

# Norwalk Tank Farm Update

Presented to the Norwalk Tank Farm  
Restoration Advisory Board

On behalf of KMEP

February 26, 2015



# Presentation Overview

- KMEP Update
  - Remediation Operations Update
  - Annual Soil Vapor Monitoring Results
  - Planned Activities



# 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
  - 20 TFE wells (product and groundwater)
  - 24 onsite and 6 off-site SVE wells (most collocated with TFE wells)
- Southeastern Area (24-inch Block Valve Area)
  - 3 TFE wells (GMW-O-15, GMW-O-18, GMW-36)
  - 3 SVE wells (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



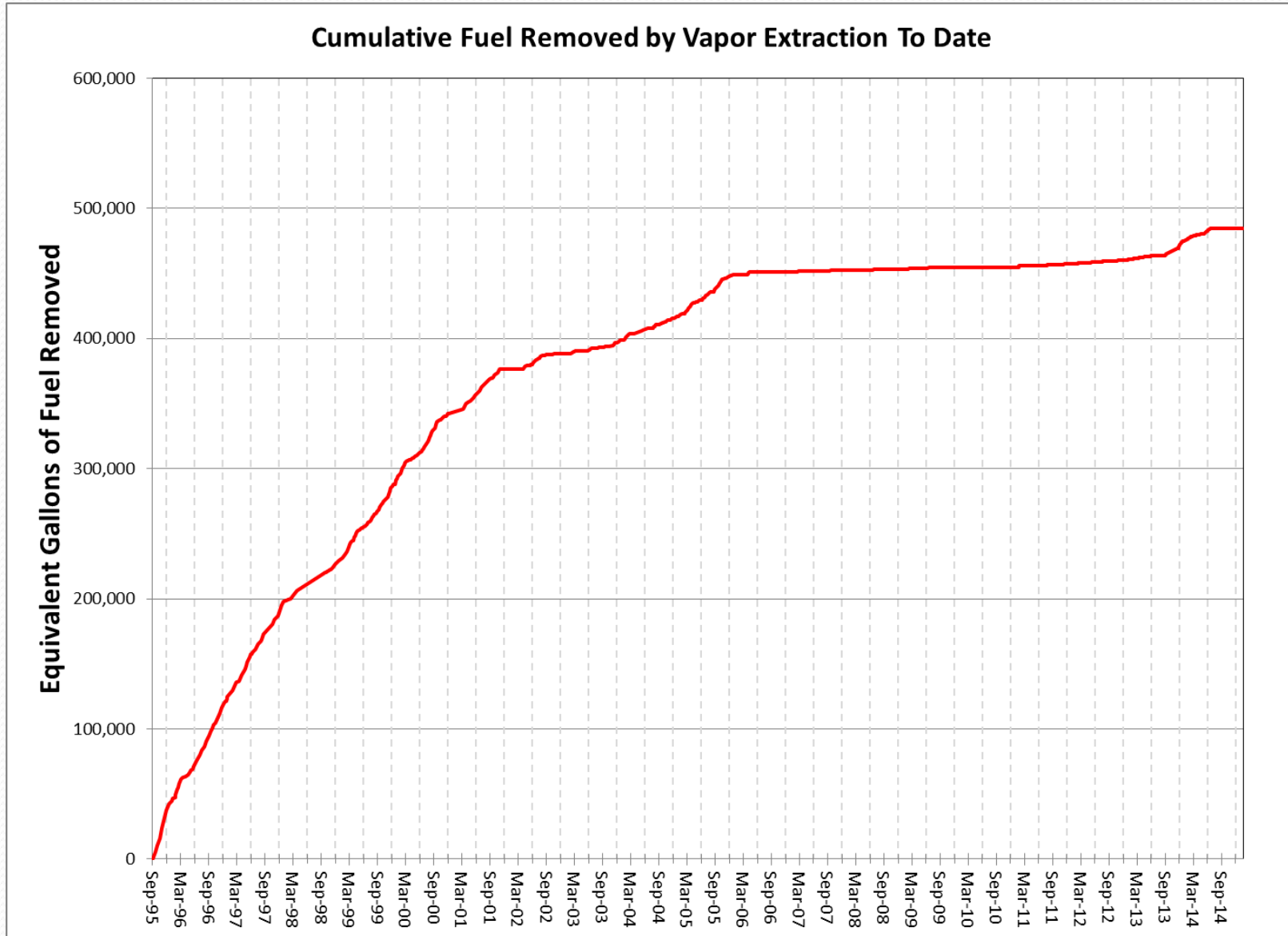
# Remediation Systems

- 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
  - Hand bailing product from 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
- 3<sup>rd</sup> Quarter 2014– 80 gallons (526 pounds)
  - Shut down in early July due to leaky heat exchanger
- 4<sup>th</sup> Quarter 2014– Shut down
  - SCAQMD permit modification
- Since 1995 – Approx. 485,000 gallons (3.2 million pounds)

# SVE System Operations Summary



# TFE/GWE System Operations Summary

- Groundwater Extracted
  - 3<sup>rd</sup> Quarter 2014
    - South-Central and Southeast Areas -213,651 gallons \*
    - West Side Barrier – none (shutdown in third quarter 2008)
  - 4<sup>th</sup> Quarter 2014
    - South-Central and Southeast Areas - 191,276 gallons \*
    - West Side Barrier – none (shutdown in third quarter 2008)
  - Since 1995
    - South-Central and Southeast Areas– 64 million gallons
    - West Side Barrier – 26.9 million gallons

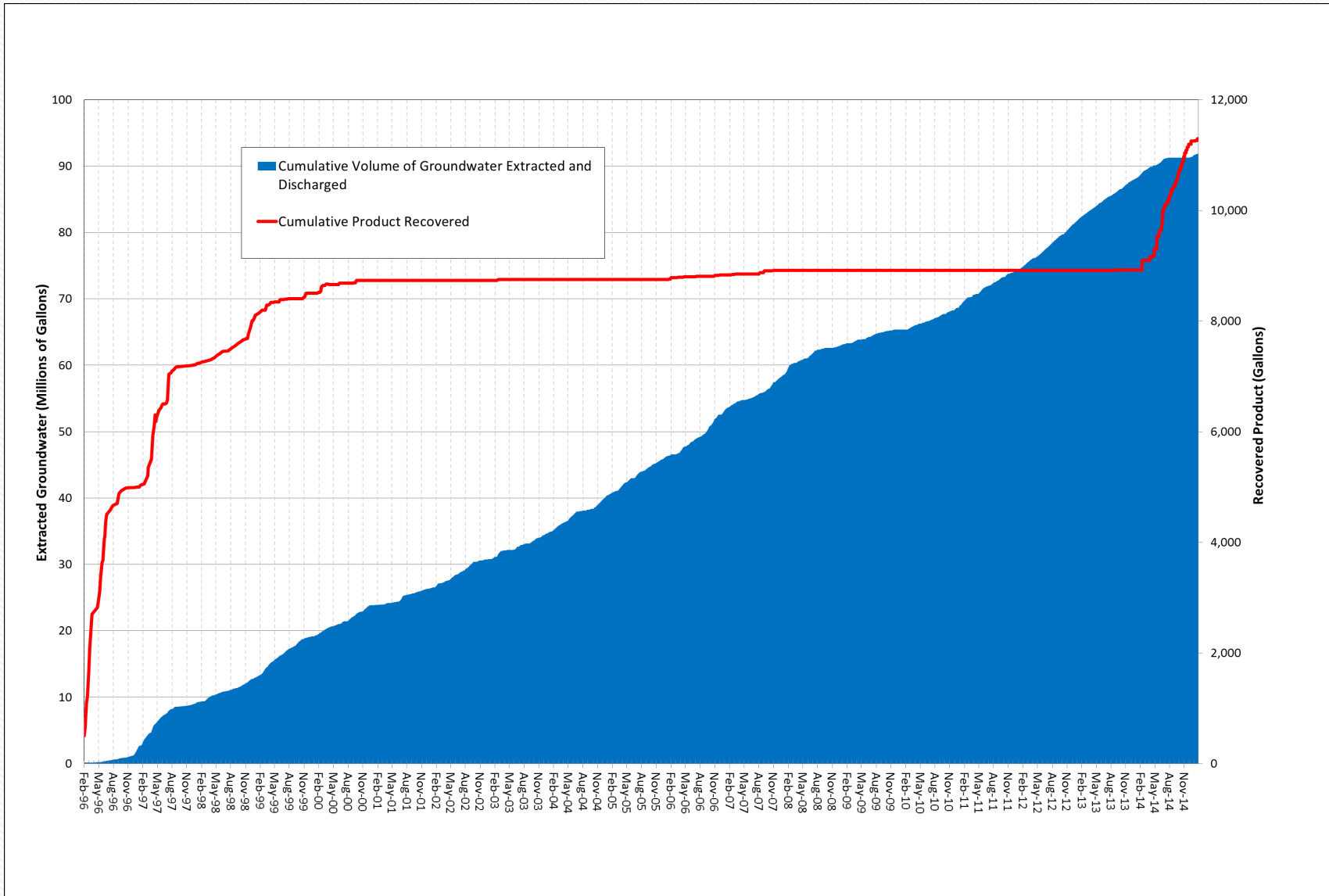
\* Lower volume extracted due to temporary shut down of GWTS to facilitate processing of SCAQMD permit



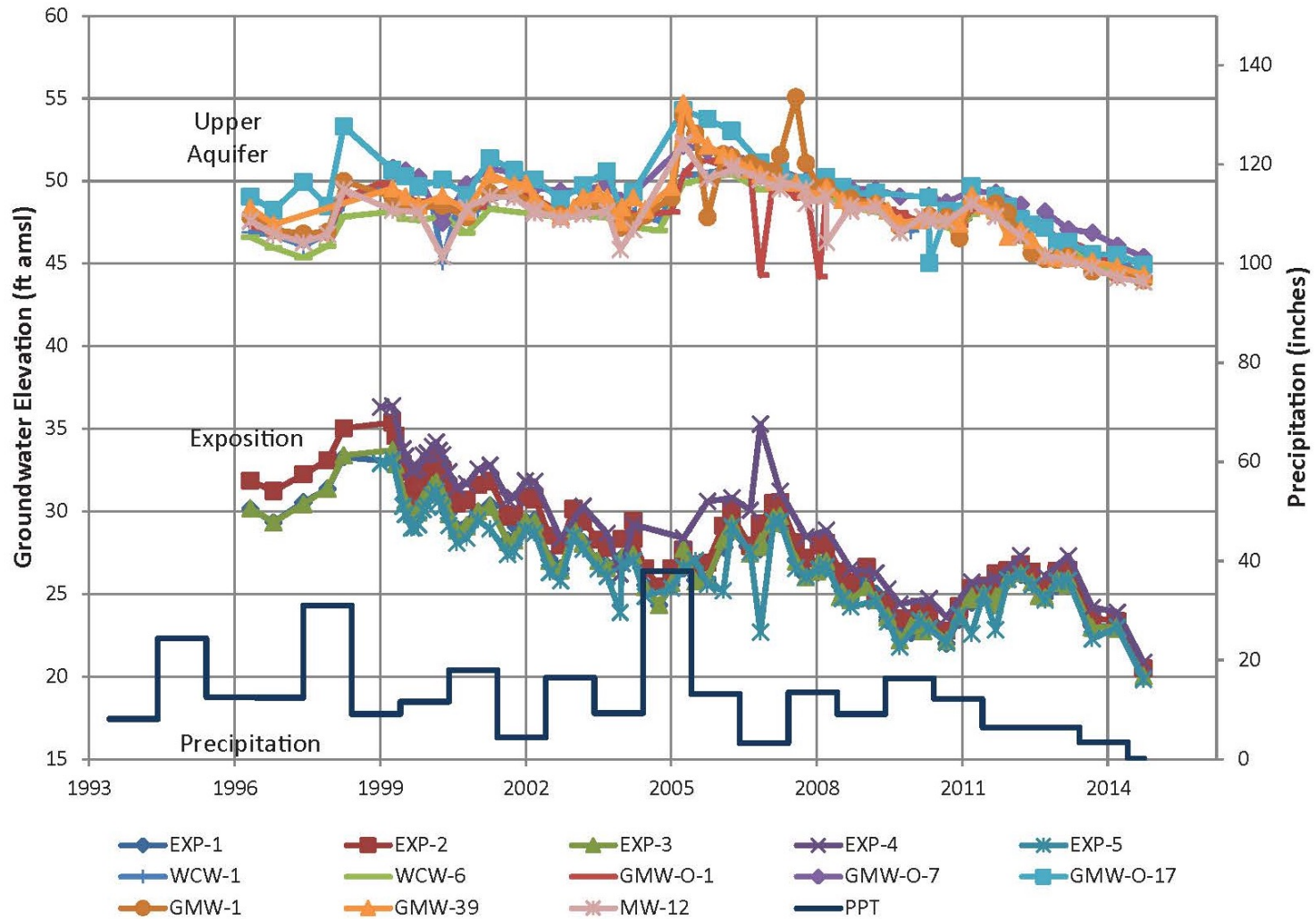
# TFE System Operations Summary

- Free Product Extracted
  - 3<sup>rd</sup> Quarter 2014
    - Approximately 27 gallons of free product observed to accumulate in the product holding tank
    - Recovered 555 gallons of free product by hand bailing
  - 4<sup>th</sup> Quarter 2014
    - Recovered 635 gallons of free product using hand bailing
  - Since 1995 – 11,255 gallons

# TFE System Operations Summary



# Historical Groundwater Elevations



# Remediation System Operations Summary

- SVE System
  - Shut down during 3<sup>rd</sup> and 4<sup>th</sup> Quarters
    - Leaky heat exchanger
    - SCAQMD permit modification
- TFE/GWE System
  - 3<sup>rd</sup> Quarter 2014
    - Operated 31% of time; shut down in August and September to facilitate processing of SCAQMD permit
  - 4<sup>th</sup> Quarter 2014
    - Operated 30% of time; shut down in October and November to facilitate processing of SCAQMD permit

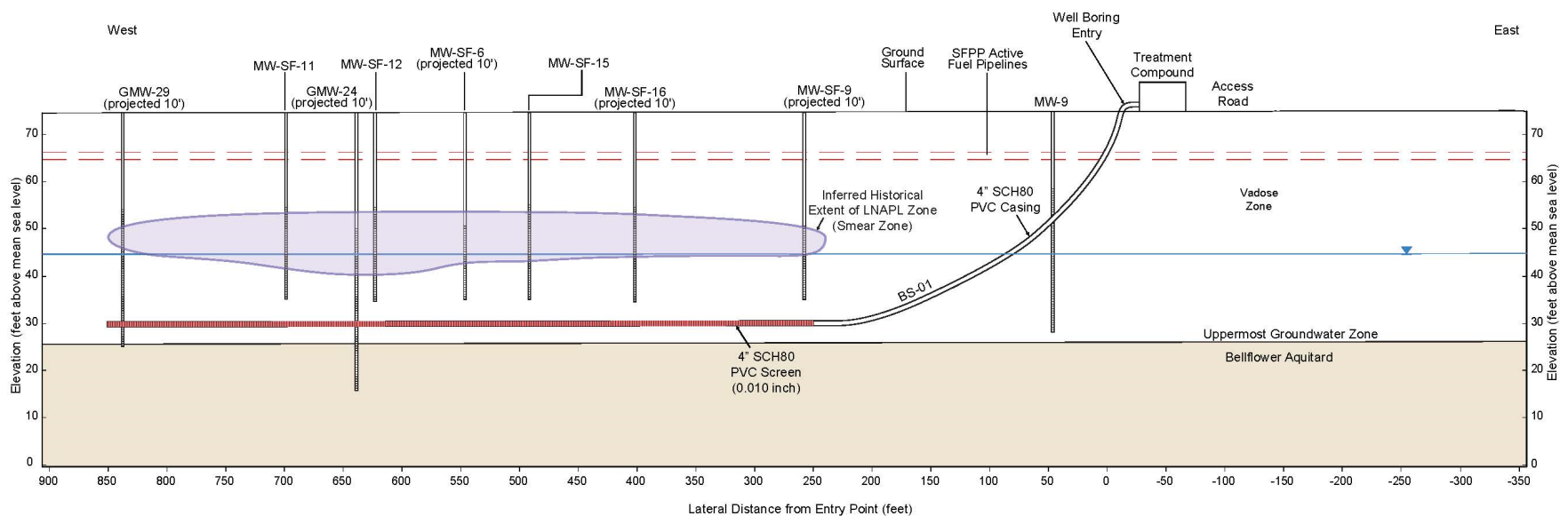
# Remediation System Status

- SVE System
  - Repairs to heat exchanger completed in Dec 2014
  - Will remain down until AQMD permit modification is complete
  - Anticipate resuming SVE operations in 2<sup>nd</sup> QTR 2015
- TFE System
  - Fully operational with more than 10 pumps installed in wells with free product
- Biosparge System
  - Anticipated to be online in 2<sup>nd</sup> or 3<sup>rd</sup> QTR 2015 (discussed further below)

# Pilot Biosparge System

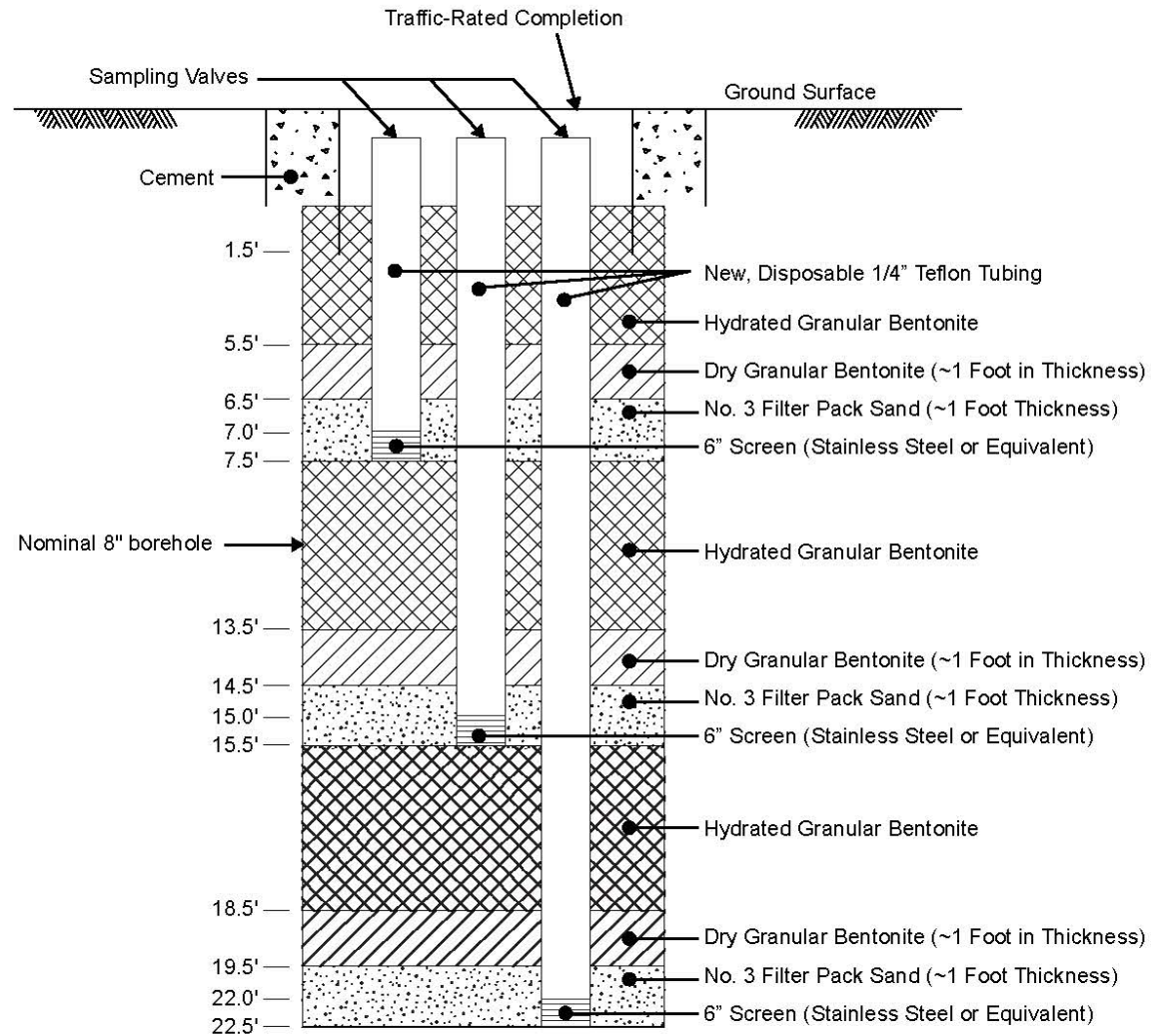
- Construction and Pilot Test Work Plan
  - Work Plan – November 18, 2013
  - Response to Comments – February 14, 2014
  - Approved by RWQCB – February 26, 2014
- Implementation
  - Horizontal well construction – Completed in August 2014
  - 6 triple nested soil vapor probes – Completed in September 2014
  - Pilot testing for 1 year – Planned start 2<sup>nd</sup> or 3<sup>rd</sup> QTR 2015
    - Monitor for VOCs, CO<sub>2</sub>, O<sub>2</sub>, methane, electron acceptor chemistry

# Horizontal Well Construction



- Well Casing and Screen
  - SCH 80 PVC 4-inch diameter well
  - Open slot design (no sand pack required); slot width 0.010 inches, 11 slots per foot, 1.2 inches length; 0.28 to 0.30 % open area
  - Screen depth of 45 feet bgs
  - 250 feet of riser casing; 600 feet of screen

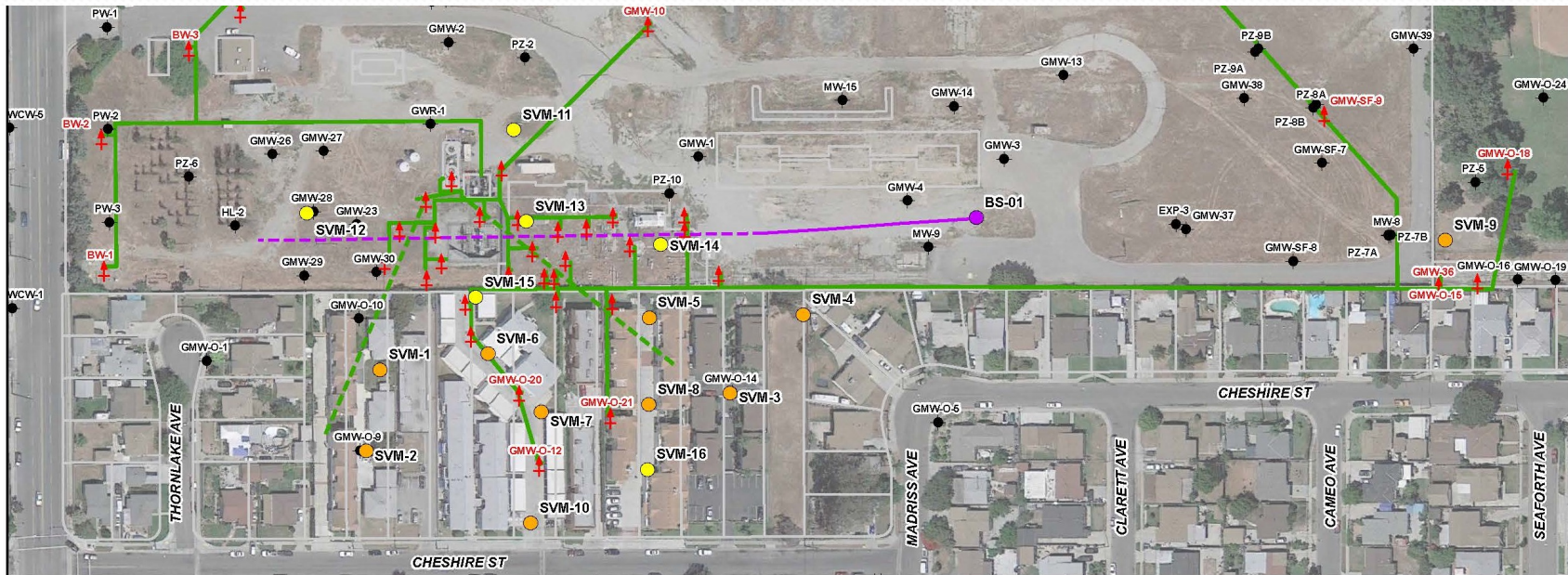
# Soil Vapor Probe Construction



Not to Scale



# Annual Soil Vapor Monitoring

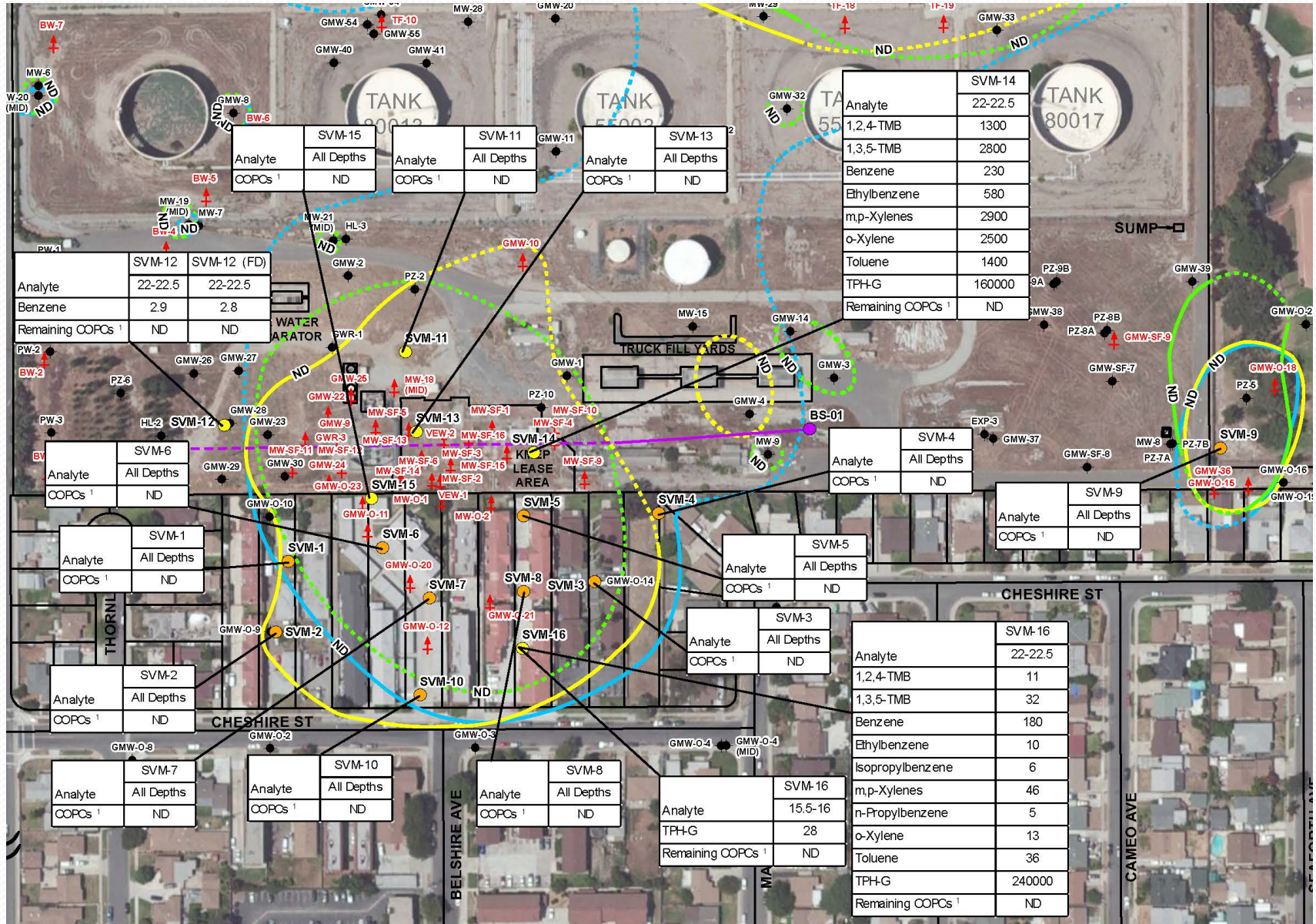


- 10 nested soil vapor monitoring probes (9 in southern offsite and 1 in southeastern area) installed in 2012; probes screened at ~ 5 and 15 feet bgs
- 6 triple nested soil vapor monitoring probes installed in south-central area in 2014; probes screened at ~ 7, 15, and 22 feet bgs
- Sampled probes in October 2014 for VOCs, TPH, and fixed gases analysis using mobile lab and fixed lab

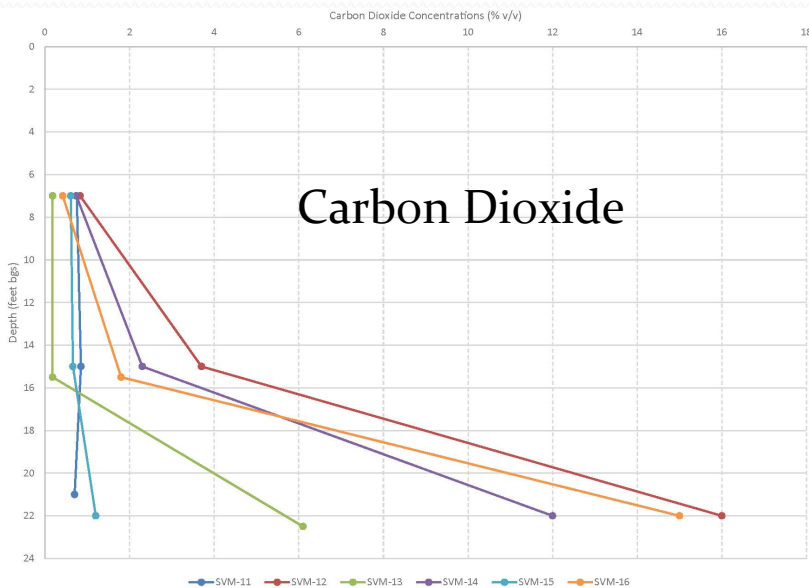
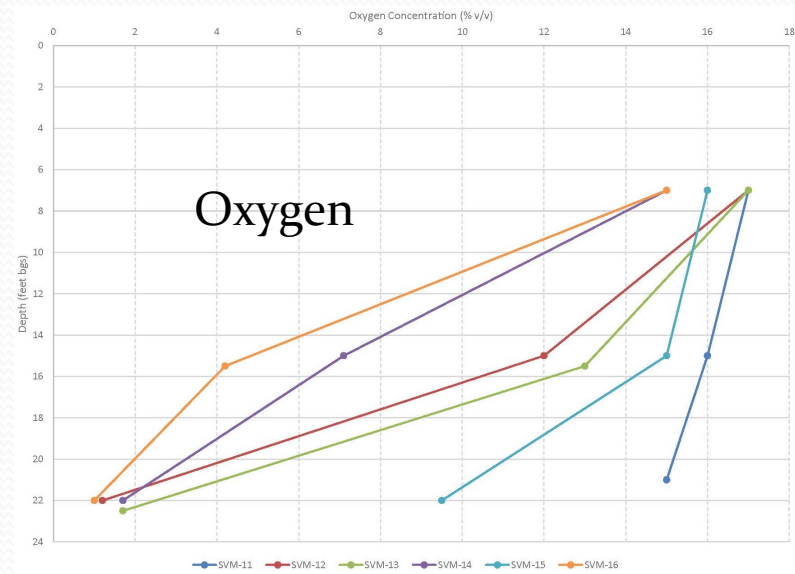
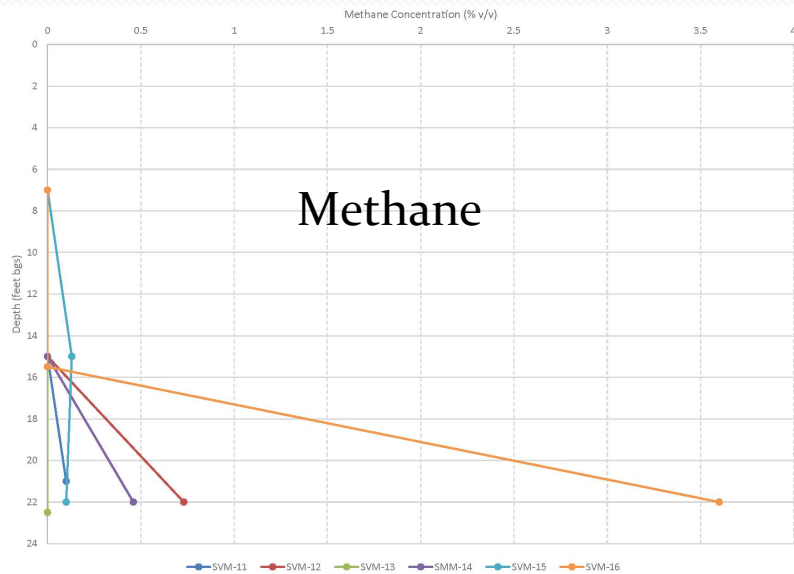
# Annual Soil Vapor Monitoring

- Mobile lab
  - Detections of COPCs in deeper probes (22-foot depth) of SVM-12, SVM-14, and SVM-16 at concentrations greater than human health screening levels
  - With the exception of TPH-g detected in SVM-16 at the 15.5-foot depth, all COPCs shallower than 15.5 feet were nondetect and below human health screening levels
- Fixed lab
  - Sampled 4 probes (SVM-3, SVM-5, SVM-9, and SVM-15) at 15-foot depth
  - Detections of COPCs in all probes but generally below analytical reporting limits (J-qualified), and all detections were below the human health screening levels

# Annual Soil Vapor Monitoring



# Fixed Gas Profiles



- Profiles demonstrate that hydrocarbons are biodegrading under aerobic conditions at depths shallower than 15 feet and under anaerobic conditions at deeper depths near the smear zone

# Planned Remediation Activities

- Continue TFE in south-central and southeastern areas
- Resume SVE once SCAQMD permit is issued – 2<sup>nd</sup> QTR 2015
- Install new oil water separator to GWTS – 2<sup>nd</sup> QTR 2015
- Complete electrical and conveyance work associated with biosparge system – 2<sup>nd</sup> QTR 2015
- Begin operation of biosparge well – 2<sup>nd</sup> or 3<sup>rd</sup> QTR 2015
- Collect monthly groundwater and soil vapor samples as part of pilot testing program
- Submit monthly reports to RAB presenting operational and analytical data from pilot testing activities



Questions?