SHIELDALLOY METALLURGICAL CORPORATION SUPERFUND SITE

RECORD OF DECISION AMENDMENT PROPOSED REMEDIAL ACTION PLAN FOR OPERABLE UNIT 1 (OU1)

PUBLIC MEETING

Wednesday, August 12, 2015

Why are we here tonight?

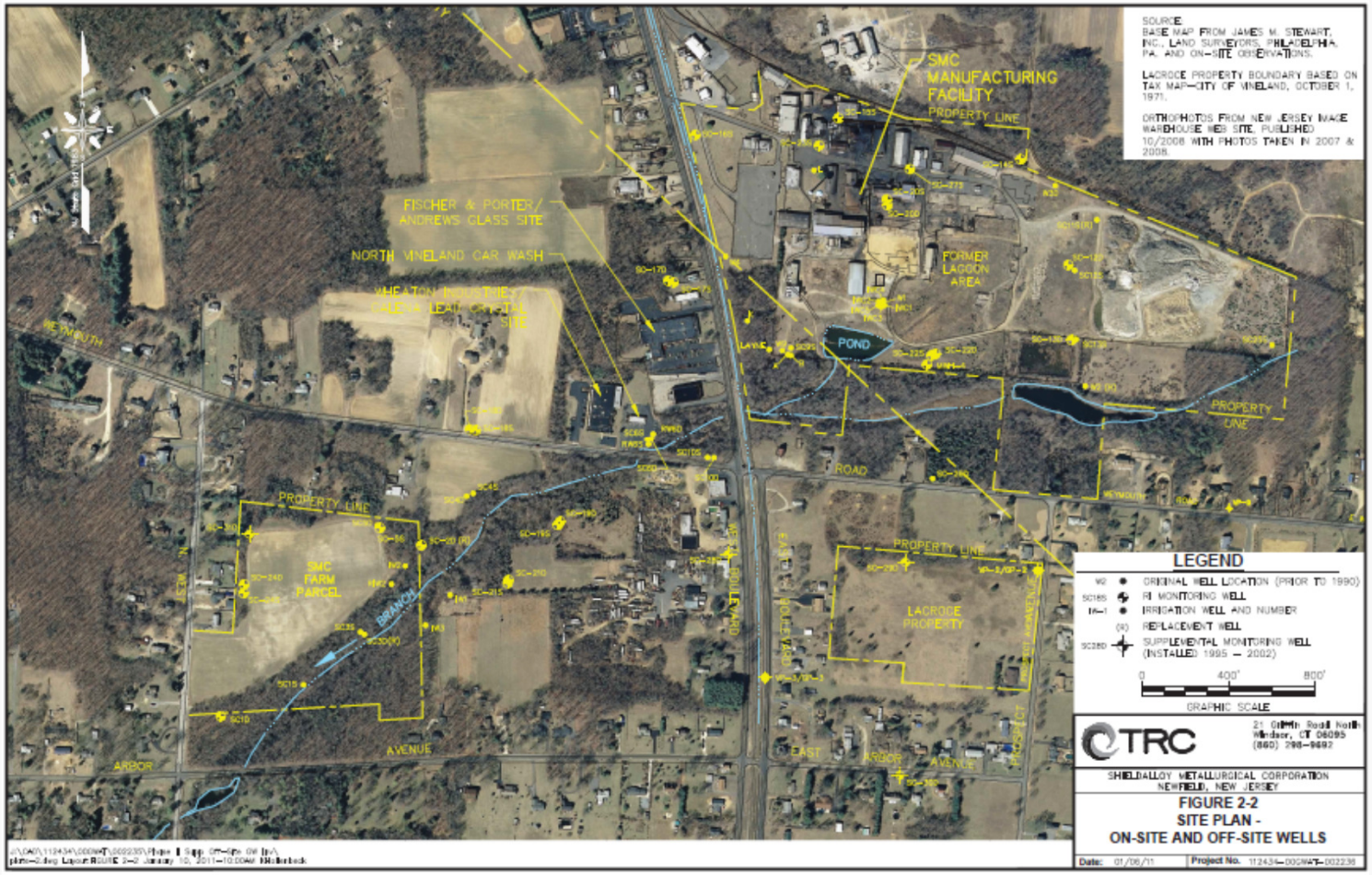
- Based on new information collected at the SMC site, EPA is proposing to amend the 1996 ROD
- Fundamental change:
  - From: extraction and treatment of contaminated groundwater
  - To: injection of treatment reagents to stimulate *in situ* chemical and biological degradation of contaminants in the groundwater aquifer

Site Background

- **SMC utilized Facility (67.7 acres) from 1955-2007 for specialty metals manufacturing**
  - 2007 to present administrative and rented warehouse
- **Farm Parcel (20 acres) purchased by SMC(to facilitate P&T)**
- **Former manufacturing wastewater treatment lagoons**
  - Unlined received water containing Cr, TCE and Perchlorate
  - Closed in 1995-1998, soil removal, post excavation sampling

Site History

- *1970-Chromium contamination detected in municipal and private wells by NJDEP*
- *1972-Site investigations identified Cr (primary) TCE (secondary) contaminants in groundwater*
- *1979-NJDEP directed SMC to pump-and-treat chromium-contaminated groundwater*
- *1984-Site added to EPA's National Priorities List*
- *1990's-various remedial investigation activities conducted by NJDEP*
- *1996-NJDEP issued a Record of Decision for OU1*
- *2010 – EPA took enforcement lead at Site*


SOURCE:
BASE MAP FROM JAMES M. STEWART, INC., LAND SURVEYORS, PHILADELPHIA, PA. AND ON-SITE OBSERVATIONS.
LACROCE PROPERTY BOUNDARY BASED ON TAX MAP-CITY OF VINELAND, OCTOBER 1, 1971.
ORTHOPHOTOS FROM NEW JERSEY MAGIC WAREHOUSE WEB SITE, PUBLISHED 10/2008 WITH PHOTOS TAKEN IN 2007 & 2008.
SMC MANUFACTURING FACILITY
PROPERTY LINE
FISCHER & PORTER/ ANDREWS GLASS SITE
NORTH VINELAND CAR WASH
WHEATON INDUSTRIES/ CALCIUM LEAD CRYSTAL SITE
FORMER LAGOON AREA
POND
PROPERTY LINE
ROAD
PROPERTY LINE
SMC FARM PARCEL
BRANCH
LACROCE PROPERTY
AVENUE
ARBOR
EAST
LEGEND
WI ORIGINAL WELL LOCATION (PRIOR TO 1990)
SC185 RI MONITORING WELL
IW-1 IRRIGATION WELL AND NUMBER
(R) REPLACEMENT WELL
SC280 SUPPLEMENTAL MONITORING WELL (INSTALLED 1995 – 2002)
0 400' 800'
GRAPHIC SCALE
TRC
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY
FIGURE 2-2
SITE PLAN -
ON-SITE AND OFF-SITE WELLS
Date: 01/06/11
Project No. 112434-000WAT-002236

Key Studies

- OU1 Optimization Study- (2010)
- Supplemental RI- (2010)
- In Situ Remediation Treatability Study- (2010-2014)
- Monitored Natural Attenuation (MNA)-(2012-2014)
- Focused Feasibility Study- (2013-2015)
- Proposed Plan-2015

Optimization Study

- Data collected monthly for over 20 years were reviewed
  - Five pumping wells
  - Three Locations (SMC facility, farm parcel and car wash)
- Determine ability of P&T system to meet remedial action objectives (RAOs) in a timely fashion
- Data review focused on Cr and TCE

Optimization Study Results/Recommendations

- Pump-and-treat was no longer effective at reducing contaminant concentrations within a reasonable timeframe and had reached asymptotic conditions
- Pump-and-treat system was not cost effective and energy intensive
- Recommended that treatability studies be performed to evaluate *in situ* remediation

OU1 Supplemental Investigation

- Purpose of the 2010 Supplemental RI is to:
  - Improve delineation of the nature and extent of groundwater contamination(VOCs, namely TCE)

OU1 Supplemental Remedial Investigation

- RI conducted at the site during phases in 2002, 2006, 2009 and 2010
- Installing and sampling of 25 temporary wells
- Installing two new permanent wells and sampling of nine permanent wells

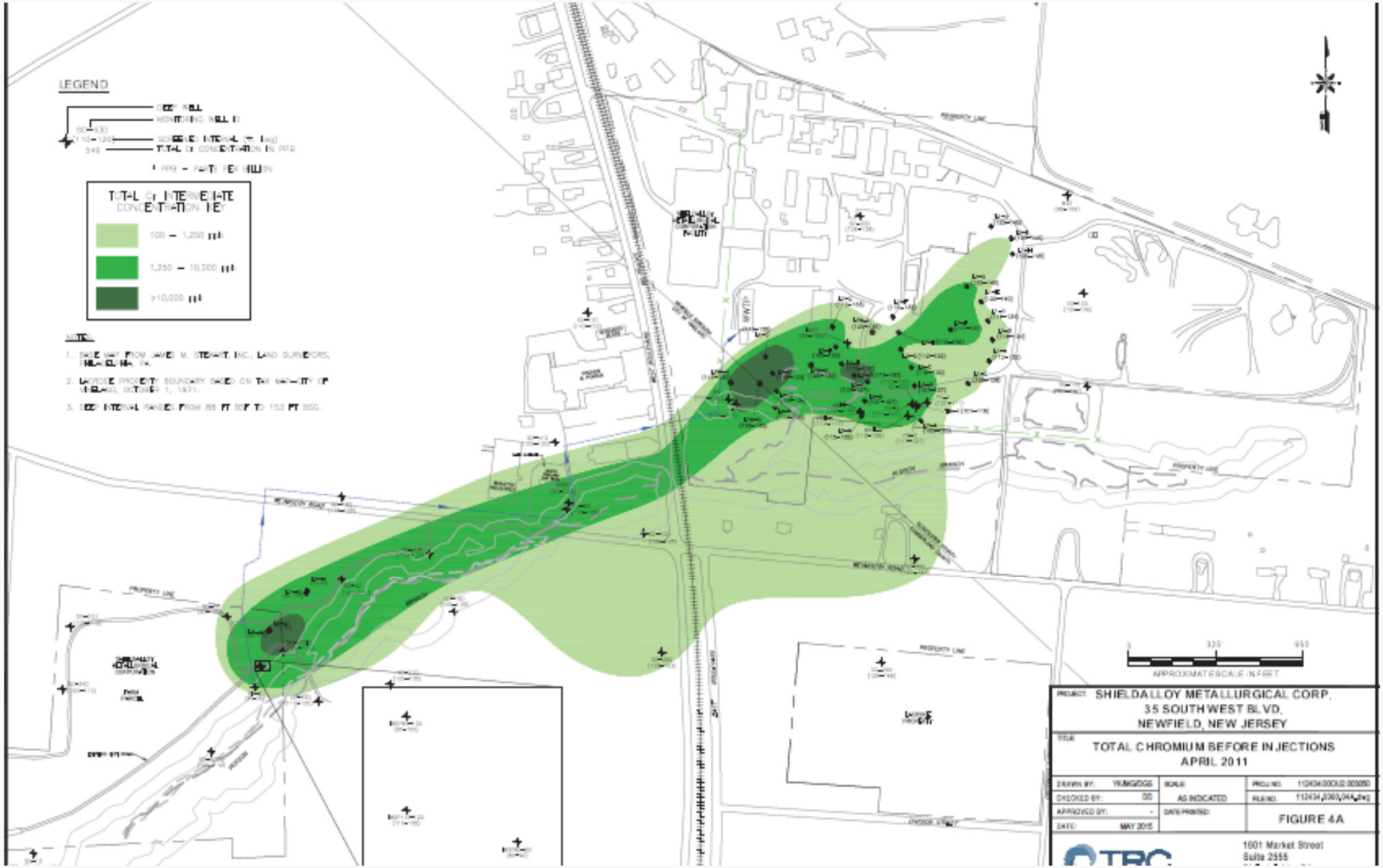
OU1 Supplemental RI Results

- Facility

➢ Chromium plume is 2,600 feet long extending from the facility to the farm parcel.

➢ Chromium plume is 400 feet wide near the facility and narrows to 100 feet wide by 110 feet deep near the farm parcel

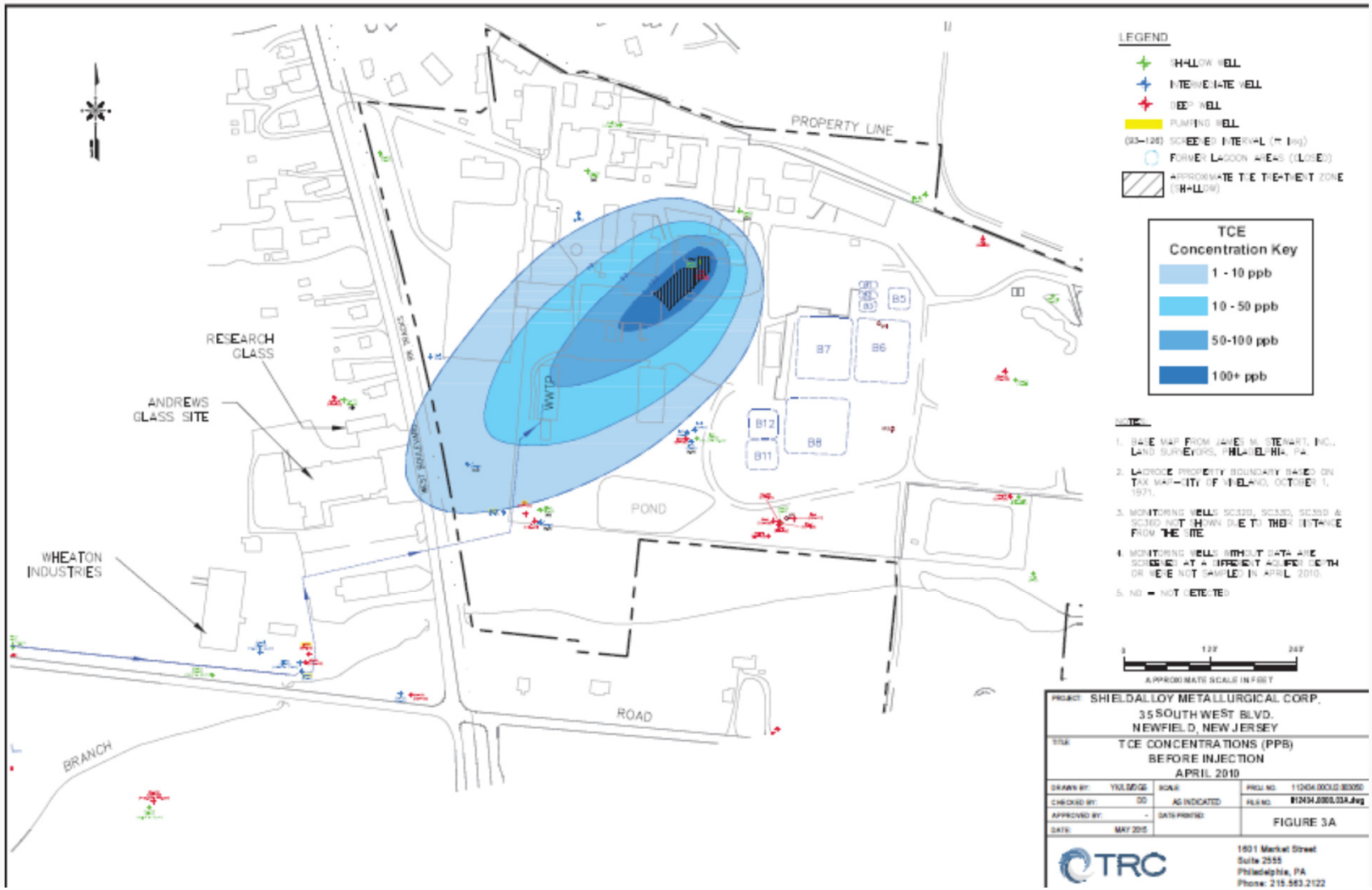
Total Cr Groundwater Plume -2010



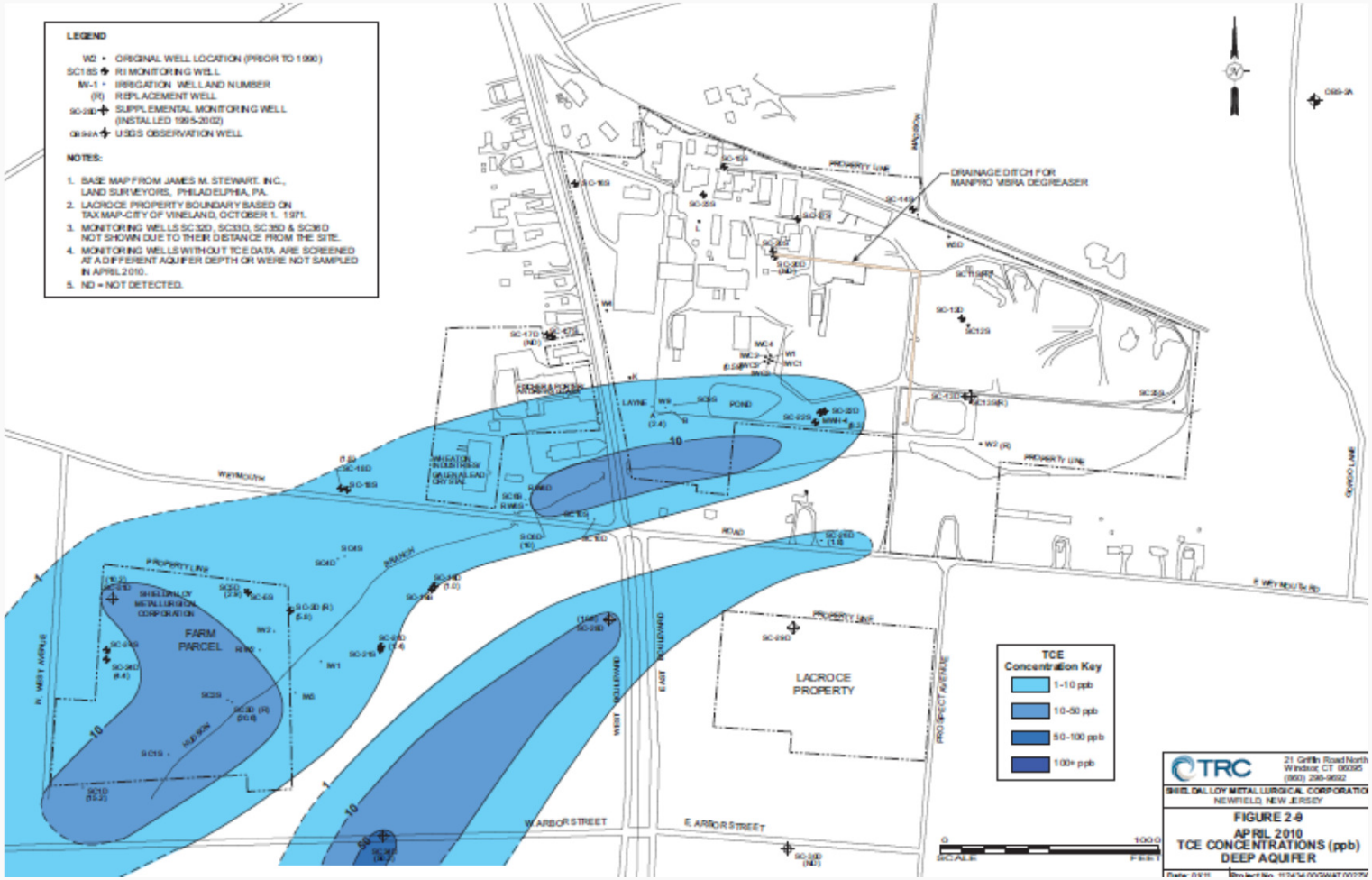
OU1 Supplemental RI Result-TCE

- Facility
  - TCE plume is 1,000 feet long by 500 feet wide in the shallow zone (30-70 feet)
  - TCE plume extends approx. 10,000 feet from the facility to beyond the farm parcel and is approx. 5,000 feet wide in the deep zone (70-130 feet)
  - Non-SMC sources exist near the site

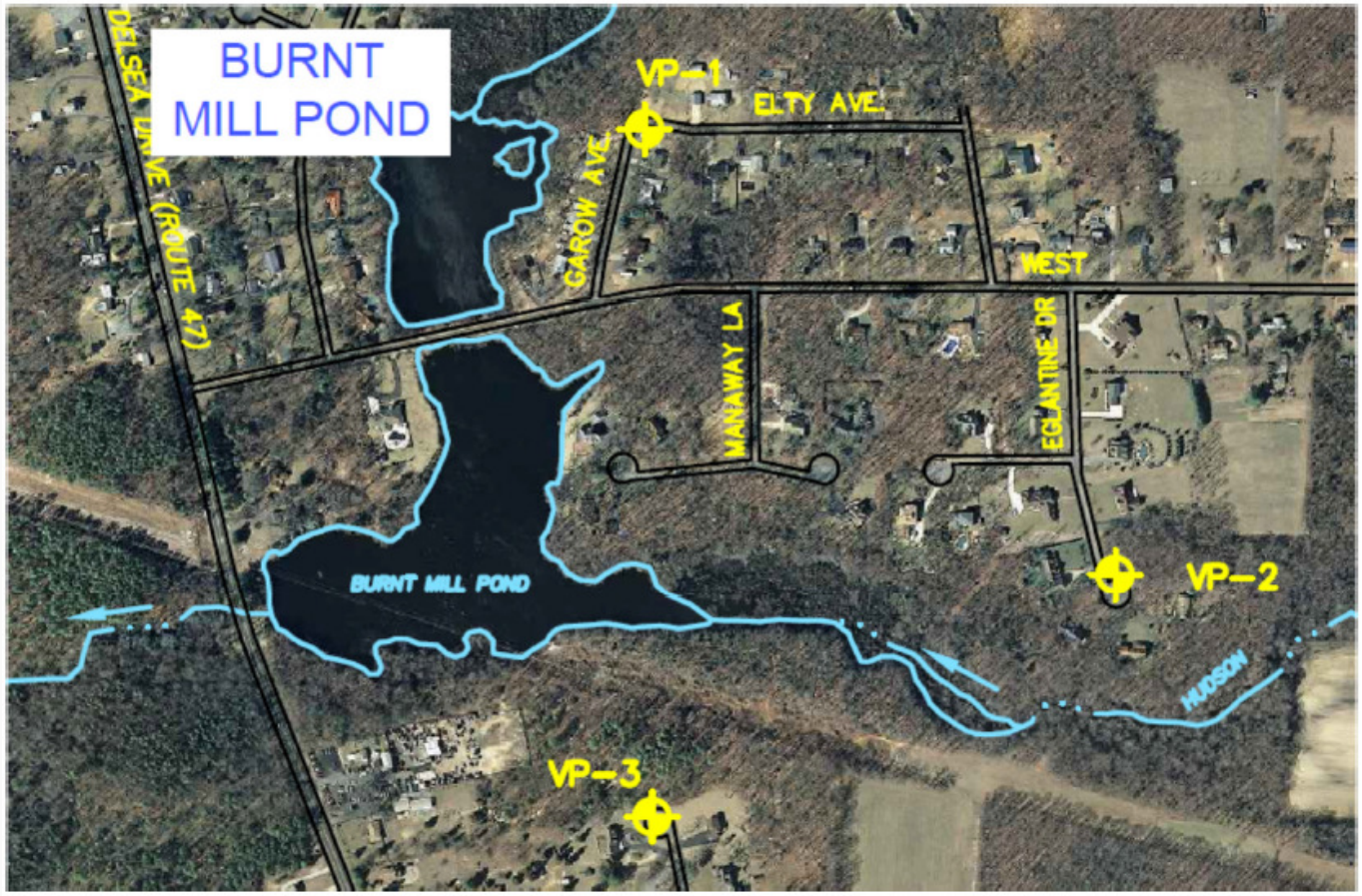
OU1 RI Results-TCE Shallow-2010



OU1 RI Results-TCE Deep Zone-2010



Picture of Wells Near Burnt Mill Pond



Burnt Mill Pond Evaluation

- Three wells (VP-1,2,3) near the Pond showed VOCs (PCE)
- PCE also detected in other wells south and west of the SMC site
- TCE was found in two of the three wells at depth deeper than Burnt Mill Pond
- Significant layer of non-VOC impacted shallow water lies below Burnt Mill Pond
- PCE/TCE from the deep zone do not flow into Burnt Mill Pond

In situ Treatability Investigation

- Goal:
  - Prove that in situ technology can reduce contaminant mass
  - Use the more advanced in situ (in the ground) injection technology to reach a point where natural processes can serve as a final polishing step

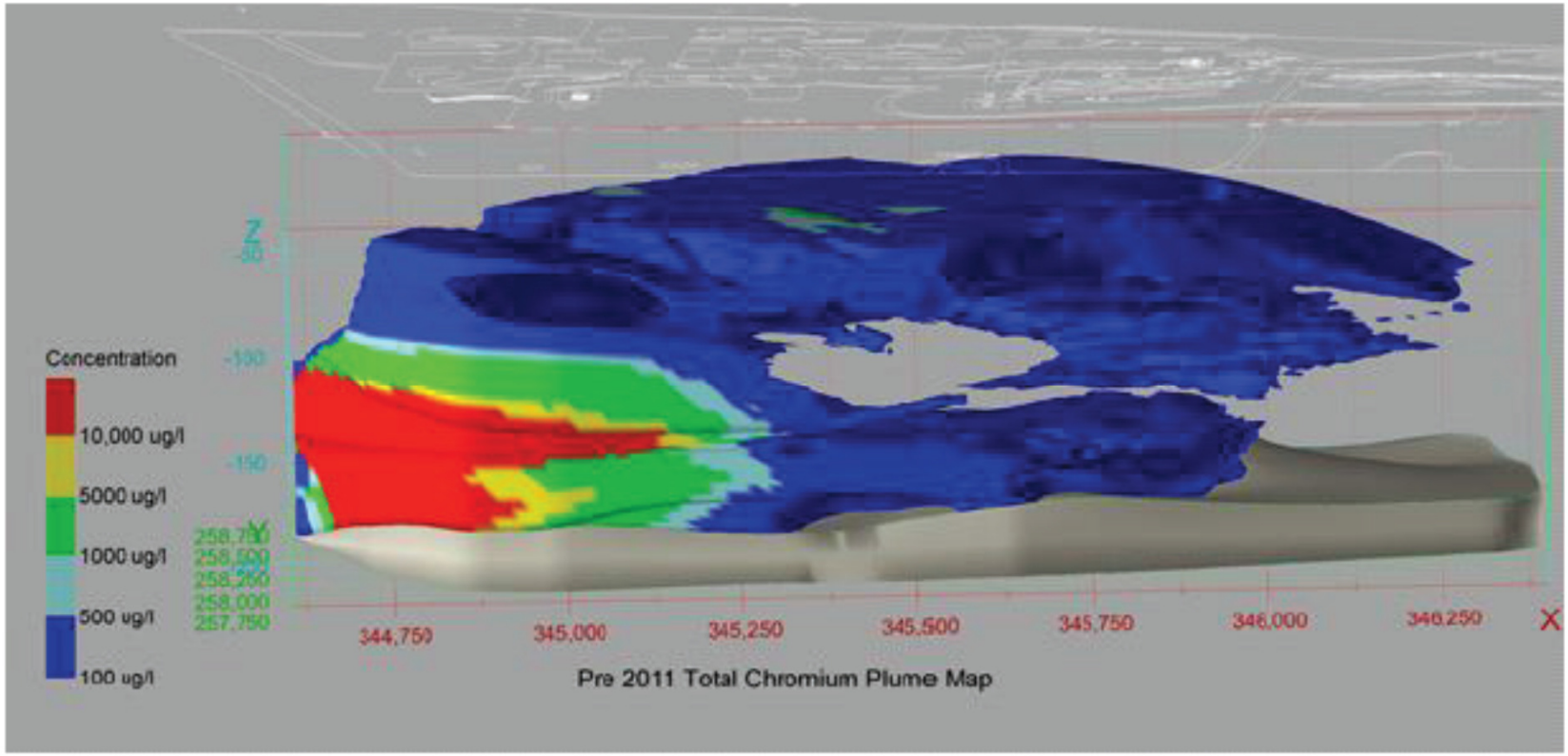
In situ Treatability Investigation

- 2011-2014-Extensive In Situ Technology Work
  - Calcium Polysulfide (CPS) for Chromium
  - Emulsified Vegetable Oil (EVO) for TCE
  - Collection of MNA parameters

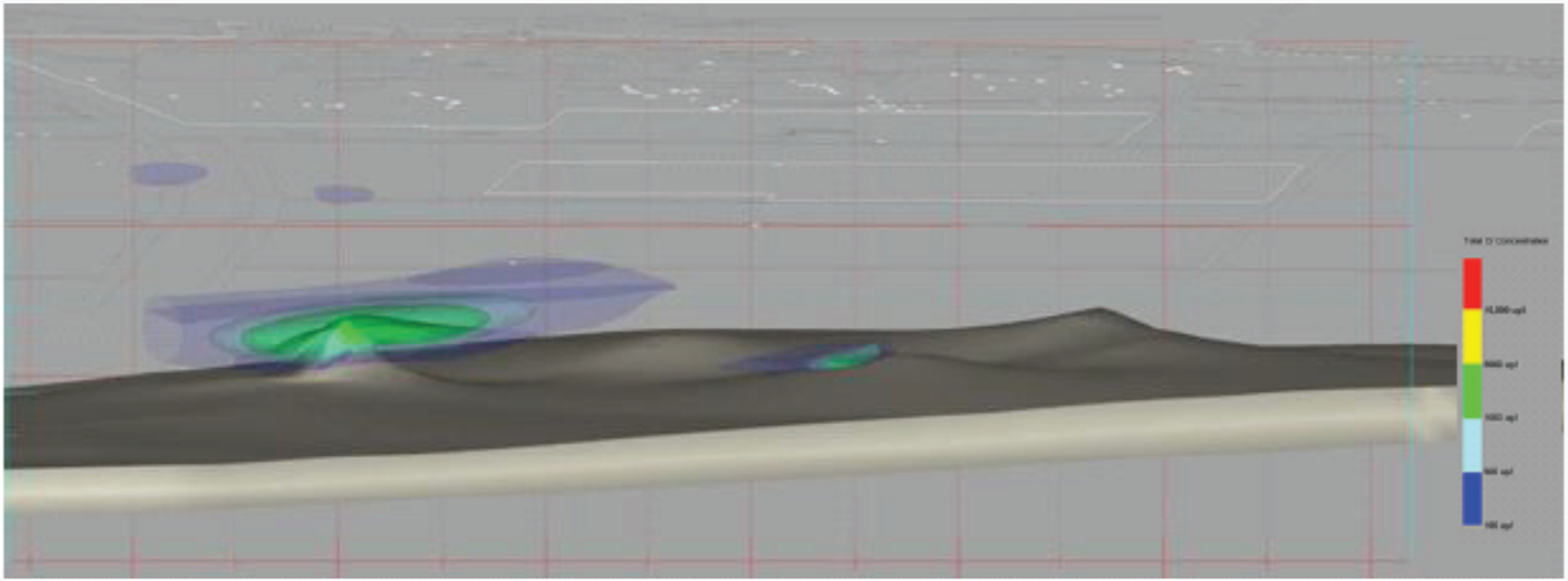
In situ Treatability Results-Facility

- Total Chromium
  - Average concentration for total chromium declined from 4,490 ug/l to 140 ug/l
- Hexavalent Cr(VI)
  - Average concentration for Cr(VI) declined from 2,130 ug/l to 13 ug/l

Total Chromium Plume Pre-Injection –Facility 2011



Total Chromium Plume Post-Injection –Facility 2012



In Situ Treatability Results

- TCE Facility –Source area shallow zone (30-70 feet)
  - Average concentration declined from 207 ug/L in 2010 to non-detect (i.e. essentially zero, and below regulatory cleanup numbers) in 2012 and 2013

Monitored Natural Attenuation Investigation

- Natural attenuation relies on natural processes to decrease or ”attenuate” concentrations of contaminants
- Monitoring to make sure natural attenuation is working
- Right conditions must exist underground to clean sites
- Investigation determined that MNA is viable for the Site

Risk Assessment

- Human health
  - Site related contaminant including chromium (VI), beryllium, boron, vanadium and chlorinated VOCs (TCE) have been found in groundwater above Federal and State standards
  - Direct exposure to contaminated groundwater poses an unacceptable human health exposure risk to current and future users

- Ecological
  - No exposure pathways were identified for ecological receptors to come in contact with groundwater

OU1 Remedial Action Objectives -RAOs

- *Prevent exposure, due to groundwater ingestion, to groundwater contaminants attributable to the SMC facility which have been detected at levels exceeding guidance values.*
- *Prevent migration of groundwater contamination; and*
- *Remediate the groundwater contamination attributable to the SMC facility to achieve guidance values.*

OU1 Preliminary Remediation Goals

- *Total Chromium – 70 ug/L*
- *TCE -1 ug/L*

Proposed Plan

- Remedial Alternatives
  - Alternative #1 – *No Further Action ($0)*
  - *Alternative #2 – Pump-and-Treat (1996 ROD) ICs, Long-Term Monitoring and Five-year Reviews ($27,050,000)*
  - *Alternative #3 – In Situ Remediation, MNA, ICs, Long-Term Monitoring and Five-year Reviews ($9,125,000)*

Common Element

- Institutional Controls (ICs)
  - Classified Exception Area (CEA)/Well Restriction Area (WRA)
- *Long-Term Monitoring*
- *Five-year Reviews*

Alternative 2-Pump-and-Treat (1996 ROD)

- Five extraction wells to capture contaminated groundwater
- Air stripping to remove VOCs (TCE) from the recovered groundwater
- Electrochemical precipitation treatment (modified to ion exchange) to remove chromium from the recovered water
- Discharge of treated water to surface water of the Hudson Branch
- Monitoring to evaluate the effectiveness of the pump-and-treat system

Alternative 3-In Situ Remediation

Much of this alternative was implemented via the in situ pilot study that was conducted from 2010 to today.

- Treatment reagents were injected into the groundwater to target the area of the aquifer with the highest concentrations of Cr and TCE.
- Chromium and TCE concentrations were significantly reduced
- Active remediation is ongoing
- *MNA- chromium and TCE in the groundwater will gradual diminish over time as a result of ongoing treatment and natural and enhanced biological and geochemical processes.*

Nine Criteria for Analysis of Alternatives

1. *Overall Protection of Human Health and the Environment:* *Will it protect you and the plant and animal life on or near the site?*

2. *Compliance with Applicable or Relevant and Appropriate Requirements (ARARs):* *Does the alternative meet all federal and state environmental status, regulations and requirements?*

Balancing Criteria

3. *Long-Term Effectiveness and Permanence:* *Will the effects of the cleanup plan last or could contaminants cause future risks?*

4. *Reduction in Toxicity, Mobility or Volume through Treatment* *Using treatment, does the alternative reduce the harmful effects, spread of and the amount of contamination?*

5. *Short Term Effectiveness:* *How soon will site risk be adequately reduced? Could the cleanup cause short-term hazards to workers, residents or the environment?*

6. *Implementability:* *Is the alternative technically feasibility?*

7. *Cost:* *What is the total cost? EPA must find a plan that gives necessary protection for a reasonable cost*

Modifying Criteria

8. *State Acceptance: Does the states environmental agencies agree with EPA's proposal?*

9. *Community Acceptance: What objections, suggestions or modifications do the public offer during the comment period?*

OU1 Preferred Alternative
Alternative 3

- Injecting CPS into the high concentration target portions of the aquifer to reduce Chromium concentrations.
- Injecting EVO into the high concentration target site portions of the aquifer to reduce VOCs concentrations (TCE).
- Implementing long-term monitoring of groundwater to monitor the degradation of TCE and chromium plumes and to monitor MNA parameters and evaluate the ongoing effectiveness of the treatments.
  - Secondary contaminants beryllium, boron and vanadium present a noncancer health hazard that will be addressed by MNA and long-term monitoring.

OU1 Preferred Alternative (cont)
Alternative 3

- Establishing institutional controls in the form of CEA/WRA to restrict the groundwater use and prohibit activities that could result in human exposure to chromium and VOCs in groundwater.

- Reviewing site conditions at least once every five years, as required by CERCLA, until the RAOs and PRGs are met.

Basis for the Preferred Remedy

- The remedial alternative evaluated and selected provides overall protectiveness of both human health and the environment and attains federal and State ARARs by:

➢ The most advanced remedial technology has been effectively applied to dramatically decrease concentrations and provide a setting where further contaminant degradation and natural processes are most effective.

➢ Rapid reduction of the of plume volume through in situ treatment.

➢ Optimization of current conditions through enhancement of natural attenuation capacity by increasing availability of reducing agent , iron

- Use institutional controls to prevent unacceptable exposure

Next Steps

- *EPA signs Record of Decision Amendment*
- *EPA negotiates with potentially responsible parties*
- *Development of Remedial Design and Remedial Action*
- *Implementation of the Remedy*

Public Comment Period

- July 30, 2015 through August 28, 2015
- Address written comments to:

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  Fax: (212) 637-4273
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- Verbal and written comments will be accepted during this public meeting