Norwalk Tank Farm Update

Defense Energy Support Center-

Americas West

Norwalk Tank Farm

Restoration Advisory Board

April 28, 2005

Presentation Overview

Topics to be Covered

- Central plume remediation system update
- Remediation Optimization
- Wells GMW-60 and GMW-61 Quarterly Testing

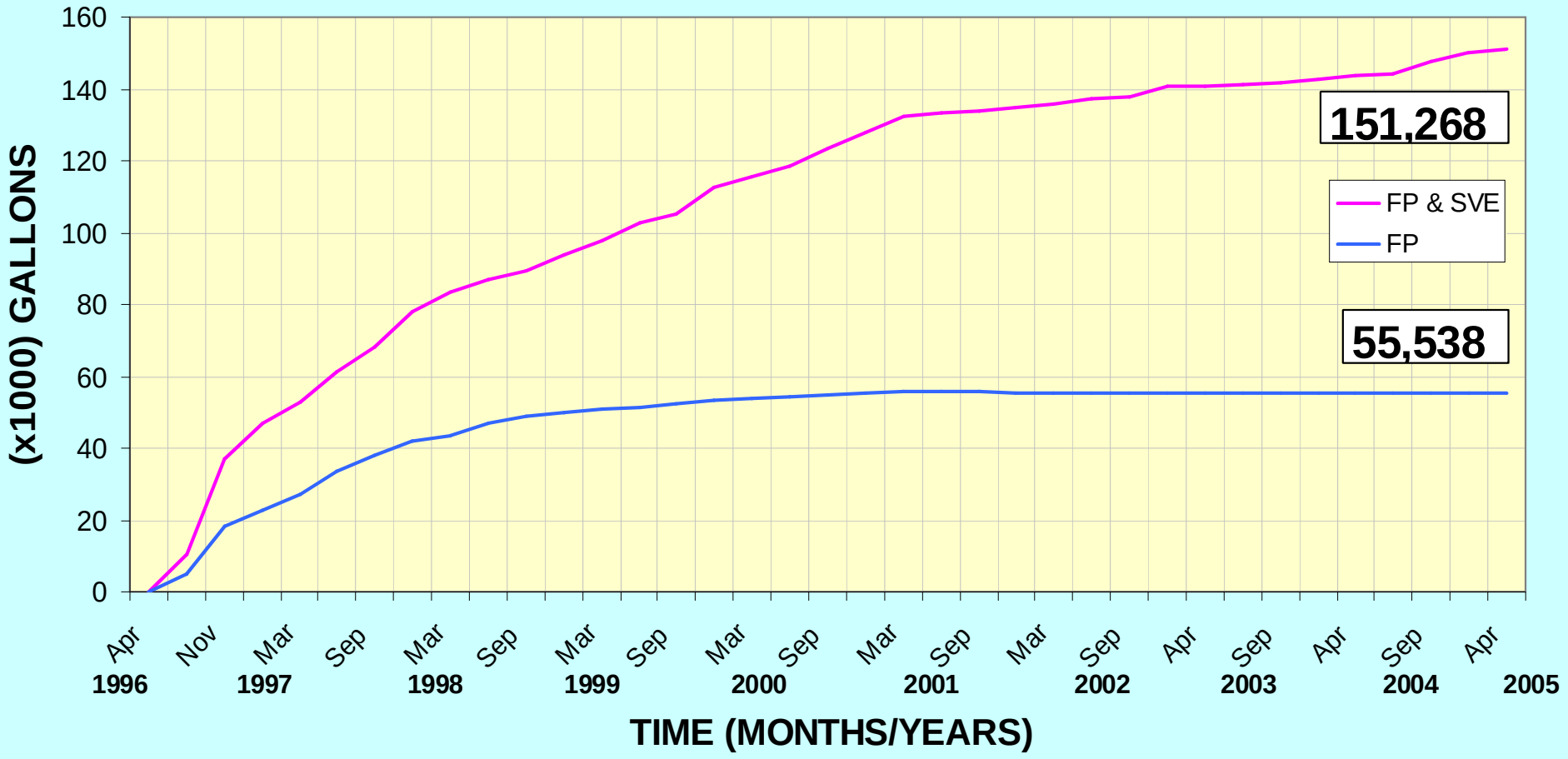
Central Plume Remediation

- System Performance First Quarter 2005
  - Total Hydrocarbons Mass Removed: 3,494 gallons
    - Approx. 1,307 gallons recycled and destroyed
      - 0 gallons of free product recovered
      - 0 gallons of dissolved phase hydrocarbons recovered
      - 1,307 gallons of volatile hydrocarbons recovered through soil vapor extraction
    - Estimated 2,187 gallons of hydrocarbons destroyed due to enhanced biodegradation
  - 0 gallons of water treated

Central Plume Remediation

- System Performance since April 1996
  - Total Hydrocarbons Mass Removed: 278,507 gallons
    - Approx. 151,268 gallons recycled and destroyed
      - 55,538 gallons of free product recovered
      - 94,333 gallons of volatile hydrocarbons recovered through soil vapor extraction
      - 1,397 gallons of dissolved phase hydrocarbons recovered
    - Estimated 127,239 gallons of hydrocarbons destroyed due to enhanced biodegradation
  - 42.2 M gallons of water treated

HYDROCARBONS & FREE PRODUCT-CENTRAL PLUME



Weed Abatement

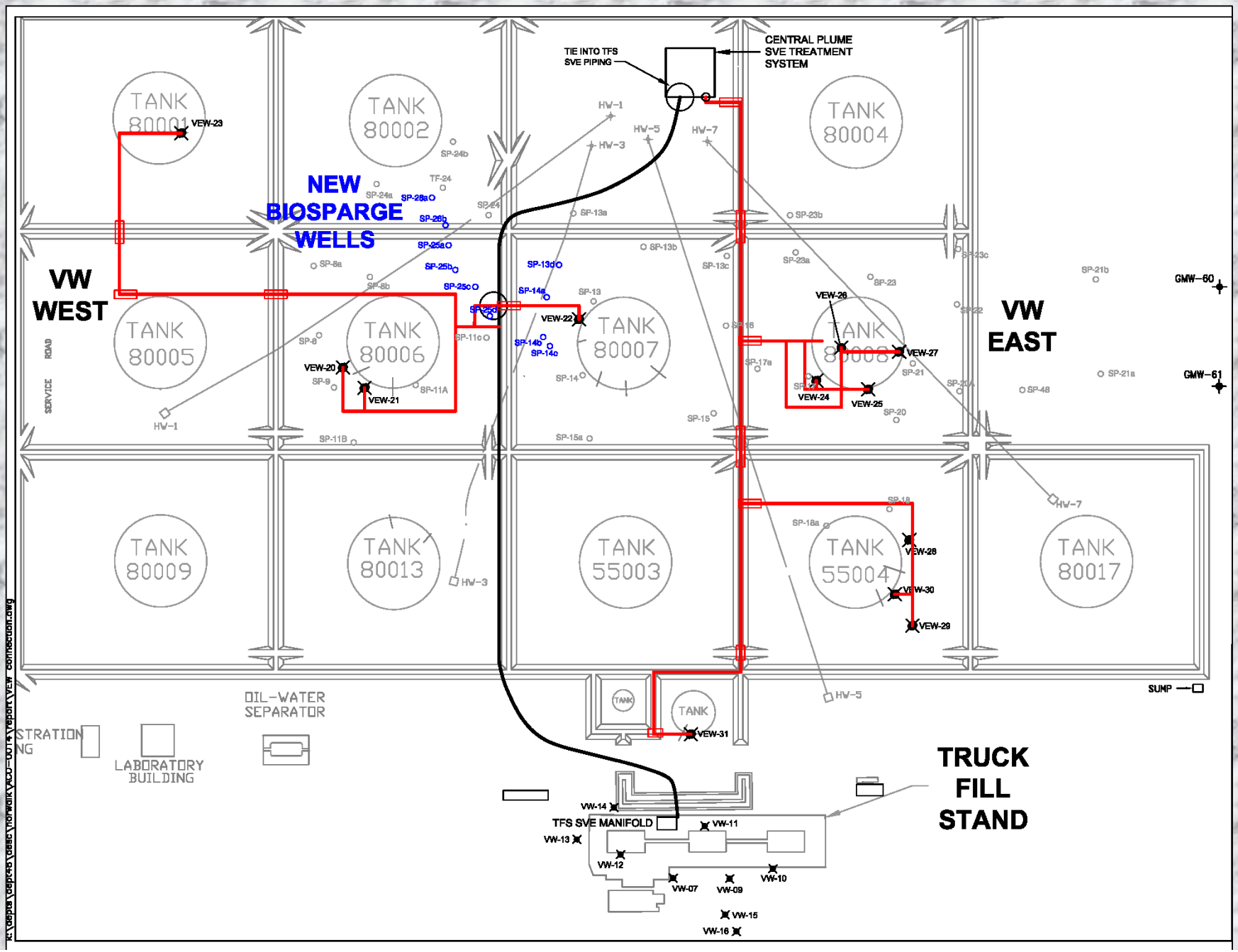
Oily Waste Area of Concern

- Received soil closure with deed restriction from Regional Water Quality Control Board in April 2005

Remediation Optimization

- Installed truck fill stand (TFS) vapor extraction system (VES) —April 2004
- Expanded tank farm VES system:
  - Cut access holes in 3 tanks—April/May 2004
  - Started up VW East and VW West—November 2004
  - Respiration testing—March 2005
  - Radius of influence testing—April 2005
- Expanded biosparge system—March 2005
- Evaluating:
  - Shutting off groundwater treatment and free product recovery (GWT/FPR) system
  - Replacing VES with bioventing

Layout of New DESC Remedial Systems



Remediation Optimization—Biosparging Startup

- Installed 10 additional sparge points in free product area between Tanks 80002 and 80007
- Biosparge System Startup Testing
  - Conducted March 2005
  - Performed individual tests at 4 sparge points
  - Monitored flow, pressure, water level, and dissolved oxygen (DO) at 7 nearby wells
- Results
  - DO increased to 7-10 mg/L
  - Air injection zone of influence—20 feet

Wells GMW-60 and GMW-61 Testing—Soil

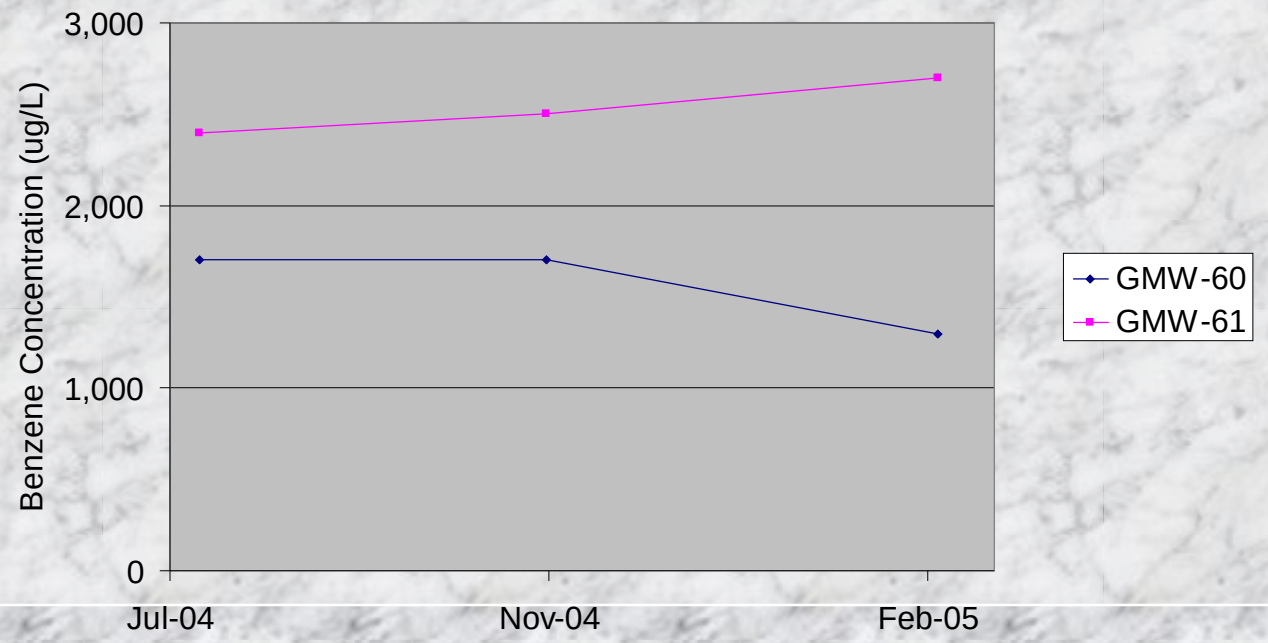
- Wells installed along eastern site boundary—April 2004
  - TPH detected at 10 ft and 30 ft in GMW-60
  - BTEX detected only at 30 ft (below groundwater)
- Soil step-out investigation—July 2004
  - North, west, and south of GMW-60
  - No contaminants detected in shallow soils

Wells GMW-60 and GMW-61 Quarterly Testing—Groundwater

Well	Date	TPHg	TPHfp	Benzene
GMW-60	7/21/04	15,000	5,300	1,700
	11/3/04	12,000	3,500	1,700
	3/2/05	8,300	4,900	1,300
GMW-61	7/21/04	19,000	14,000	2,400
	11/3/04	23,000	5,700	2,500
	3/2/05	20,000	10,000	2,700

Wells GMW-60 and GMW-61 Quarterly Testing—Groundwater

- Benzene concentrations:
  - Decreasing slightly in GMW-60
  - Increasing slightly in GMW-61



Wells GMW-60 and GMW-61 Quarterly Testing—Groundwater

		TPHg	TPHfp	Benzene	TPH: Benzene
Tank Farm					
GMW-17	11/6/04	--	3,000	110	27
GMW-32	4/21/04		1,500	0.5	2,885
MW-11	11/6/04	--	1,300	2	565
TF-16	11/4/04	--	16,000	180	89
South Plume					
GMW-27	11/3/04	21,000	1,500	8,800	2
MW-SF-1	11/3/04	34,000	12,000	13,000	3
Eastern Area					
GMW-47	3/2/05	170	110	33	5
GMW-57	3/2/05	400	170	190	2
GMW-58	3/2/05	5,800	2,200	1,700	3
GMW-59	3/2/05	4,200	2,300	400	11
GMW-60	3/2/05	8,300	4,900	1,300	6
GMW-61	3/2/05	20,000	10,000	2,700	7

Wells GMW-60 and GMW-61 Testing—Forensics

- 4 samples analyzed
  - Product from tank farm wells PZ-3 and TF-18
  - Dissolved-phase from GMW-60 and GMW-61
  - No free product available from eastern wells
- Conclusions
  - PZ-3 and TF-18 “most closely resembles degraded JP-4 fuel”
  - GMW-60 and GMW-61 “not related to the product in PZ-3 and TF-18, and are likely from gasoline”

Wells GMW-60 and GMW-61 Testing—Forensics

- Free product characterization
  - Kerosene-range hydrocarbons
  - No alkylead (leaded gasoline) or fuel oxygenates (most unleaded gasoline)
  - Only trace amounts alkylate hydrocarbons (gasoline octane booster)
  - BTEX constituents relatively minor
- Conclusion—JP-4

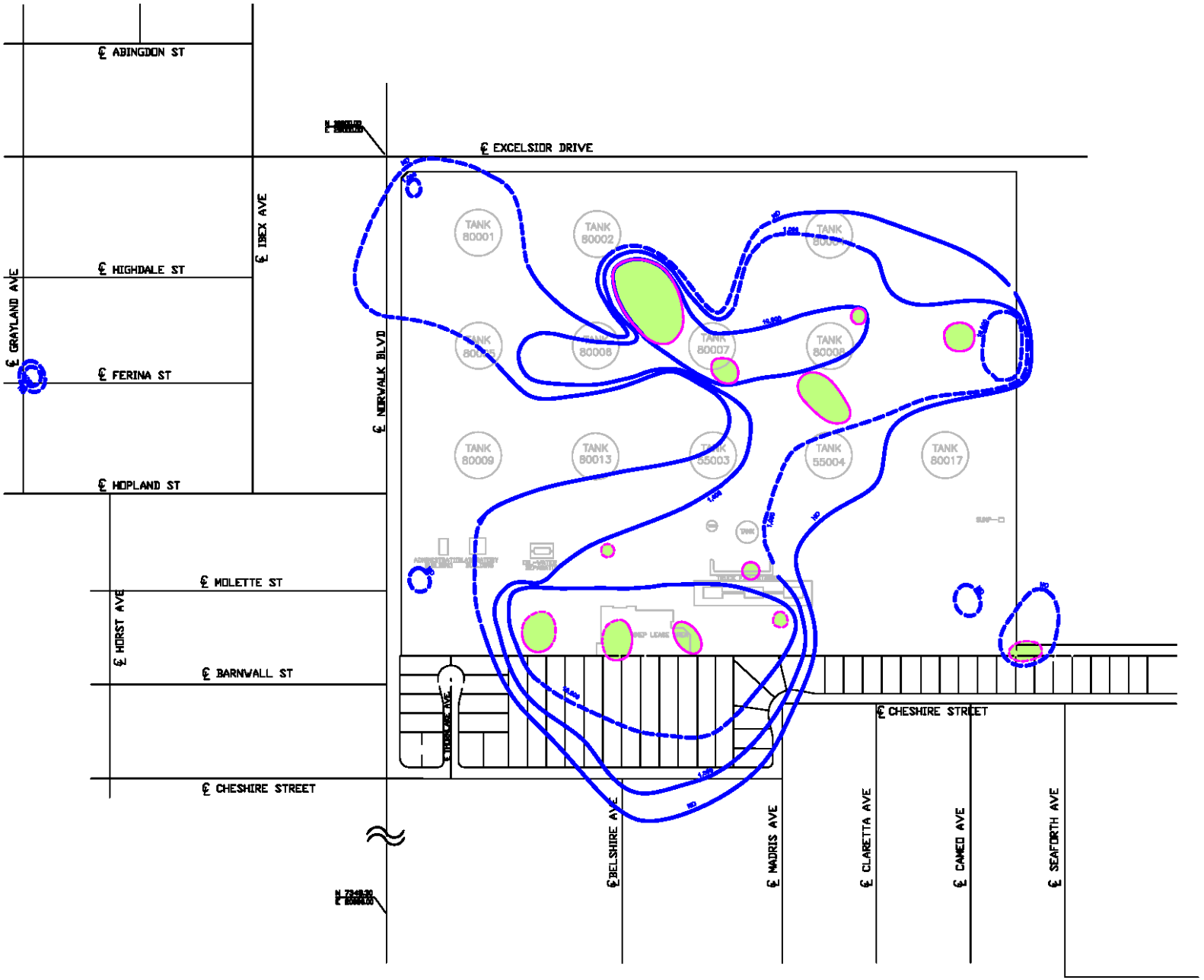
Wells GMW-60 and GMW-61 Testing—Forensics

- Dissolved product characterization
  - Hydrocarbons dominated by BTEX components
  - No fuel oxygenates (most unleaded gasoline)
  - No alkylate hydrocarbons (gasoline octane booster)—limited solubility in water
  - No evidence of kerosene hydrocarbons
  - Carbon isotope ratios substantially different (3-4%) from JP-4 fuels in PZ 3 and TF 18, suggesting different source
- Conclusion—volatile fuel such as gasoline

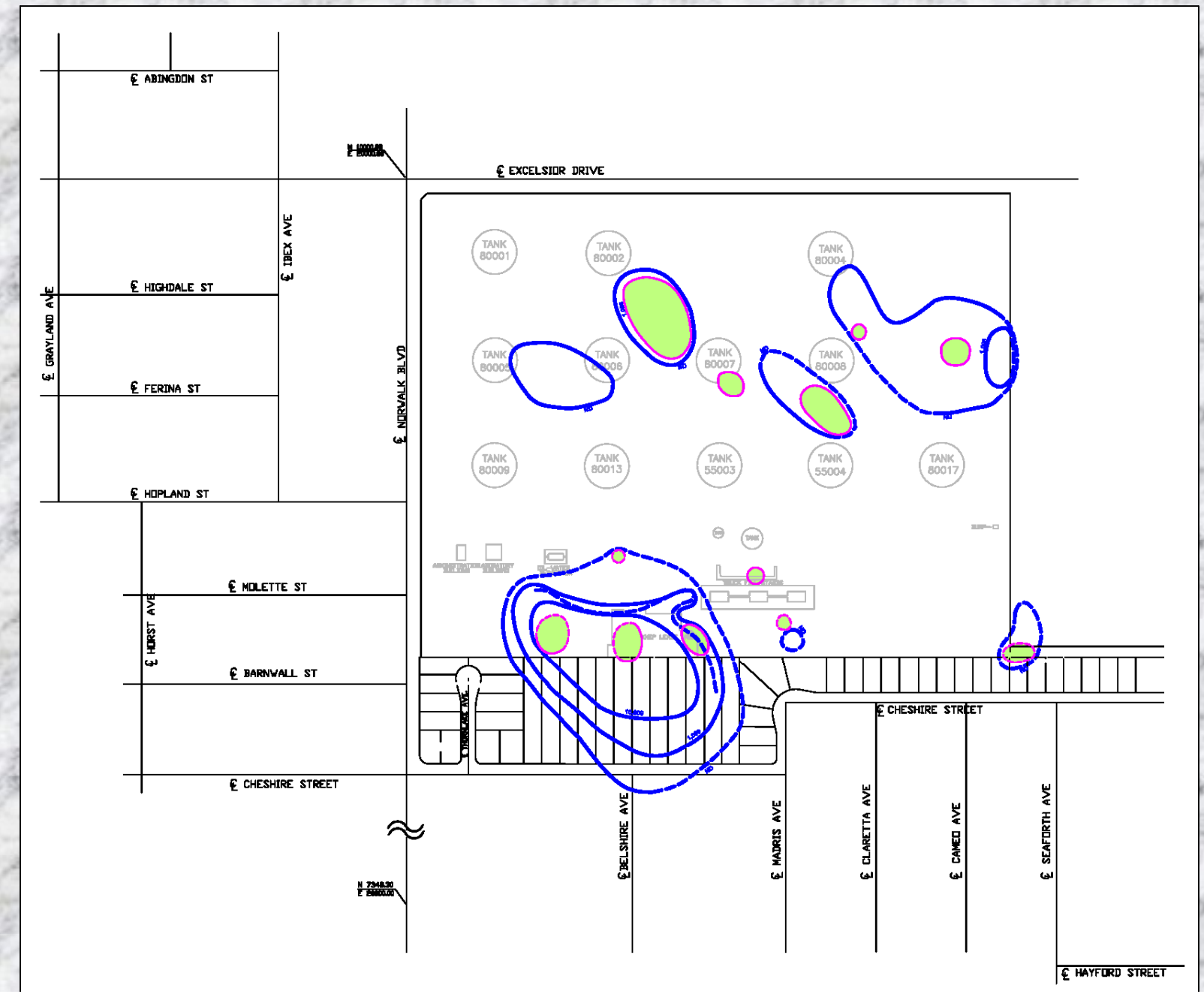
Discussion

Groundwater Equipotential Map and Limits of Measurable Liquid-Phase Hydrocarbons Nov 2004

TPH Isoconcentration Map
Nov 2004



Benzene Isoconcentration Map
Nov 2004



1,2-Dichloroethane Isoconcentration Map
Nov 2004

MTBE Isoconcentration Map
Nov 2004