

# Norwalk Tank Farm Update

Presented to the Norwalk Tank Farm  
Restoration Advisory Board

On behalf of KMEP

August 8, 2013



# Presentation Overview

- KMEP Update
  - Remediation Operations Update
  - Conceptual Site Model
  - Five -Year Action Plan Progress Report
  - Planned Activities
- Revised Groundwater Monitoring and Reporting Program
- First Semiannual 2013 Monitoring Update



# Remediation Operations Update

- Objectives
  - Contaminant Mass Containment
  - Contaminant Mass Removal
- South-Central and Southeast Areas
  - Soil Vapor Extraction (SVE) System
  - Groundwater Extraction (GWE) System
  - Total Fluids Extraction (TFE) System
    - Free product
    - Groundwater
- West Side Barrier
  - Groundwater Extraction
    - Discontinued August 2008
    - Shut-down based on low concentrations of MTBE and 1,2-DCA
    - Currently monitoring TBA and other constituents



# Remediation Systems

- South-Central Area
  - 18 TFE wells (product and groundwater)
  - 24 onsite and 6 off-site SVE wells (most collocated with TFE wells)
  - 2 GWE Wells
- Southeastern Area (24-inch Block Valve Area)
  - 3 TFE wells (GMW-O-15, GMW-O-18, GMW-36)
  - 3 SVE wells (both collocated with TFE wells)
  - 2 GWE Wells (GMW-SF-9, GMW-SF-10)
- Treatment and Discharge
  - SVE Vapors
    - Treatment – Thermal catalytic oxidizer (catox)
    - Discharge – Atmosphere under SCAQMD Permit
  - TFE Liquids
    - Oil/Water Separator – Free product recycled offsite
    - Groundwater Treatment – Liquid-phase GAC, Fluidized Bed Bioreactors (FBBRs) for fuel oxygenates (MTBE, TBA, etc.)
    - Groundwater Discharge – Coyote Creek under NPDES permit



# Remediation Systems

- Operations & Maintenance Activities
  - Weekly Inspection and Maintenance of SVE, TFE, and TBA treatment systems
  - Weekly Data Collection
    - Vapor flow rate, vacuum, groundwater extraction rates, hours of operations, and other system parameters
  - Monthly Pump Inspections
  - Measurement of Individual Well Vapor Concentrations
  - Collection and Analysis of System Influent and Effluent Vapor and Groundwater Samples
  - Gauging of Select Remediation Wells

# SVE System Operations Summary

- Equivalent Fuel Treated

- Based on weekly monitoring of influent vapor concentration, vapor extraction flow rate, and hours of operation.
- Pounds / 6.6 lbs/gal = gallons
- 1<sup>st</sup> Quarter 2013– 1,522 gallons (10,048 pounds)
- 2<sup>nd</sup> Quarter 2013– 1,488 gallons (9,824 pounds)
- Since Second Addendum – 11,712 gallons (77,304 pounds)
- Since 1995 – Approx. 464,000 gallons (3 million pounds)

VC2

**Slide 6**

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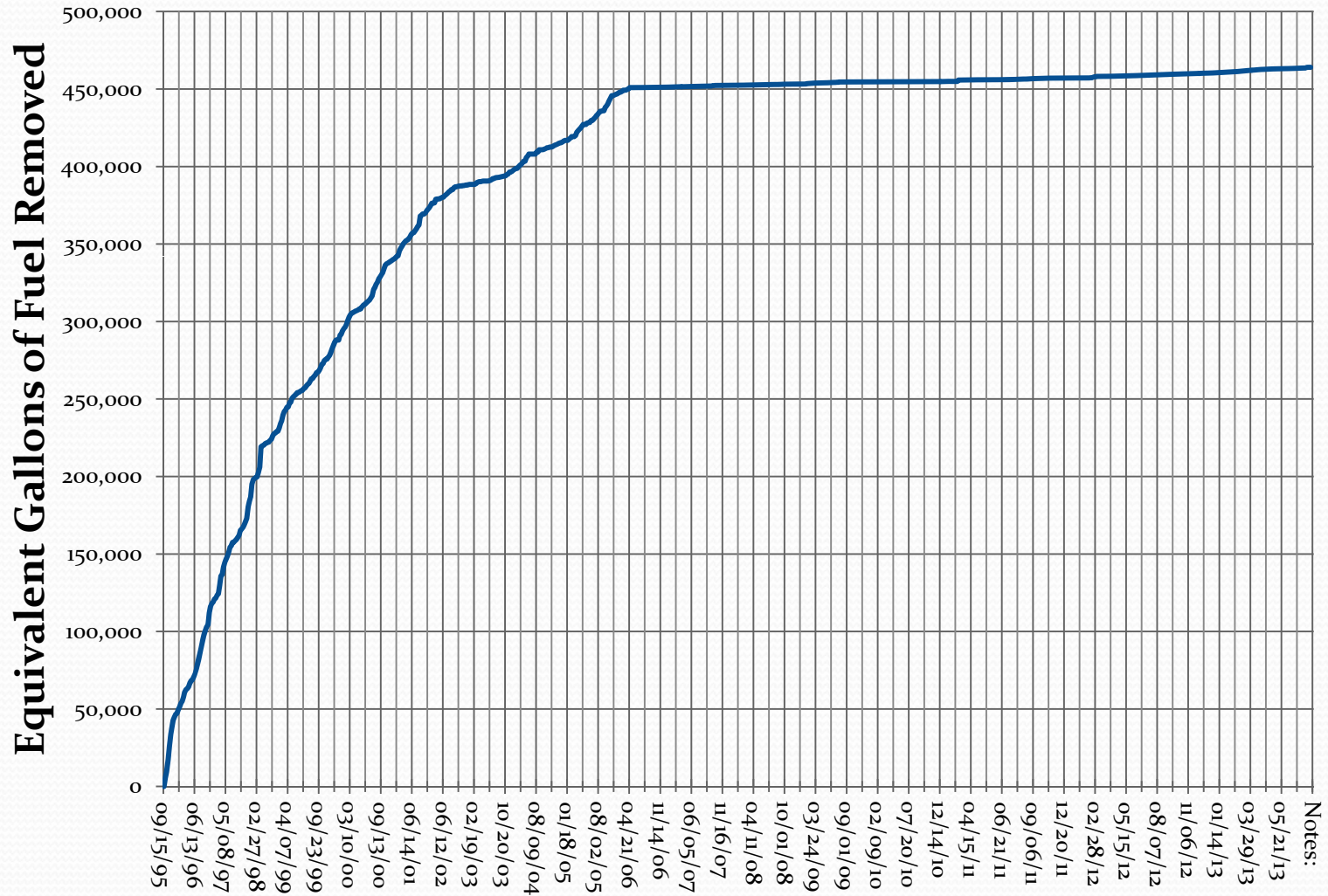
**VC2**

**Not to self, update.**

Carino, Vladimir SCO, 6/25/2012

# SVE System Operations Summary

## Cumulative Fuel Removed by Vapor Extraction To Date



Notes:



# TFE/GWE System Operations Summary

- Groundwater Extracted
  - 1<sup>st</sup> Quarter 2013
    - South-Central and Southeast Areas –1,771,016 gallons
    - West Side Barrier – none (shutdown in third quarter 2008)
  - 2<sup>nd</sup> Quarter 2013
    - South-Central and Southeast Areas 1,649,993 gallons
    - West Side Barrier – none (shutdown in third quarter 2008)
  - Since 1995
    - South-Central and Southeast Areas– 58 million gallons
    - West Side Barrier – 26.9 million gallons VC4

## Slide 8

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VC4

How did we get this number? This number was 64.4 million in the Feb. slide. With new calcs, using just the discharge number, the total is less than that.

Carino, Vladimir SCO, 6/25/2012



# TFE/GWE System Operations Summary

- Mass of TPH removed in Groundwater Extracted
  - 1<sup>st</sup> Quarter 2013– 31 gallons (208 pounds)
  - 2<sup>nd</sup> Quarter 2013– 8 gallons (55 pounds)
  - Since implementing Second Addendum
    - 378 gallons (2,498 pounds)

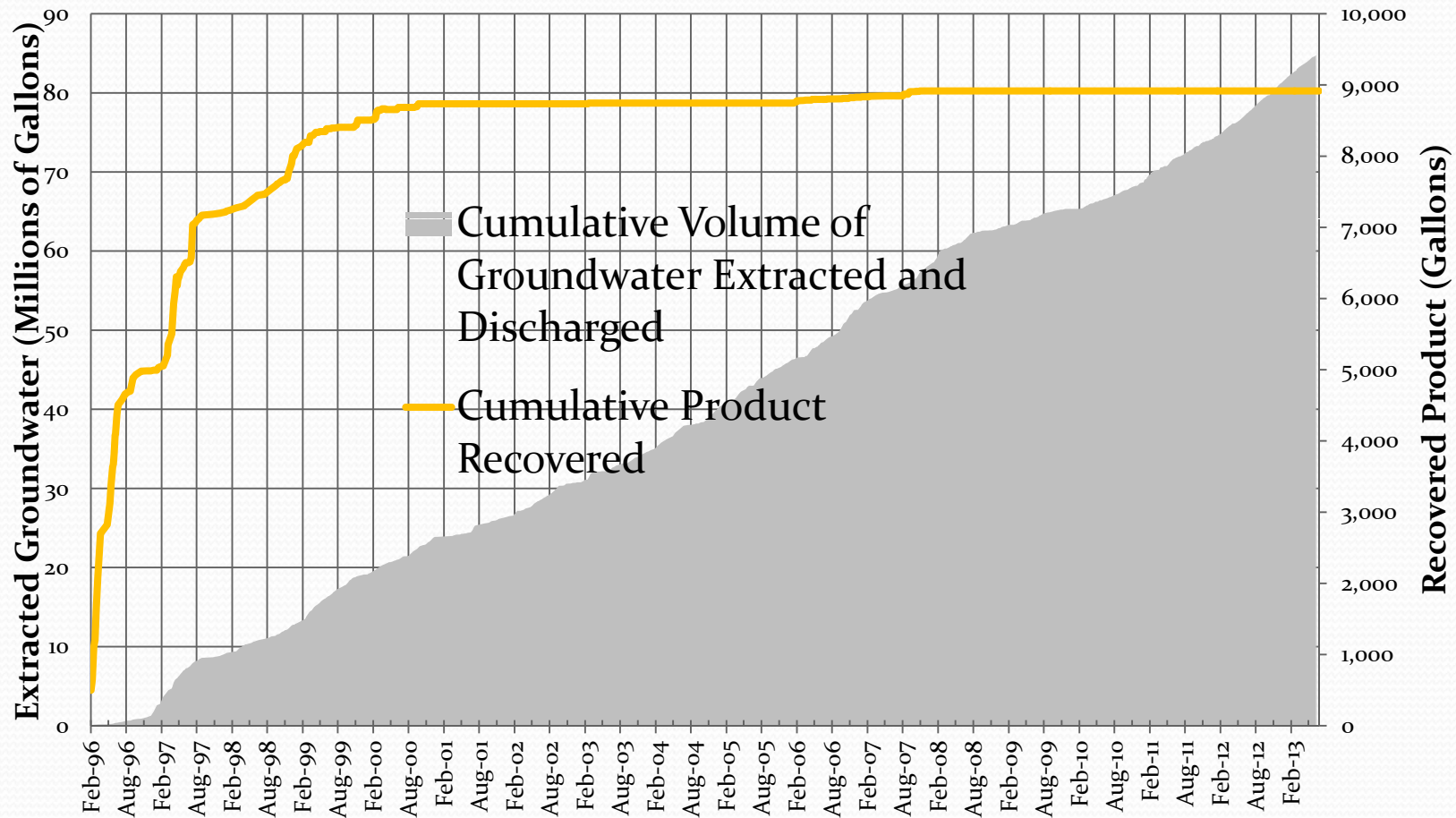


# TFE System Operations Summary

- Free Product Extracted
  - 1<sup>st</sup> and 2<sup>nd</sup> Quarter 2013
    - Free product has generally decreased since implementing the Second Addendum
    - Volume of free product recovered is small and emulsified
    - Free product not observed to accumulate in the product holding tank.
  - Free product not estimated for 1<sup>st</sup> and 2<sup>nd</sup> Quarter 2013
  - Since 1995 – 8,917 gallons

# TFE System Operations Summary

## Summary of Extracted Groundwater and Recovered Product



# Remediation System Operations Summary

- SVE System
  - 1<sup>st</sup> Quarter 2013
    - Operated 83% of time
    - Operated 86% of time (excluding planned shutdowns)
  - 2<sup>nd</sup> Quarter 2013
    - Operated 73% of time
    - Operated 90% of time (excluding planned shutdowns)
- TFE/GWE System
  - 1<sup>st</sup> Quarter 2013
    - Operated 93% of time
    - Operated 94% of time (excluding planned shutdowns)
  - 2<sup>nd</sup> Quarter 2013
    - Operated 83% of time
    - Operated 92% of time (excluding planned shutdowns)

# Remediation System Downtime

- SVE System
  - Routine maintenance activities
    - Drain water condensate from manifold
  - Re-wiring of system control panel
  - Baildown testing
- TFE/GWE System
  - Carbon change outs
  - High level alarms for transfer tank
    - Changed bag filters, cleaned bag filter housing, backwash LGAC vessels
  - Cleaning of OWS, EQ tank, sump and transfer tank
  - Baildown testing

# Preventative Maintenance

- Check pump operation – monthly
- Pump inspection/cleaning/maintenance - ongoing
- Bag filter replacements – twice per week minimum
- Inspection and minor repairs of SVE wells
- Backwashing of lead and polishing LGAC vessels
- Pre-catalyst back pressure monitoring – Weekly
  - Monitor for particulate buildup on catalyst cells
- Sampling between LGAC vessels – bi-weekly
  - Monitor for breakthrough between carbon vessels; concentrations alert technicians when a change out is required
  - Carbon change outs in lead or polishing LGAC vessels





# Preventative Maintenance

- System-specific preventative maintenance schedule for each of the other components of the remediation system
  - South-central System
  - Southeastern System
- Example system-specific preventative maintenance activities
  - Check/inspect valves, blowers, chemical pumps, level switches, hoses, and catox flame arrestor
  - Clean filters (various types), flow sensors, valves, transfer pumps, and catox catalyst
  - Change oil and air filters in various equipment
  - Check/replace belts and hoses on various equipment
  - Maintain pneumatic pumps
  - Clean oil/water separator, sump, and equalization tank
  - Drain and/or pressure wash holding tanks



# Planned Remediation Activities

- Continue focusing remedial efforts on South-central and Southeastern areas
  - Continue operating TFE, GWE, and SVE systems
  - Continue system maintenance, inspections, and data collection on weekly basis
  - Continue pumping onsite southeastern area extraction well GMW-SF-9 to hydraulically contain TBA in that area
- Monitor concentrations of 1,2-DCA, MTBE, and TBA in western area and restart WSB if necessary
- Replace SVE system blower – system is currently down
- Perform mechanical well rehabilitation of select offsite extraction wells
- Install new backwash assembly to extend life of bag filters
- Install air and discharge hoses and retrofit manifold piping to allow TFE from GWM-10



# Conceptual Site Model

- SFPP preparing integrated CSM
  - Addresses soil/soil vapor/groundwater/LNAPL
  - Will update Preliminary CSM (AMEC, February 13, 2009) with data from additional assessments
  - Identify remediation objectives, goals, and performance metrics
  - Provide technology screening and selection of interim remedy
  - Provide implementation plan for interim remedy
- CSM will be submitted to RWQCB and RAB by August 31, 2013



# Five-Year Action Plan Progress Report

- Second Addendum to Remedial Action Plan
  - Submitted – November 2006
  - Approved – April 2007
  - Remediation system enhancements
    - Expanded the SVE and TFE system into onsite areas where residual LNAPL appeared to remain
  - 5-Year Schedule to Submitting Closure Request
  - August 2012
- Update provided in February 19, 2010 Letter to RAB
  - Revised Schedule to Submitting Closure Request
  - September 2013

# Five-Year Action Plan Progress Report

Status	Task	Date Completed or Projected	Second RAP Addendum
Completed	Receive Approval from RWQCB	7-Apr	6-Dec
	Begin Remediation System Expansion	7-May	--
	Begin Upgrades to Groundwater Treatment System	7-Aug	--
	Complete Remediation System Improvements	7-Dec	7-Feb
	Full-Scale Remediation Startup	8-Jan	--
	Begin SVE Rebound Testing	8-Dec	8-Aug
	Submit First Annual Remediation Progress Report	9-Jan	8-Feb
	Submit Second Annual Remediation Progress Report	10-Jan	--
	Complete SVE Rebound Testing	As conditions allow	9-Feb
	Submit Third Annual Remediation Progress Report	11-Jan	--
	Submit Fourth Annual Remediation Progress Report	12-Jan	--
	Submit Fifth Annual Remediation Progress Report	13-Jan	--
Future	Begin Bioventing Operation	After free product removal	9-Mar
	Begin Bioventing Rebound Testing	TBD	9-Dec
	Begin Verification Groundwater Monitoring	January 2010 (ongoing)	10-Jun
	Complete Bioventing Testing	TBD	10-Jun
	Complete Verification Groundwater Monitoring	When cleanup objectives are met	10-Jun
	Submit Closure Request to RWQCB	When cleanup objectives are met	12-Aug
	Install pilot biosparge test well in SE area	13-Dec	--



# Planned Activities 2013/2014

- Preparation of Conceptual Site Model by Third Quarter 2013
- Conduct planned soil vapor sampling in southern offsite area in August 2013
- Identify by Third Quarter 2013 best option to facilitate clean up
  - Air sparging
  - Biosparging (vertical or horizontal)
  - In-situ stripping
  - Injection of chemicals or oxygenated water
  - MNA
- Prepare work plan for pilot-scale remediation system in Third Quarter 2013
- Initiate construction of pilot-scale remediation system in Fourth Quarter 2013(to address SE area)
- Begin pilot testing activities in First Quarter 2014

# Revised Groundwater Monitoring and Reporting Program

- Revised Groundwater Evaluation Report, dated January 31, 2013, was prepared by CH2M HILL in response to a letter from the RWQCB dated November 7, 2012
  - Evaluated the adequacy of the current groundwater monitoring network and program
  - Identified data gaps in evaluating the dissolved plume behavior over time
  - Identified redundancies or unnecessary data being collected with the current program
  - SFPP Evaluation Report approved by RWQCB; RWQCB provided comments to DLA Energy Evaluation Report on July 24, 2013
- Revised Sampling and Analysis Plan (SAP), dated May 30, 2013, was prepared by CH2M HILL in response to a letter from the RWQCB dated March 19, 2013
  - Previously performed groundwater sampling in accordance with SAP prepared by Geomatrix in 1995
  - Revised SAP proposes semiannual sampling for SFPP areas
  - Approved by the RWQCB in a letter, dated June 27, 2013
  - DLA Energy SAP has yet to be submitted but sampling frequency is anticipated to be semiannual



# First Semiannual 2013

## Groundwater Monitoring Report

- Sentry Event
  - January 2013 – DLA Energy
  - January 2013 – SFPP
- Semiannual Event in April
  - April 2013 – DLA Energy
  - April 2013 – SFPP
- Monthly Event
  - February 2013– SFPP
  - 6 Southeastern Area Wells
    - GMW-36, GMW-O-15, GMW-O-16, GMW-O-18, GMW-O-19, and PZ-5
  - Monthly monitoring was discontinued in March 2013 per approval by the RWQCB





# First Semiannual 2013

## Groundwater Monitoring Report

- Well Gauging by Blaine Tech and Parsons
  - 193 wells gauged
- Well Sampling by Blaine Tech
  - Low-flow sampling methods
  - 101 wells sampled
  - SFPP SVE and TFE/GWE systems remained on during gauging and sampling; DLA Energy SVE system remained on but TFE/GWE system was off

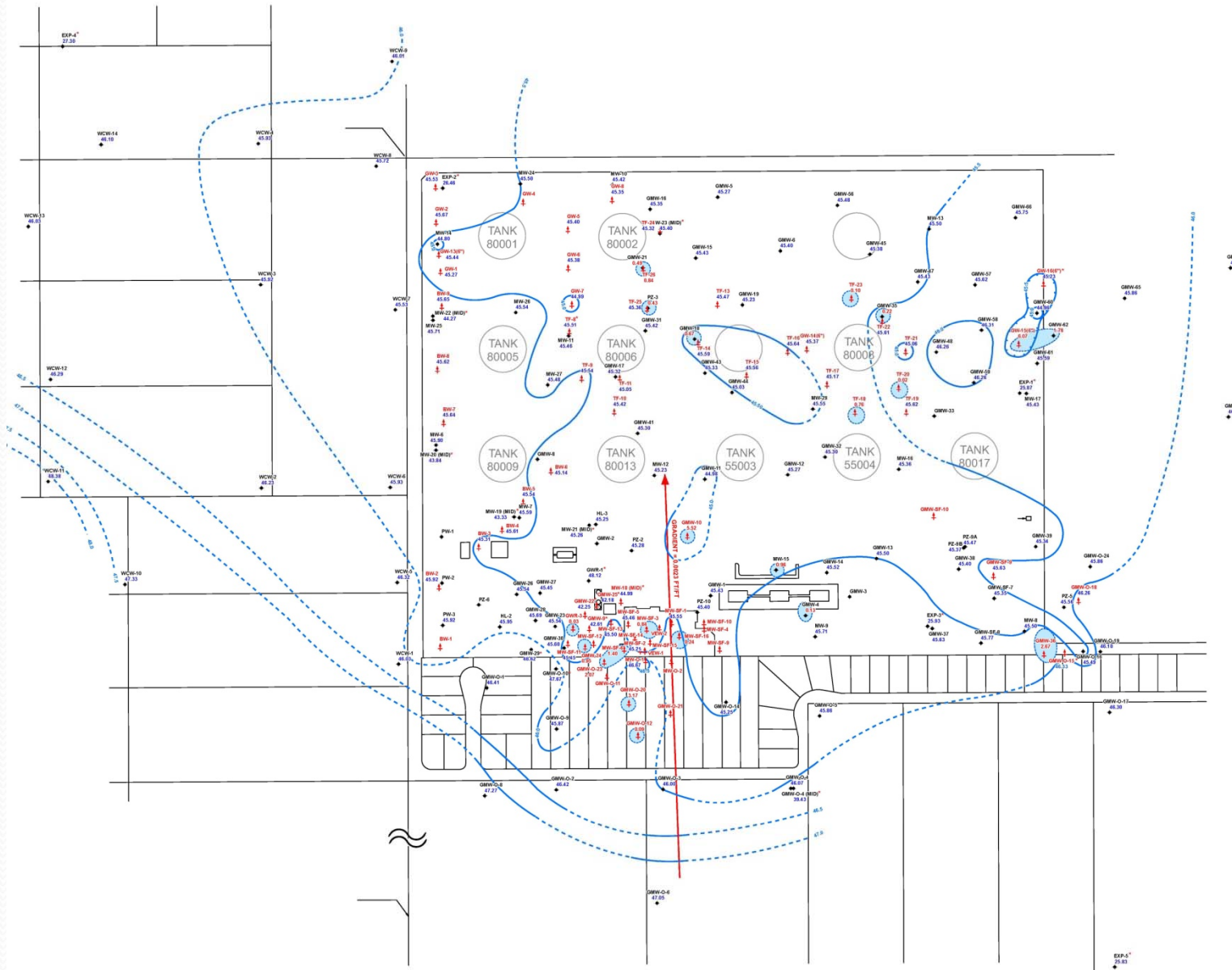


# First Semiannual 2013

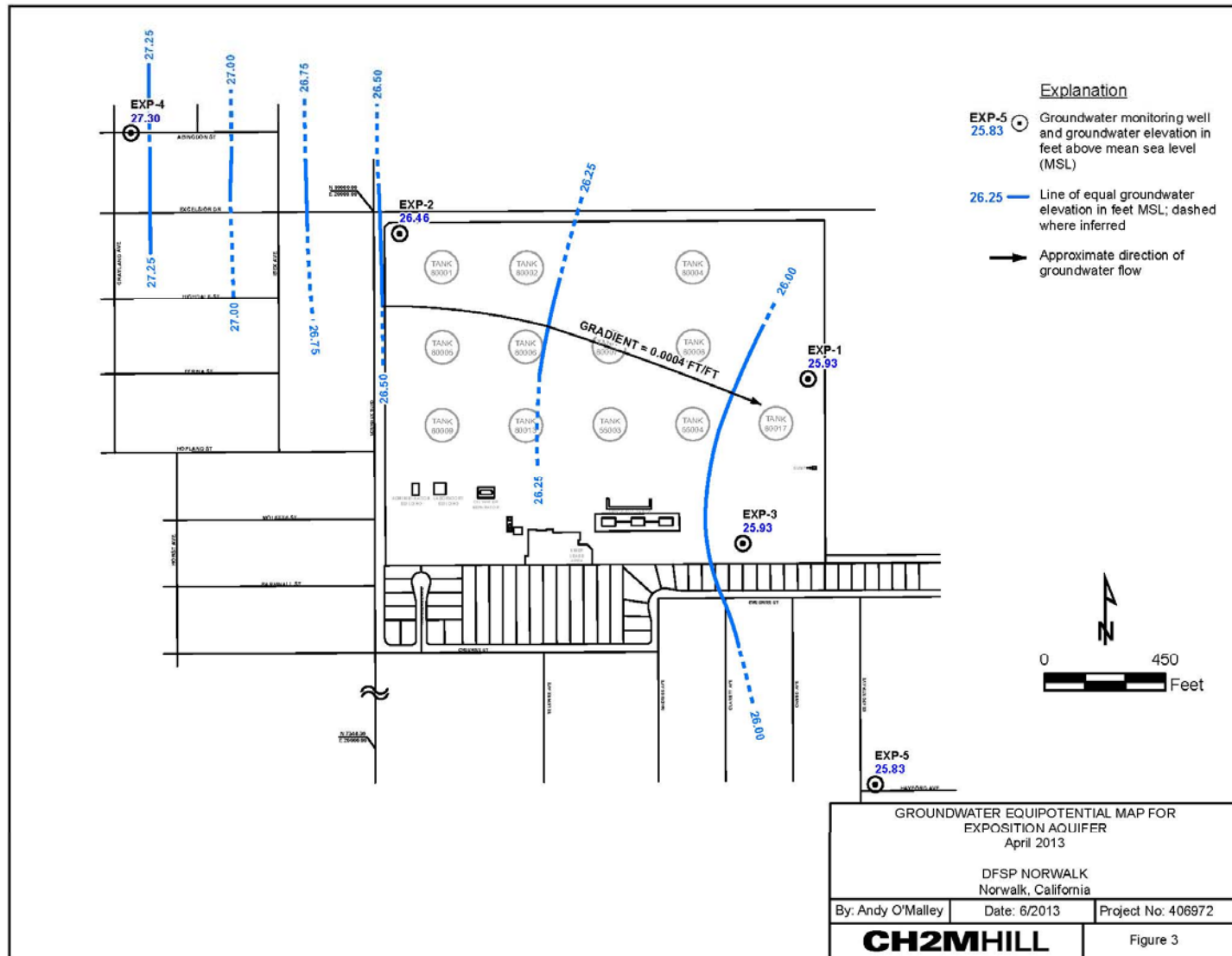
## Groundwater Monitoring Report

- Uppermost Aquifer Groundwater Elevations and Flow
  - Groundwater elevations approximately 1.3 feet lower than those reported for April 2012
  - Groundwater elevations near historical lows since monitoring first began in 1990s
  - Horizontal hydraulic gradient of 0.0023 ft/ft toward the north
- Exposition Aquifer Groundwater Elevations and Flow
  - Groundwater elevations were approximately 0.5 foot lower than those reported for April 2012
  - Horizontal groundwater gradient was approximately 0.0004 ft/ft toward the east-southeast, substantially different than the uppermost groundwater zone

# Groundwater Elevations - Water Table



# Groundwater Elevations - Exposition



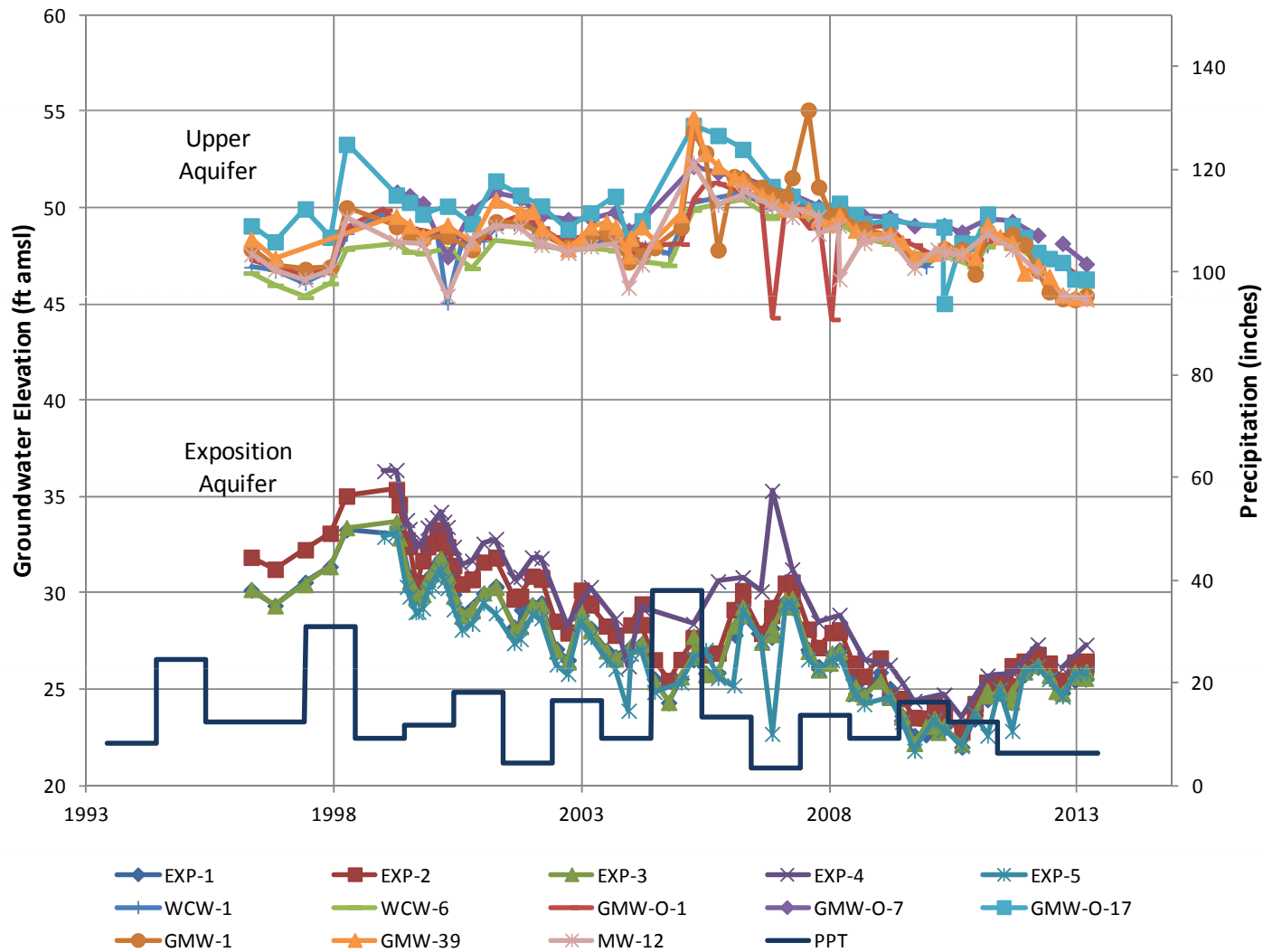
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# First Semiannual 2013 Groundwater Monitoring Report

- Free product measured in 22 of the 193 wells that were gauged.
  - North-central area: GMW-18, GMW-21, GMW-35, PZ-3, TF-18, TF-20, TF-23, and TF-26
  - Eastern area: GW-15 and GMW-62
  - Truck Rack area: GMW-4 and MW-15
  - South-central area: GMW-10, GMW-24, GMW-O-12, GMW-O-20, GMW-O-23, GWR-3, MW-SF-3, MW-SF-6, and MW-SF-16
  - Southeastern area: GMW-36
- Thicknesses ranged from 0.02 foot to 6.07 feet
- Measurable free product observed in these areas was greater than past events, likely due to a continued decline in water levels across the site.

# Historical Groundwater Elevations



# First Semiannual 2013

## Groundwater Monitoring Report

- Exposition Aquifer wells sampled:
  - EXP-1, -2, and -3 sampled twice by DLA Energy and SFPP
  - EXP-4 sampled once by SFPP
  - EXP-5 sampled twice by SFPP
- All analytical results were Non Detect (ND), except for the following:
  - MTBE was detected at EXP-3 in SFPP and DLA Energy split samples in January 2013, at concentrations below 1.0 ug/L near the laboratory reporting limit
  - 1,-2 DCA was detected at EXP-3 in the DLA Energy split sample in January 2013, at a concentration below 1.0 ug/L near the laboratory reporting limit
- These types of low-level detections occasionally occur in the EXP wells. SFPP and DLA Energy will continue to monitor the EXP wells and closely watch for any future potential detections.



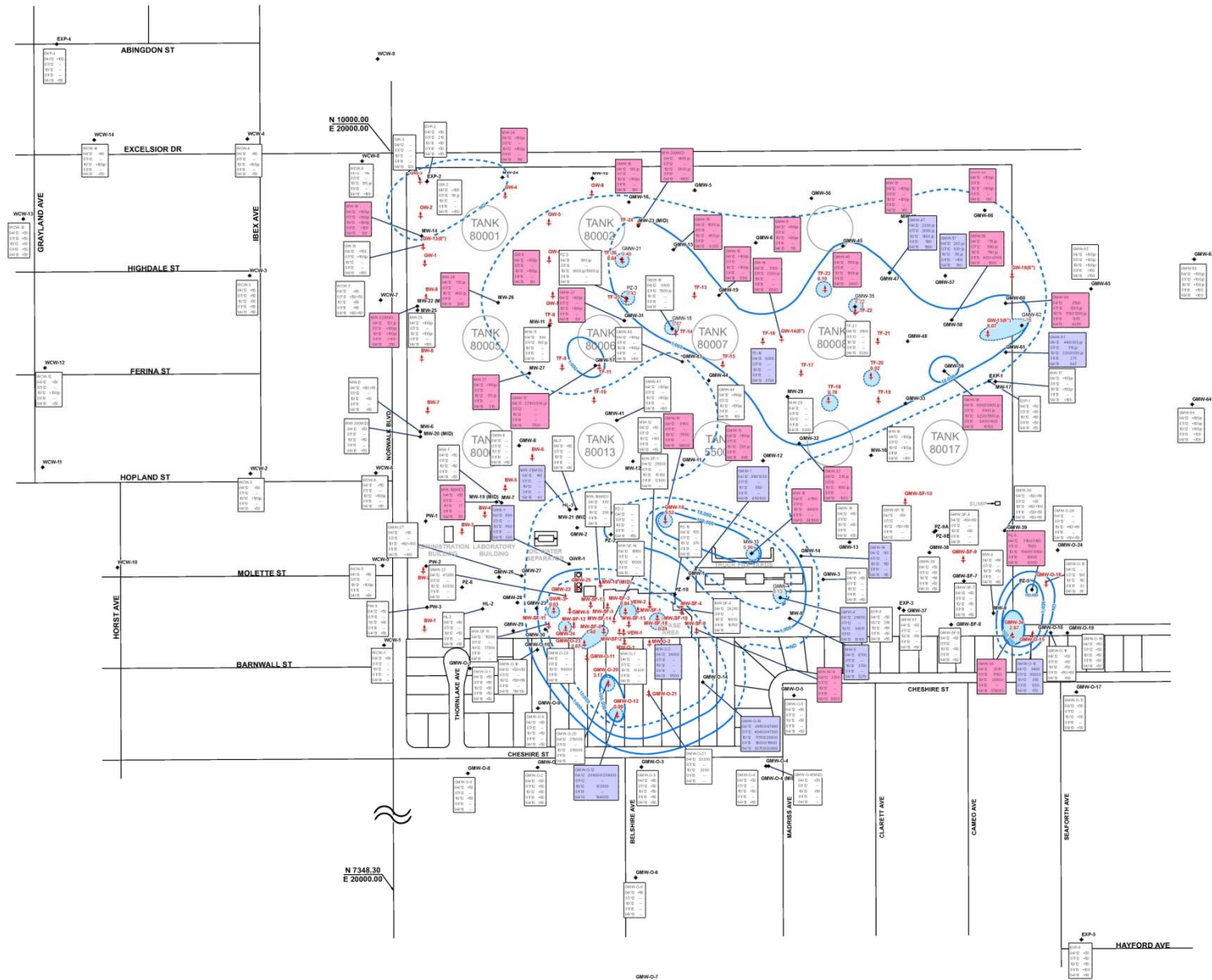
# First Semiannual 2013

## Groundwater Monitoring Report

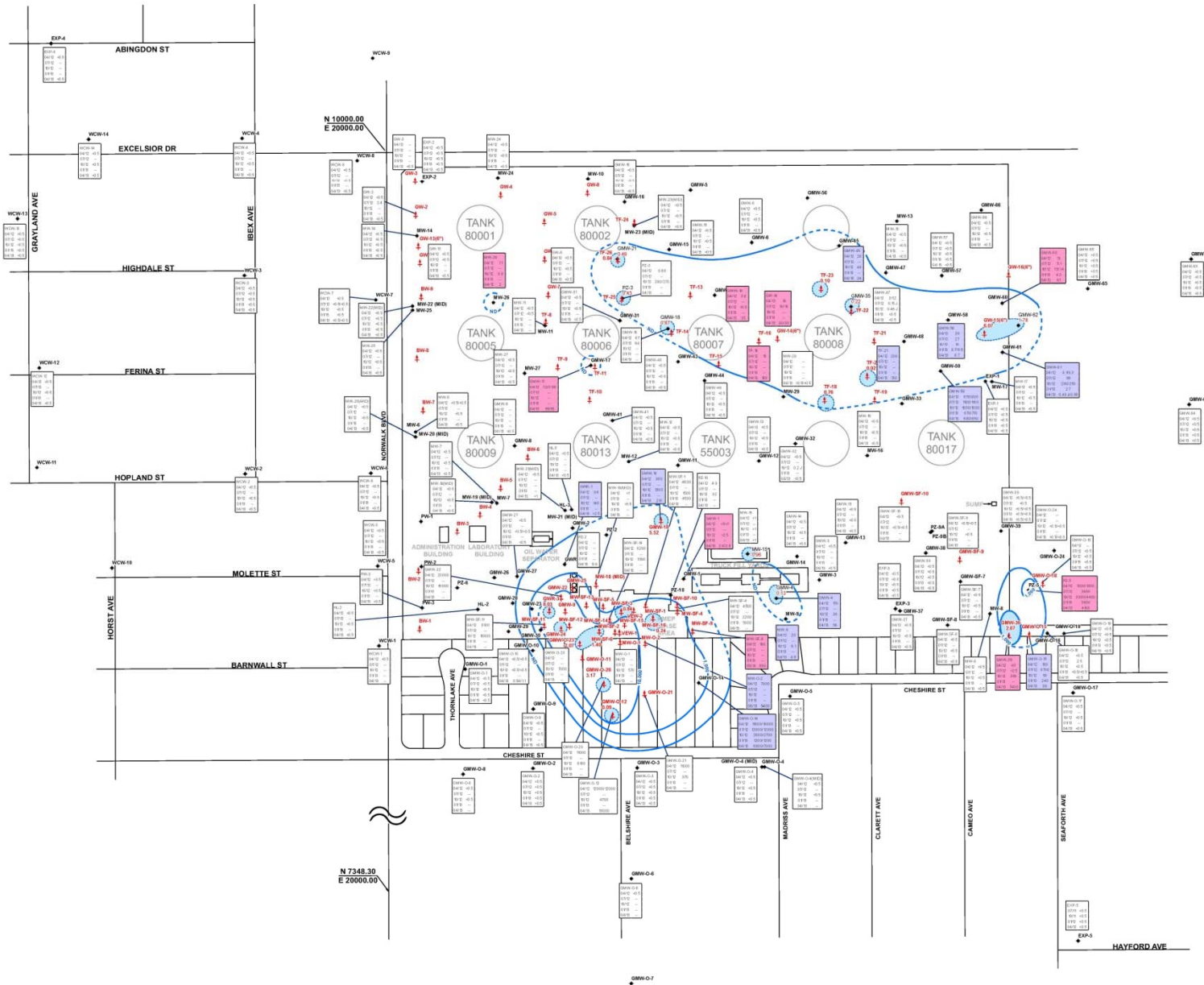
- Uppermost Aquifer Wells
  - In most areas, the lateral extents of TPH, benzene, 1-2-DCA, MTBE, and TBA in groundwater remain similar to those interpreted during recent previous monitoring events
  - TBA was detected in offsite (upgradient) monitoring well GMW-O-17 during April 2013. This is the first detection of TBA since monitoring for TBA began in April 2009
  - Confirmation sample collected from GMW-O-17 on July 2, 2013 to confirm or refute the April 2013 data. Sample was nondetect for all VOCs, including TBA; therefore, it is believed that the April 2013 detection of TBA in well GMW-O-17 is anomalous
- Concentrations are influenced by water level fluctuations



# Total Petroleum Hydrocarbons



# Benzene



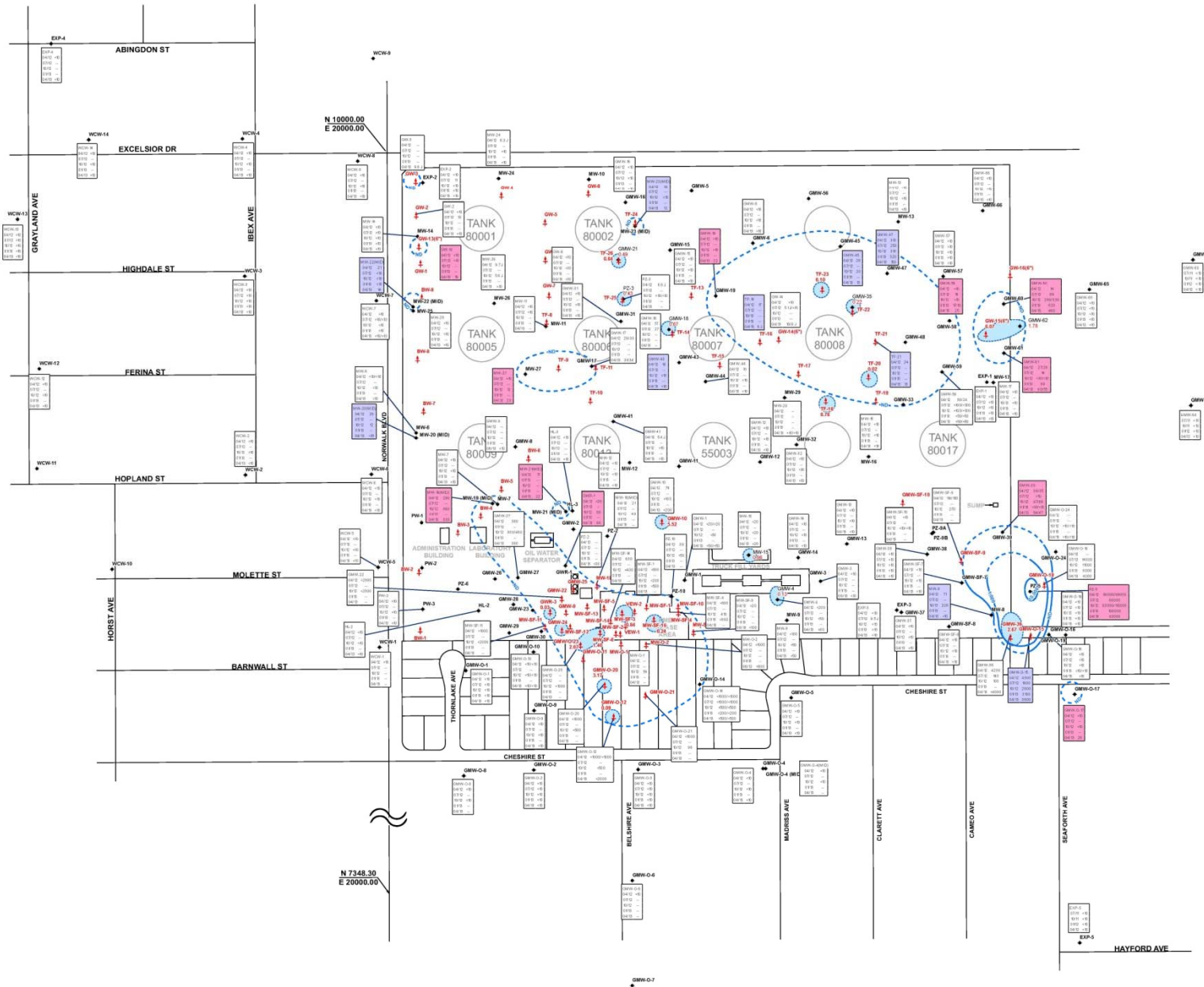
# 1,2-DCA



# MTBE



# TBA





Questions?