Norwalk Tank Farm Update

Presented to the Norwalk Tank Farm Restoration Advisory Board

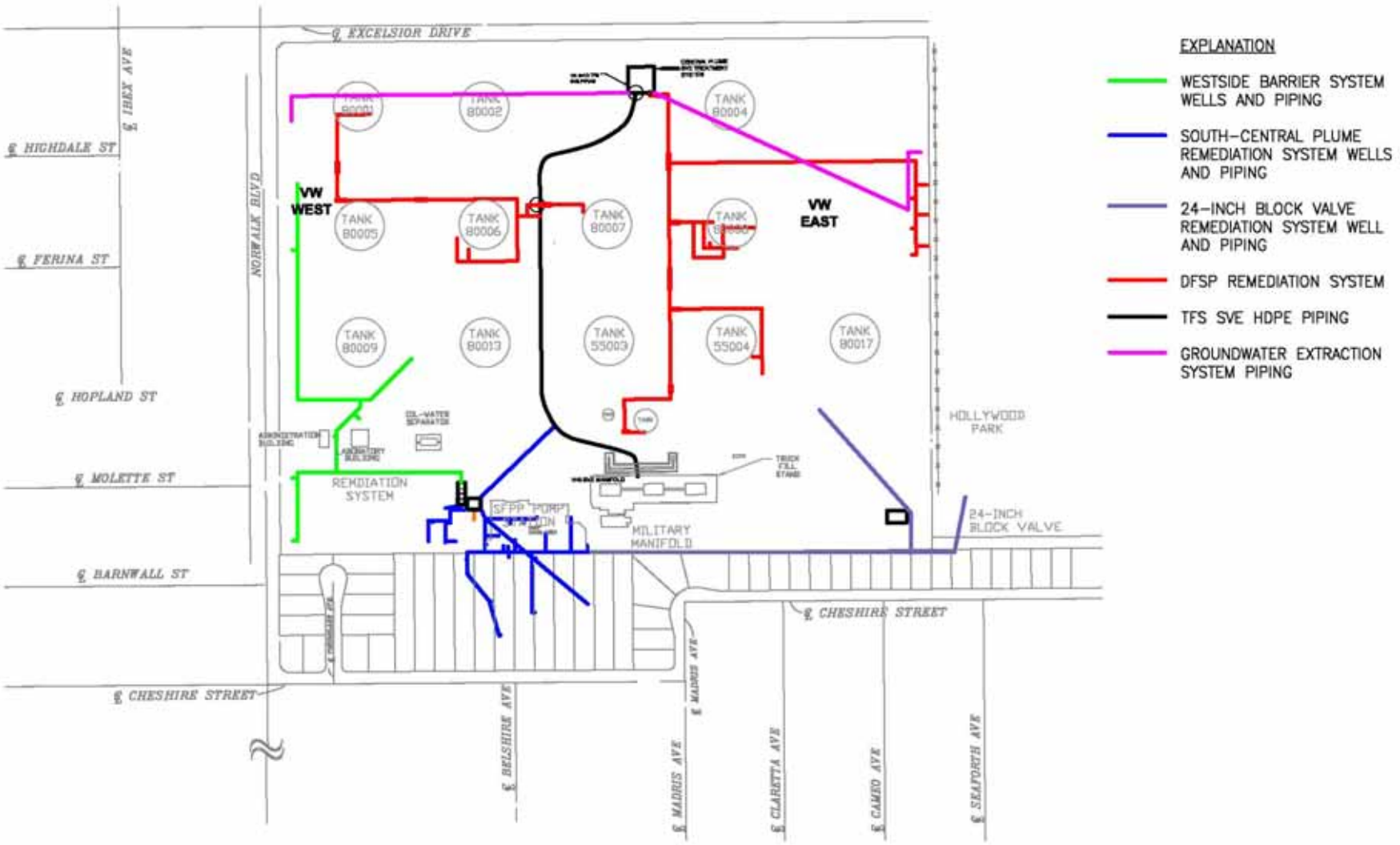
January 28, 2010

Presentation Overview

Topics to be Covered

- Remediation Operations Update
- Supplemental Vertical Delineation in Off-Site 24-Inch Block Valve Area (Off-Site Assessment Update)
- Joint Capture Zone Analysis Update

Map of Remediation Systems



Soil Vapor Extraction System

- 24 on-site and 6 off-site vapor extraction wells in the South-Central Plume area.

- 2 vapor extraction wells in the Southeastern 24-Inch Block Valve area.

Soil Vapor Extraction System Operations Summary

- Approximately 78 gallons equivalent of fuel removed from soil and destroyed by catalytic oxidation during fourth quarter 2009.

- Approximately 454,637 gallons equivalent of fuel removed from soil and destroyed by catalytic and thermal oxidation since September 1995.

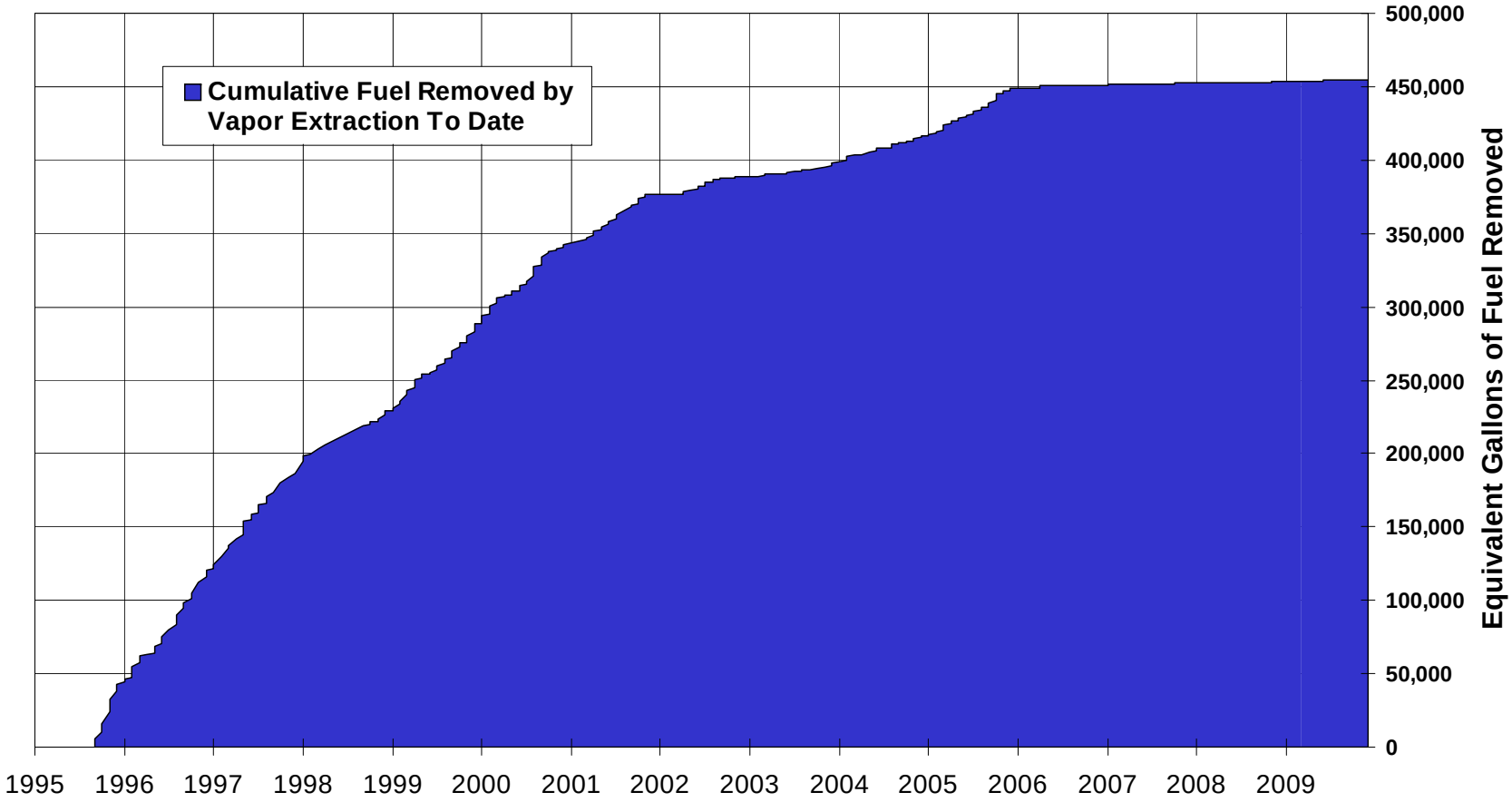
- Approximately 68,721 hours of operation since September 1995.

Soil Vapor Extraction System Operations Summary

- The SVE system operated continuously during fourth quarter 2009 with the following exceptions:
  - SVE system was shut down for approximately 12 days to facilitate groundwater monitoring.
  - SVE system was shut down for approximately 12 days total due to a burnt out motor starter. The motor starter was replaced and the SVE system was restarted on November 19, 2009.
  - SVE system was shut down for approximately 1 day due to a blown fuse. The fuse was replaced and the SVE system was restarted on December 10, 2009.
  - SVE system was shut down on 2 occasions due to undetermined causes.
- Percent operation for fourth quarter 2009: 81%
- Percent operation for fourth quarter 2009 excluding planned shutdown for groundwater monitoring: 89%

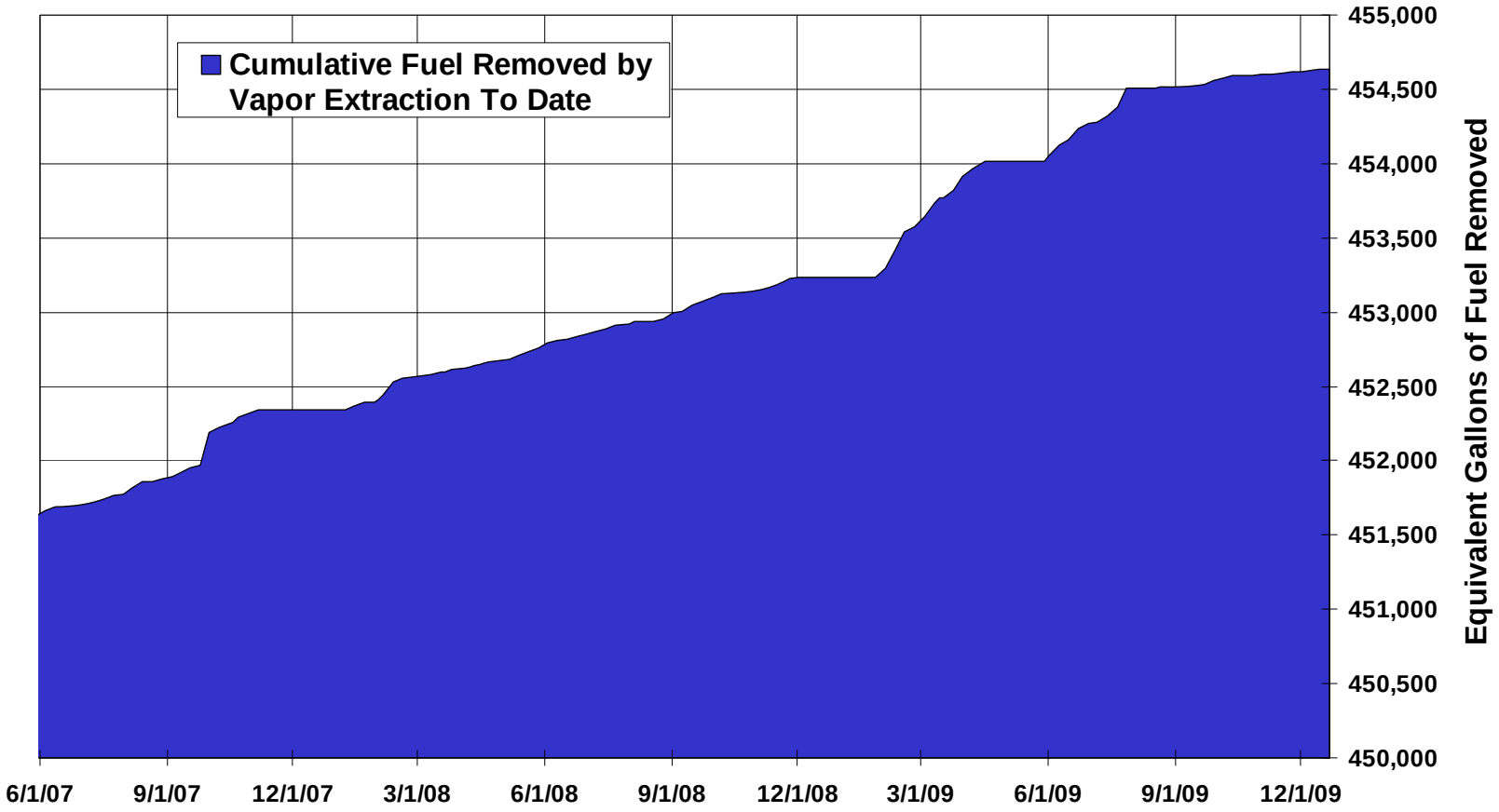
Soil Vapor Extraction System Operations Summary

Cumulative Fuel Removed by Vapor Extraction To Date



Soil Vapor Extraction System Operations Summary

Cumulative Fuel Removed by Vapor Extraction Since June 2007



Groundwater/Product Extraction System

- 18 total fluids (product and groundwater) extraction wells and 2 groundwater extraction wells in the South-Central Plume area
- 2 total fluids (product and groundwater) extraction wells in the Southeastern 24-Inch Block Valve area
- Operation of the West Side Barrier system was discontinued in August 2008.

Groundwater/Product Extraction System Operations Summary

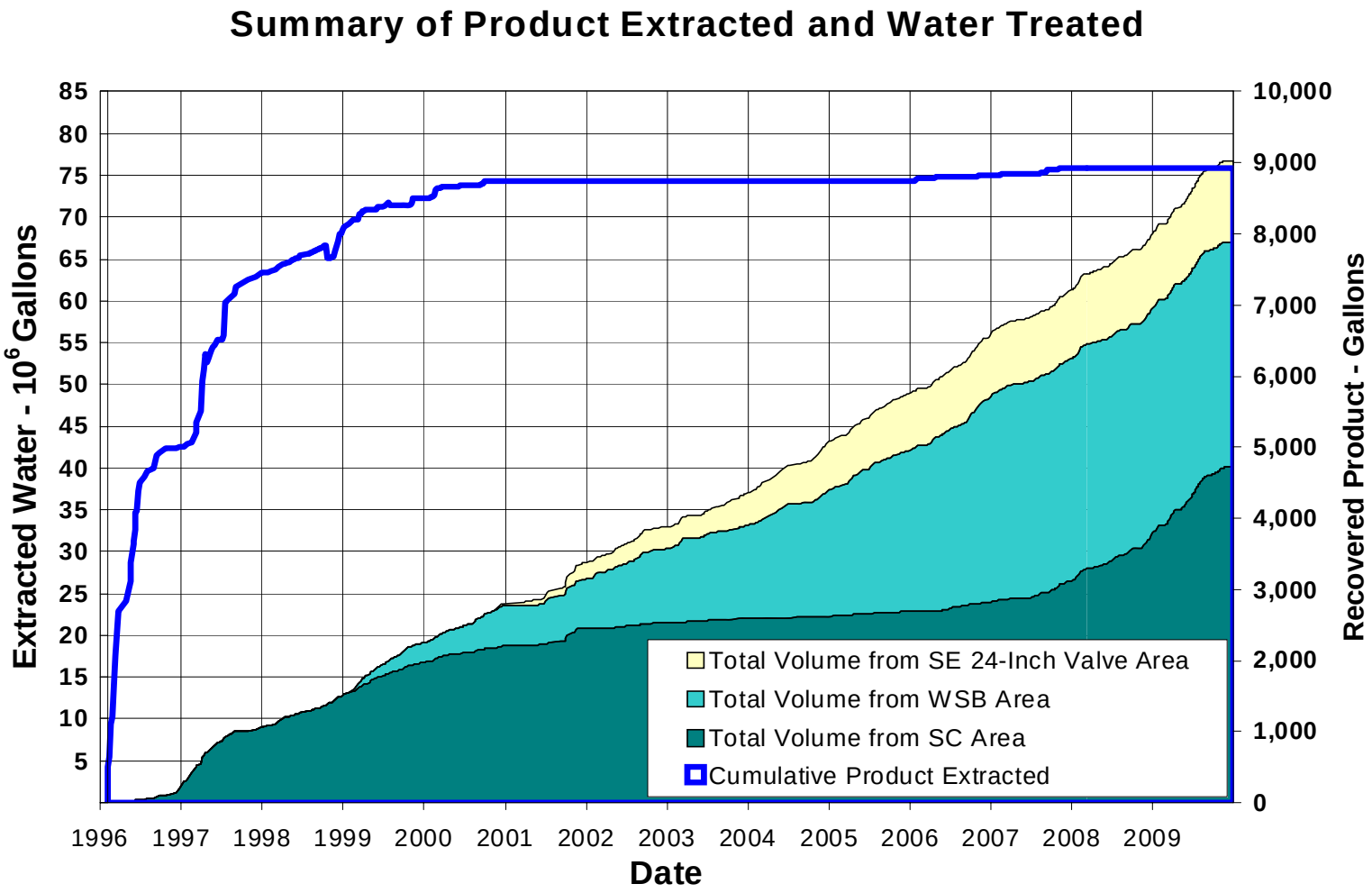
- Total groundwater extracted during fourth quarter 2009:
  - South-Central Plume area: 865,660 gallons
  - Southeastern 24-Inch Valve area: 4,494 gallons
  - West Side Barrier area: 0 gallons
- Total groundwater extracted since September 1995:
  - South-Central Plume area: 40.1 million gallons
  - Southeastern 24-Inch Valve area: 9.68 million gallons
  - West Side Barrier area: 26.9 million gallons
  - Total groundwater extracted: 76.7 million gallons
  - 8,917 gallons free product removed*

* The total volume of free product removed is estimated based on measurements of free product accumulation in the product holding tank and measurements of free product removed manually from individual wells. This estimate does not account for free product that is removed via total fluids extraction and becomes emulsified in the relatively larger volume of groundwater extracted.

Groundwater/Product Extraction System Operations Summary

- The groundwater/product extraction system operated continuously during fourth quarter 2009 with the following exceptions:
  - The system was shut down for approximately 3 days to facilitate quarterly groundwater/product level gauging of the remediation wells. The system was restarted on November 9, 2009.
  - The system was shut down on November 30, 2009 to evaluate selenium concentrations in the groundwater extraction wells. The system remained shutdown for the rest of the quarter pending further evaluation of selenium concentrations in groundwater.
  - The system was shut down for approximately 5 days total due to undetermined causes.
- Percent operation for fourth quarter 2009: 61%
- Percent operation for fourth quarter 2009 excluding planned shutdowns for gauging and selenium evaluation: 91%

Groundwater/Product Extraction System Operations Summary



Selenium Evaluation

- Selenium was detected above the average monthly discharge limit (AMEL) of 4.1 micrograms per liter (µg/L) in a sample of treated groundwater collected on November 3, 2009.
- The RWQCB was notified within 24 hours of receiving the result.
- Additional samples were collected in accordance with the NPDES permit and conversations with the RWQCB.
- The average of the selenium results for samples collected in November 2009 was 5.2 µg/L and the system was shut down on November 30, 2009 while the distribution of selenium concentrations was investigated.

Selenium Evaluation

- Groundwater samples from 30 individual extraction wells (including the WSB wells) were collected for selenium analysis in December 2009.
- Results indicated that selenium concentrations ranged from non-detect (reporting limit of 1.00) to 12.30 µg/L.
- Based on the results of the December 2009 sampling, nine wells with selenium concentrations below the AMEL will be operated beginning in early February 2010 while selenium evaluation continues.
- Selenium concentrations will be monitored weekly, pursuant to the NPDES permit, and other pumps will be restarted as appropriate.

Selenium Evaluation

- Selenium is a naturally occurring constituent in groundwater.
- The maximum contaminant level (MCL) for selenium in drinking water is 50 µg/L; treatment technologies for reducing selenium concentrations down to our 4.1 µg/L discharge limit are limited.
- Management of selenium in extracted groundwater discharge is a complex problem that many sites are trying to address.
- KMEP is continuing to evaluate options to manage selenium at the site.

TFE/GWE System Maintenance

- KMEP has reviewed and is currently implementing several maintenance and upgrade activities to improve the operation of the TFE/GWE system and to facilitate future monitoring of the system.

TFE/GWE System Maintenance

- These activities include:
  - cleaning and repairing TFE pumps,
  - rehabilitating extraction wells,
  - replacing components of the groundwater manifold, and
  - replacing the conveyance piping in certain areas.
- System restart is anticipated within two weeks.
- These maintenance activities increased the TFE/GWE system downtime from one month to two months, but are anticipated to decrease future downtime and increase performance.

Updated Maintenance Schedule

Maintenance Activity	Previous Schedule	Updated Schedule
Flow totalizer maintenance	Semiannually	Quarterly*
Check pump operation	Semiannually	Monthly*
Pump maintenance	As needed	Semiannually*

* Or more frequently as needed. Pump operation will be checked one week after the pump has been restarted.

Planned Remediation Activities

- Continue SVE in the South-Central and Southeastern areas.
- Restart TFE and GWE in the South-Central and Southeastern areas.
- Implement updated maintenance schedule.
- Continue to monitor concentrations of dissolved 1,2-DCA and MTBE in western area.
- Continue data collection for monitoring and evaluation of remediation systems.

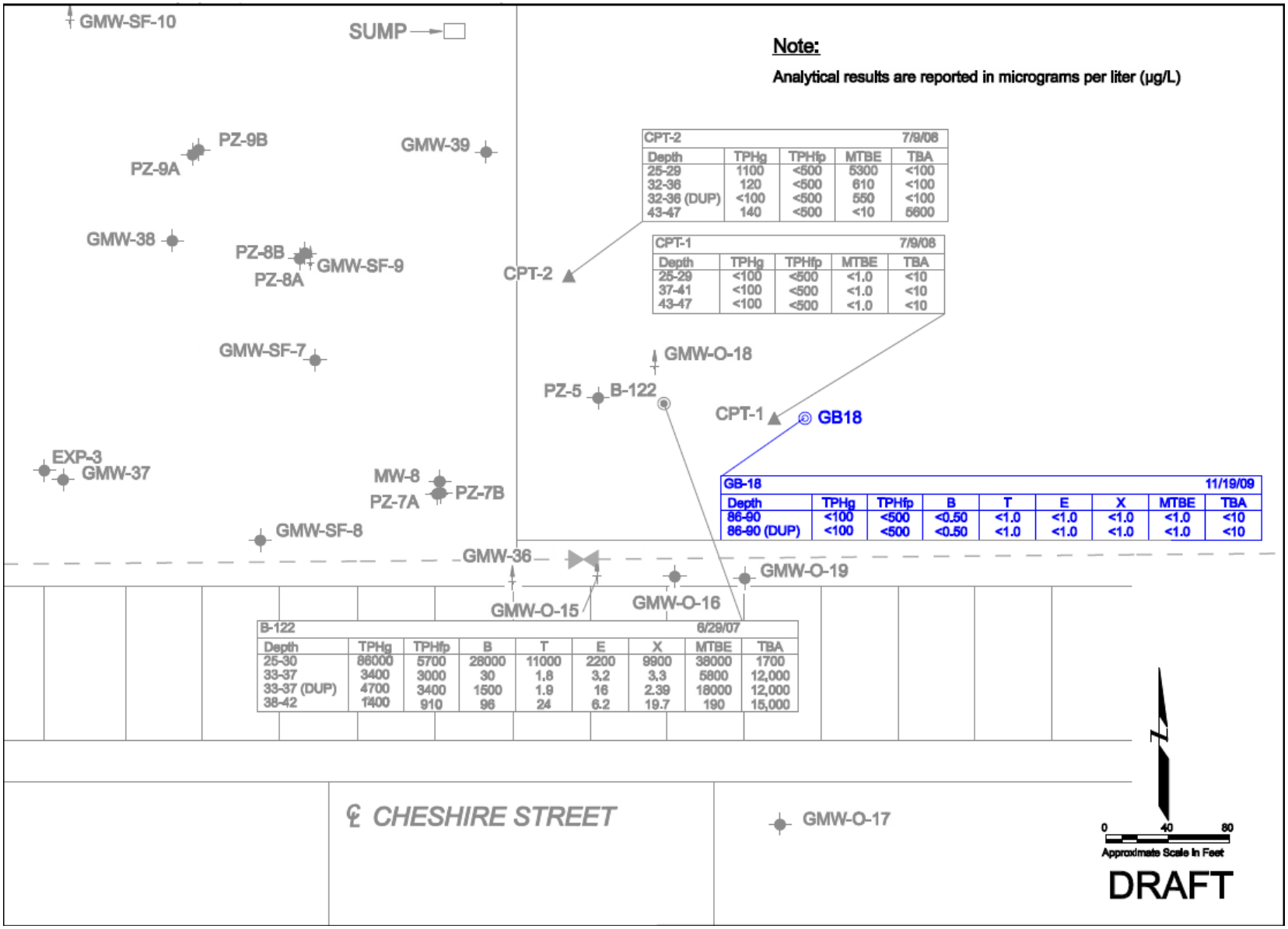
Planned Remediation Activities

- Evaluate selenium management options.
- Evaluate groundwater capture zones and adjust pumping configurations as appropriate.
- Continue adjustments to remediation wells to optimize remediation.

Off-Site Assessment Update

- A supplemental assessment in the vicinity of the off-site 24-inch block valve was conducted to:
  - verify the composition of sediments comprising the Bellflower aquitard in the off-site 24-inch block valve area; and
  - assess groundwater quality in the Exposition aquifer in the hydraulically downgradient vicinity of previous sample location CPT-2.
- Assessment activities included lithologic assessment using sonic drilling methods and soil and groundwater sampling at a location (GB-18) approximately 170 feet southeast of previous sampling location CPT-2 and approximately 20 feet east of previous sampling location CPT-1.

Additional Assessment Update



CPT-2 — 7/9/08

Depth	TPHg	TPHfp	MTBE	TBA
25-29	1100	<500	5300	<100
32-36	120	<500	610	<100
32-36 (DUP)	<100	<500	550	<100
43-47	140	<500	<10	5600

CPT-1 — 7/9/08

Depth	TPHg	TPHfp	MTBE	TBA
25-29	<100	<500	<1.0	<10
37-41	<100	<500	<1.0	<10
43-47	<100	<500	<1.0	<10

GB-18 — 11/19/09

Depth	TPHg	TPHfp	B	T	E	X	MTBE	TBA
86-90	<100	<500	<0.50	<1.0	<1.0	<1.0	<1.0	<10
86-90 (DUP)	<100	<500	<0.50	<1.0	<1.0	<1.0	<1.0	<10

B-122 — 6/29/07

Depth	TPHg	TPHfp	B	T	E	X	MTBE	TBA
25-30	86000	5700	28000	11000	2200	9900	38000	1700
33-37	3400	3000	30	1.8	3.2	3.3	5800	12,000
33-37 (DUP)	4700	3400	1500	1.9	16	2.39	18000	12,000
38-42	1400	910	96	24	6.2	19.7	190	15,000

Off-Site Assessment Update

- Continuous core soil samples were logged by a professional geologist and samples of the soil were submitted for laboratory analysis of physical and hydraulic properties.
- A discrete-depth groundwater sample was collected from the upper part of the Exposition aquifer and analyzed for TPHg, TPHfp, BTEX, and fuel oxygenates.

Additional Assessment Update

Additional Assessment Update

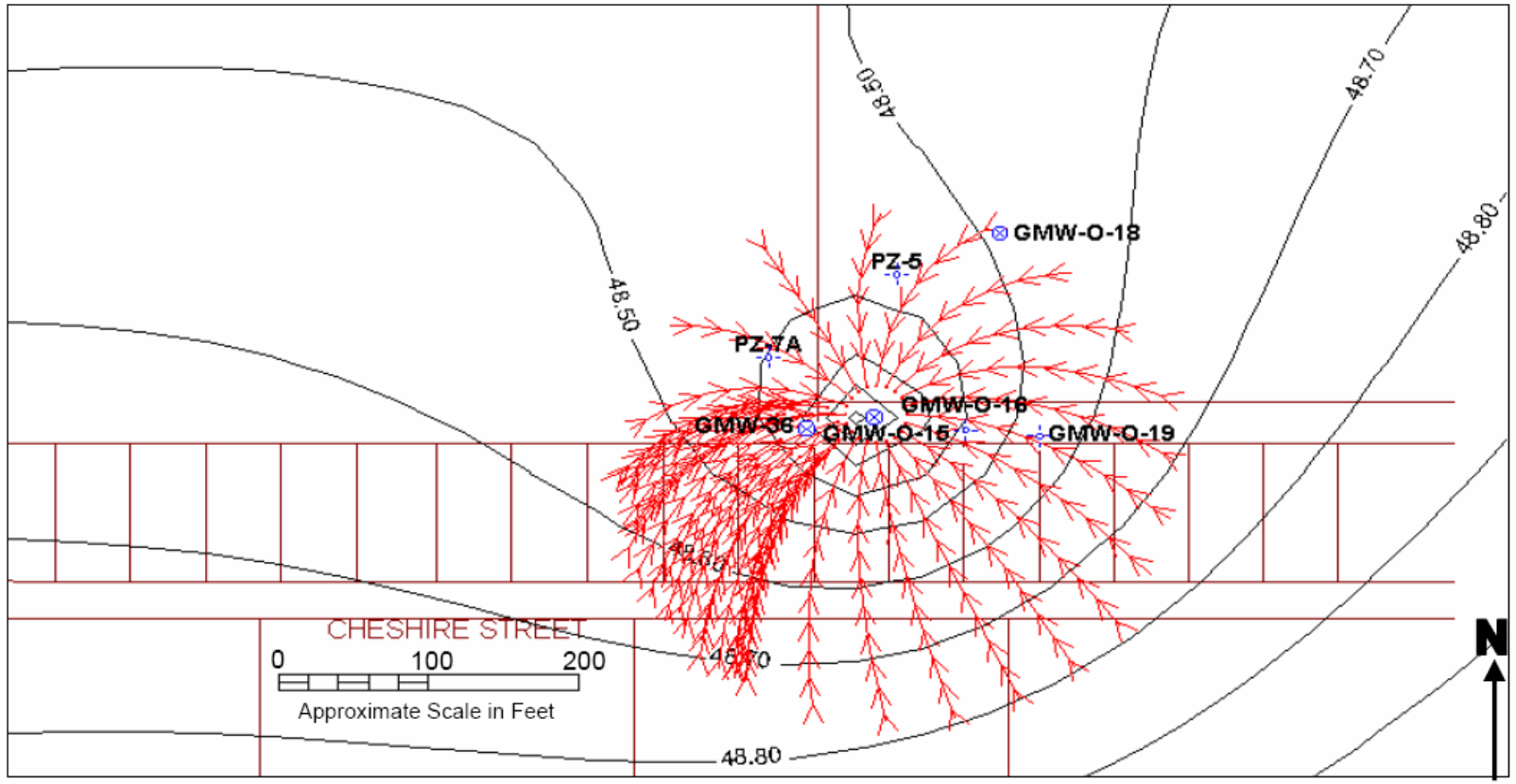
Additional Assessment Update

- Lithologic assessment confirmed the depth and presence of the interpreted Bellflower aquitard from approximately 47 to 81 feet below ground surface.
- Physical and hydraulic properties of the sediment indicate the aquitard is composed primarily of silts and clays and impedes downward vertical flow of groundwater.
- Analytical results for the discrete-depth groundwater sample collected from the Exposition aquifer show no groundwater impact to the Exposition aquifer.

Joint Capture Zone Analysis Update

- KMEP and DESC are performing capture zone analyses for groundwater extraction at various parts of the site.
  - KMEP is reviewing the pumping configuration and modeled hydraulic capture of remedial extraction in the south-central and southeastern areas of the site.
  - Capture zone analyses will be performed using WinFlow, a 2-dimensional analytical model.
- Preliminary simulations performed for extraction wells in the southeastern area indicate a predicted hydraulic capture extending to GMW-O-18 under a pumping scenario of 3 gallons per minute (gpm) at GMW-O-15 and 2 gpm at GMW-36.

Joint Capture Zone Analysis Update



WinFlow transient simulation.

Pumping Scenario 2:
GMW-O-15 at 3 gallons per minute
GMW-36 at 2 gallons per minute

ESTIMATED CAPTURE SCENARIO 2, ONE YEAR OF PUMPING, SOUTHEASTERN AREA
SFPP NORWALK
Norwalk, California

By: ker	Date: 12/10/09	Project No.: 1603
AMEC Geomatrix		Figure 5

Joint Capture Zone Analysis Update

- Individual well flow rates from GMW-36 and GMW-O-15 will be measured and the pumps will be adjusted until the recommended flow rates are observed.
- Simulated results will be checked by measuring and contouring drawdown in wells and piezometers in the field after at least six months of pumping and comparing the measured drawdown to the drawdown predicted in the model.