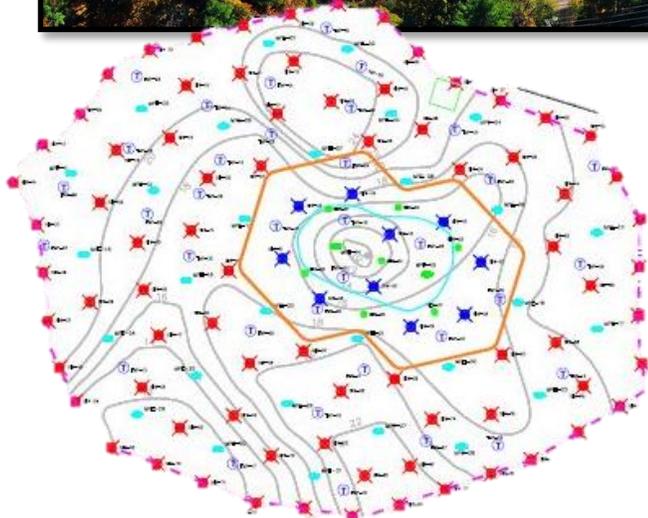


# Phase 1 Thermal Layout



## Wellfield Layout

- Steam wells configured in hexagonal array
- MPE wells located in center
- Temperature monitored throughout



# What you'll see & hear

- Minimal vehicular traffic (daily TerraTherm operators, occasional deliveries) through 221 Main Street entrance
- Slats in (old) Kelley Road entrance installed – limits visual impact of treatment equipment for neighborhood

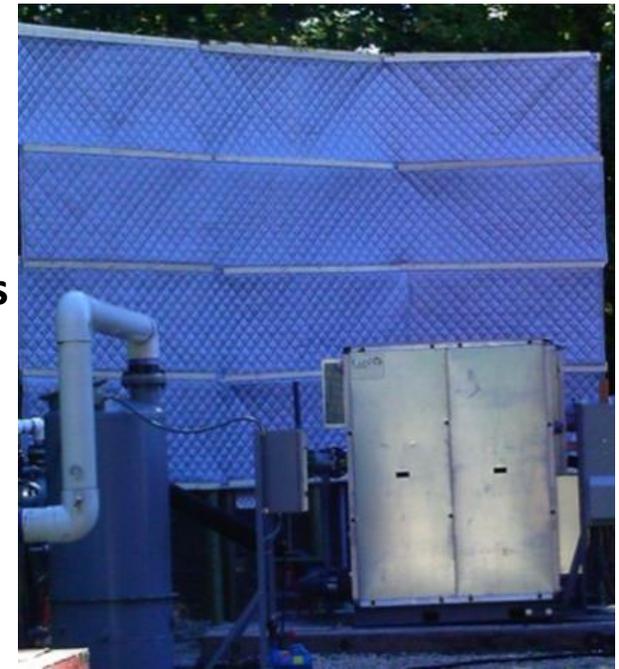


# What you'll see & hear

- Steam plume from stack
- Noise barrier (to be installed)



Sound Curtains



# How we know it's working:

- Operations Monitoring
  - Temperature monitoring – 41 locations, 7 to 8 individual temperature probes/ sensors at select depths at each location, over 300 across the treatment area
  - Vapor and liquid remedy performance monitoring – pre and post treatment
- Remedy Performance Monitoring – vapor, groundwater, soil throughout operations
- Compliance Monitoring – soil sampling

# Safety



- General Safety Precautions
  - Site fenced and locked
  - Only authorized personnel allowed in Phase 1 area during operations
  - 24 hour security and motion detector cameras
  - Operators – proper training and personal protective equipment (PPE)
  - Police patrol on site at night
  - Ambient air monitoring around work zone/ site perimeter



# Safety Continued



Figure 4.3 Steam Injection Well Equipped with Pressure Regulator and Metering

- Equipment Precautions
  - Pressure release valves on steam unit
  - Redundant back-up systems are provided, including an emergency generator that turns on automatically in the event of a loss of grid power, so that the off-gas treatment equipment can operate continuously
  - Immediate remote alarm notification to operators
  - Heated pipes are insulated

# Questions?

- [www.epa.gov/ne/superfund/sites/beede](http://www.epa.gov/ne/superfund/sites/beede) and on NHDES's One Stop Web Site at: <http://des.nh.gov/onestop//>.
- or please visit the Beede Groups progress updates and on-going field work at:
- <http://www.facebook.com/pages/Beede-Clean-Up/447695315275824>

**Beede Clean Up**  
Engineering/Construction

Timeline About Photos Likes Videos

82 people like this

Invite friends to like this Page

**ABOUT**

This site is provided by the Beede Site Group and will be used to keep neighbors updated on activities at the Site, and will allow questions and other...  
READ MORE

**Beede Clean Up**  
February 12 at 8:27am

Week of 2/16

Well, believe it or not, Spring is right around the corner and hopefully it's not too far to the corner. Therefore, our team needs to get prepared for the new construction season. Like you, we will be moving a lot of snow to start the work. After the snow is moved, our work will begin and our "plans" for next week are:

Thermal Phase 1 System Construction... See More

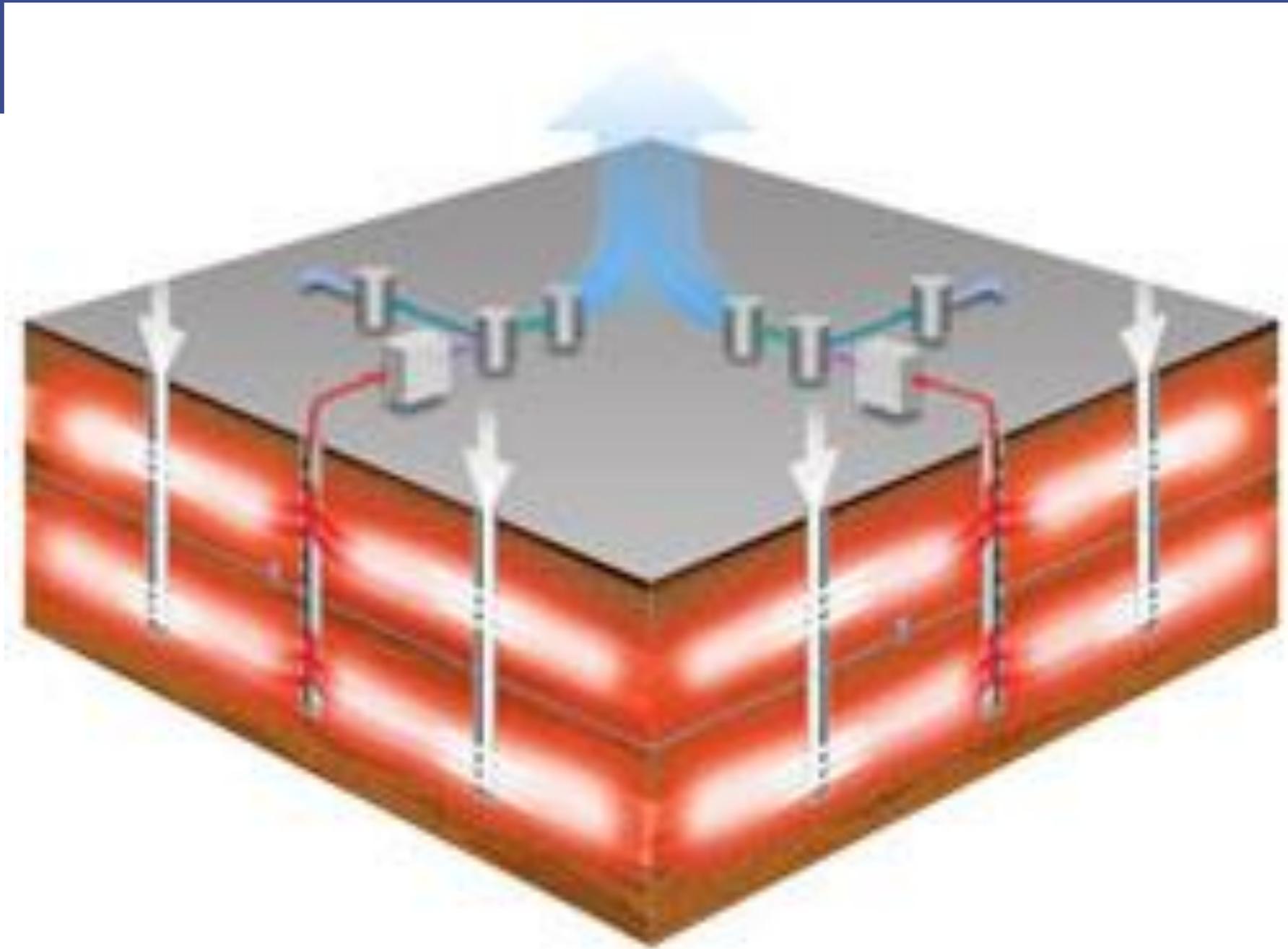
Like - Comment - Share - 1



Back up information

# Site Plan





**Steam  
Enhanced  
Extraction  
(SEE)**

# Thermal Status

- Work Completed:
  - Phase 1 Well field installed
  - New gas line and electric lines installed
  - Equipment pad poured
- Equipment installation – started mid-February 2015
- Operations start-up Spring 2015
- estimated operation of 150 days – into fall of 2015



- **Field Work Scheduled for Upcoming Period**
  - **Soils – Phase 1 Thermal (*current schedule; subject to change*)**
    - Continue installation of wellfield components
    - Collection of samples from onsite carbon vessels for waste characterization (March 16)
    - Delivery of liquid treatment train (March 17)
    - Gravel placement for base for rental tanks/ equipment outside of the treatment pad
    - Set electrical skid, duct heater, and scrubber pumps (March 20)
    - Crane operations for rental tanks (March 23)
    - Carbon vessel delivery (March 23 tentatively)
    - Delivery of rental boiler (March 30)
    - Noise barrier wall (end of March)
    - Delivery of rental generator (April 1)
    - Installation of fiber optic cables on electrical poles between MOM system and thermal equipment pad (TBD)
  - **MOM system – Groundwater treatment**
    - Extraction well/line flushing (Weston) – TBD pending weather
    - Installation of piping connections inside the treatment plant for the effluent from and influent to the thermal treatment system.
    - Support controls integration for the thermal system (late March/early April)
    - Sludge pickup in mid to late March.