Norwalk Tank Farm Update

Defense Energy Support Center-
Americas West
Norwalk Tank Farm
Restoration Advisory Board

July 27, 2006

Presentation Overview

Topics to be Covered

- Central plume remediation system update
- Remediation Optimization
- General Site Activities
- Eastern Boundary Update
- Eastern Boundary Wells
- Biosparge Efficiency Measures

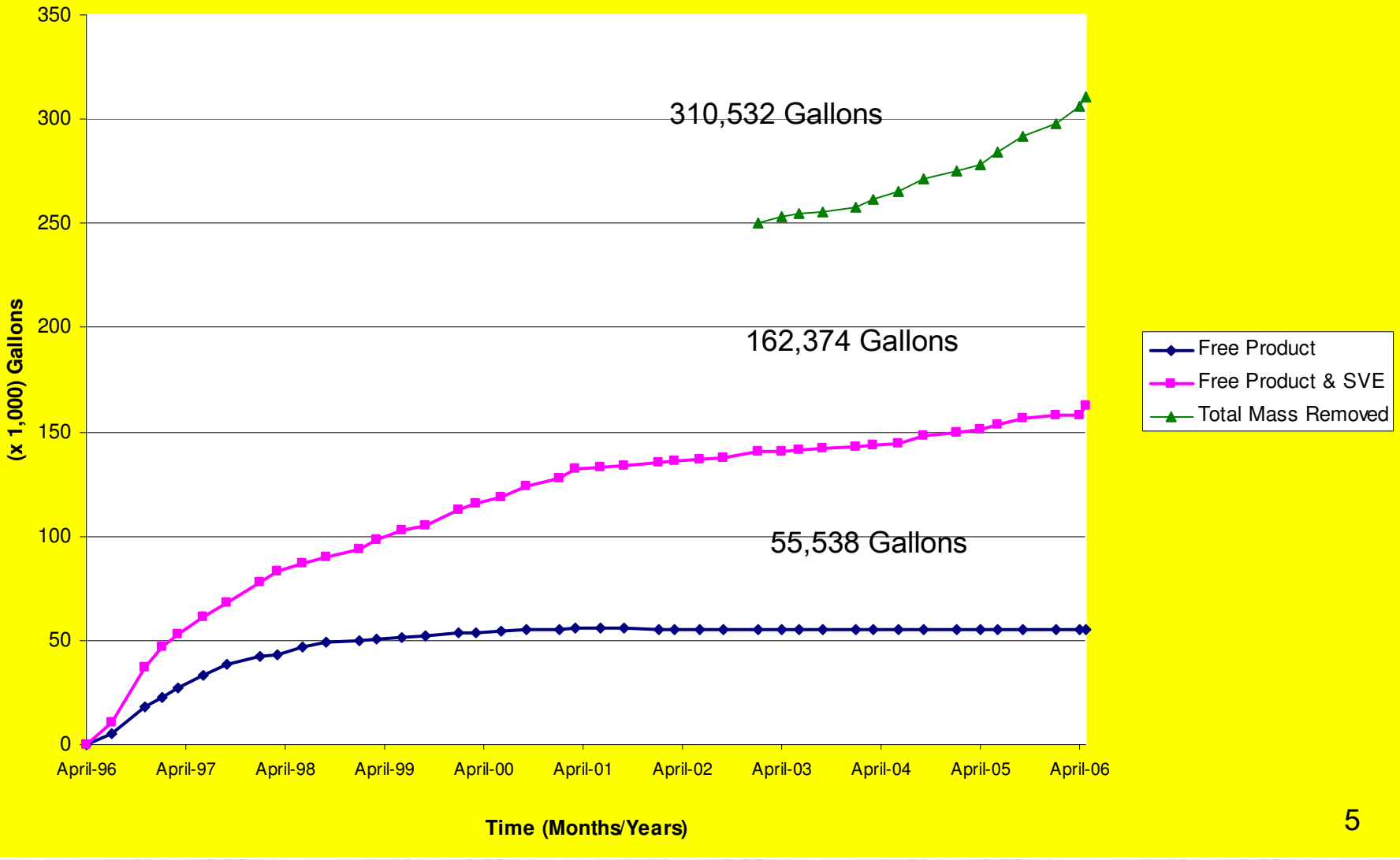
Central Plume Remediation

- System Performance Second Quarter 2006
  - Total Hydrocarbons Removed: 436 gallons
    - No gallons of hydrocarbons recycled/destroyed by FPR/GWT system
  - 0 gallons of water treated

Central Plume Remediation

- System Performance since April 1996
  - Total Hydrocarbons Mass Removed: 310,532 gallons.
    - Approx. 162,374 gallons recycled and destroyed
      - 55,538 gallons of free product recovered
      - 1,397 gallons of dissolved-phase hydrocarbons recovered
      - 105,439 gallons of volatile hydrocarbons recovered through SVE
    - Estimated 148,158+ gallons of hydrocarbons destroyed due to enhanced biodegradation
  - 42.2 M gallons of water treated

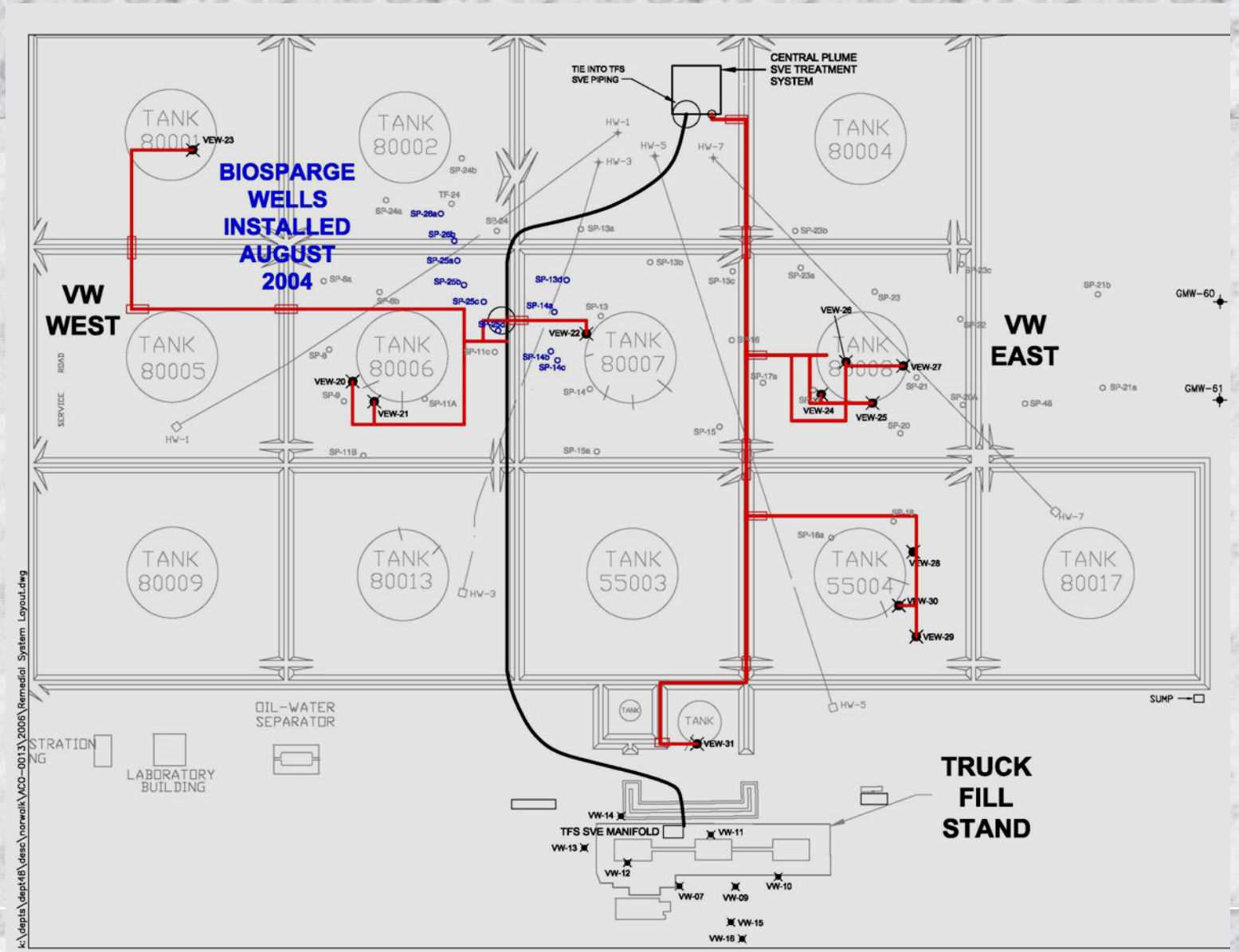
Hydrocarbons & Free Product – Central Plume



Remediation Optimization

- Continued soil remediation through SVE.
  - SVE removed ~320 gallons within tank farm and water tank
  - SVE removed ~ 43 gallons from truck fill stand (TFS)

Layout of DESC Remedial Systems



General Site Activities

- Reprogrammed the PLC
- Performed Weed Abatement
- Conducted Baseline Sampling for Biosparging
- Working on SVE system modification for use as SVE and biovent system
- Additional work planned for replacing the touchscreen panel and for replacing the EPROM.

Weed Abatement

General Site Activities

- GWT system maintenance in progress
  - Replace trays on air stripper
  - Replace water level sensor on blue water tank
  - Recharge and recertify fire extinguisher and repair eye wash
  - Enhance the capacity of the water filters and the arsenic removal tank
  - Fix any damaged valves and gauges
  - Assessing the cost of replacing the pneumatic pumps in TF wells with the submersible pumps to enhance the scope of GWT system, and refurbishing some submersible pumps

Eastern Boundary Update

- Access agreement to Hollifield Park approved by DESC.
- Field activities in Hollifield Park will be initiated after approval of the access agreement by the City of Norwalk.
- Biosparging workplan submitted to install additional on-site biosparge wells near the eastern boundary.
- Additional investigation activities proposed near the northeast corner of the site

Eastern Boundary Wells

- GMW-57
- GMW-58
- GMW-59
- GMW-60
- GMW-61

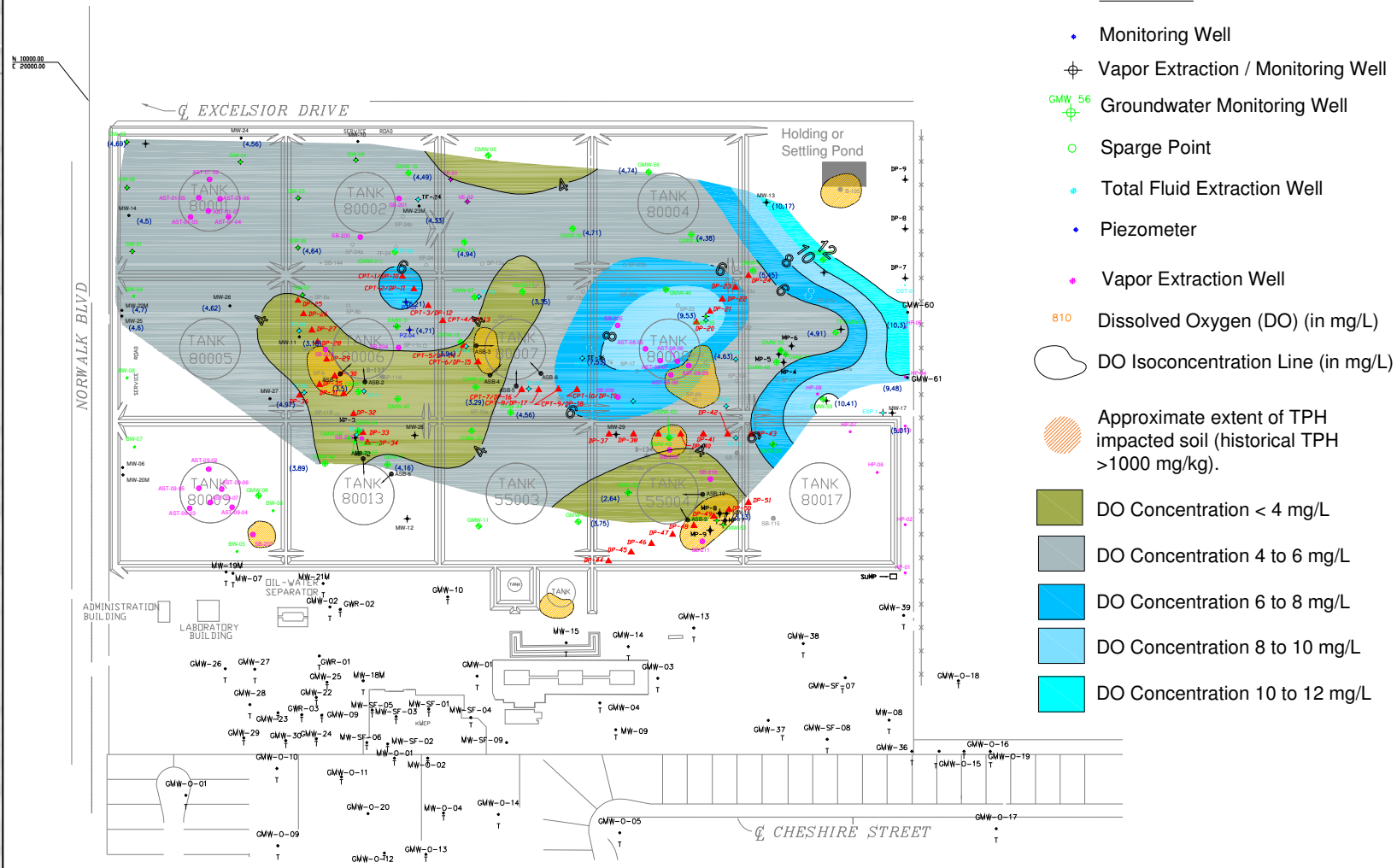
Eastern Boundary Wells Groundwater Analytical Results (May 06)

Well I.D.	Constituents of Concern					
	TPH as Fuel Product	TPH as Gasoline	MTBE	Benzene	Toluene	Ethylbenzene
	All constituents reported in micrograms per liter (µg/L)					
GMW-57	280	<100	<0.5	<0.5	<0.5	<0.5
GMW-58	16,000	2,900	<1.0	260	<1.0	85
GMW-59	9,300	9,900	<1.0	210	<1.0	4.0
GMW-60	2,200	3,900	<5.0	770	<5.0	230
GMW-61	7,300	9,600	<10	1,900	89	810

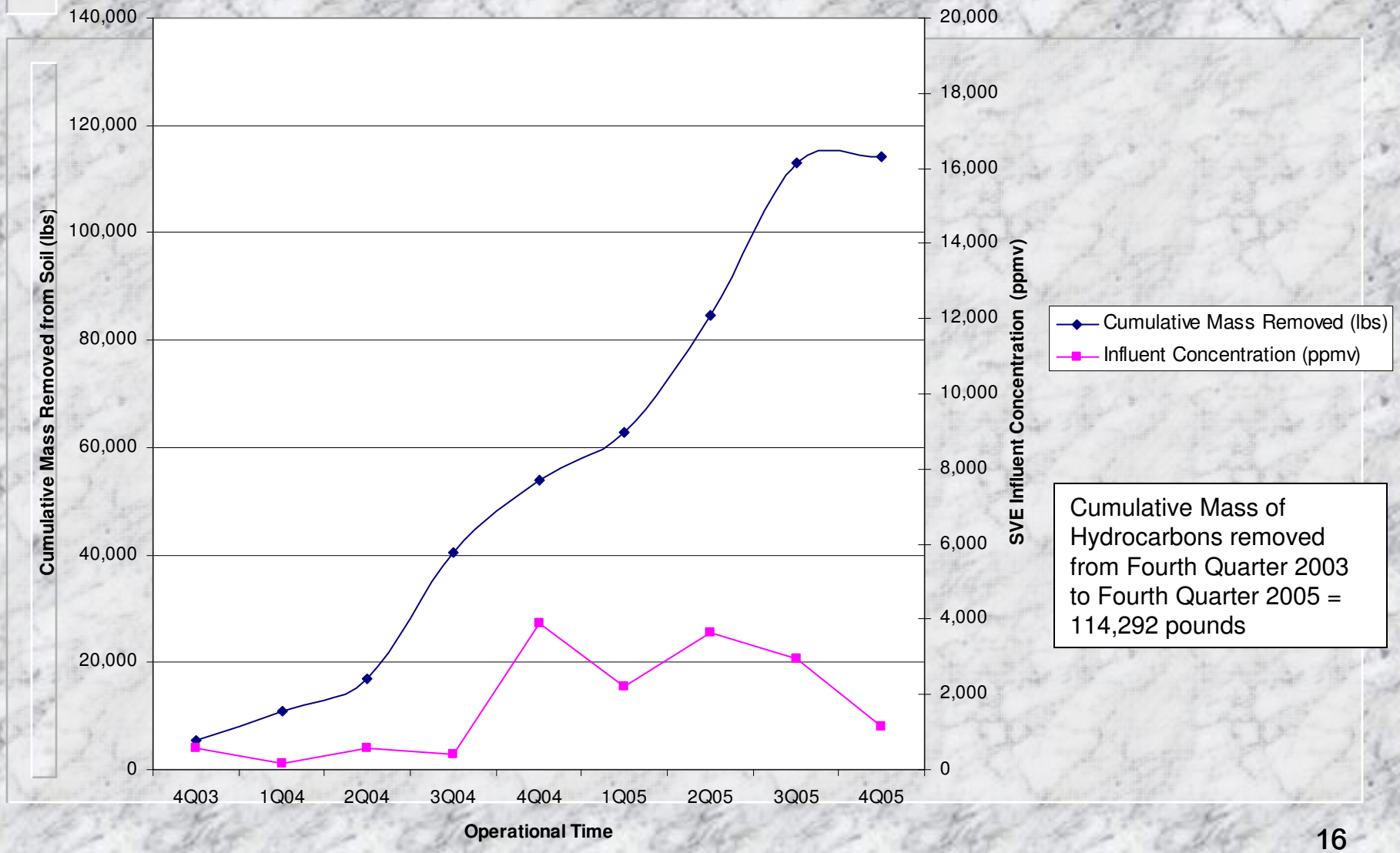
Biosparge Efficiency Measure

- Dissolved Oxygen (>4 mg/L)
- Performance Curve of Cumulative Mass Removal Vs. Influent SVE Concentration
- TPH Mass Estimate

Dissolved Oxygen Isoconcentration Map



PERFORMANCE EVALUATION OF BIOSPARGE SYSTEM

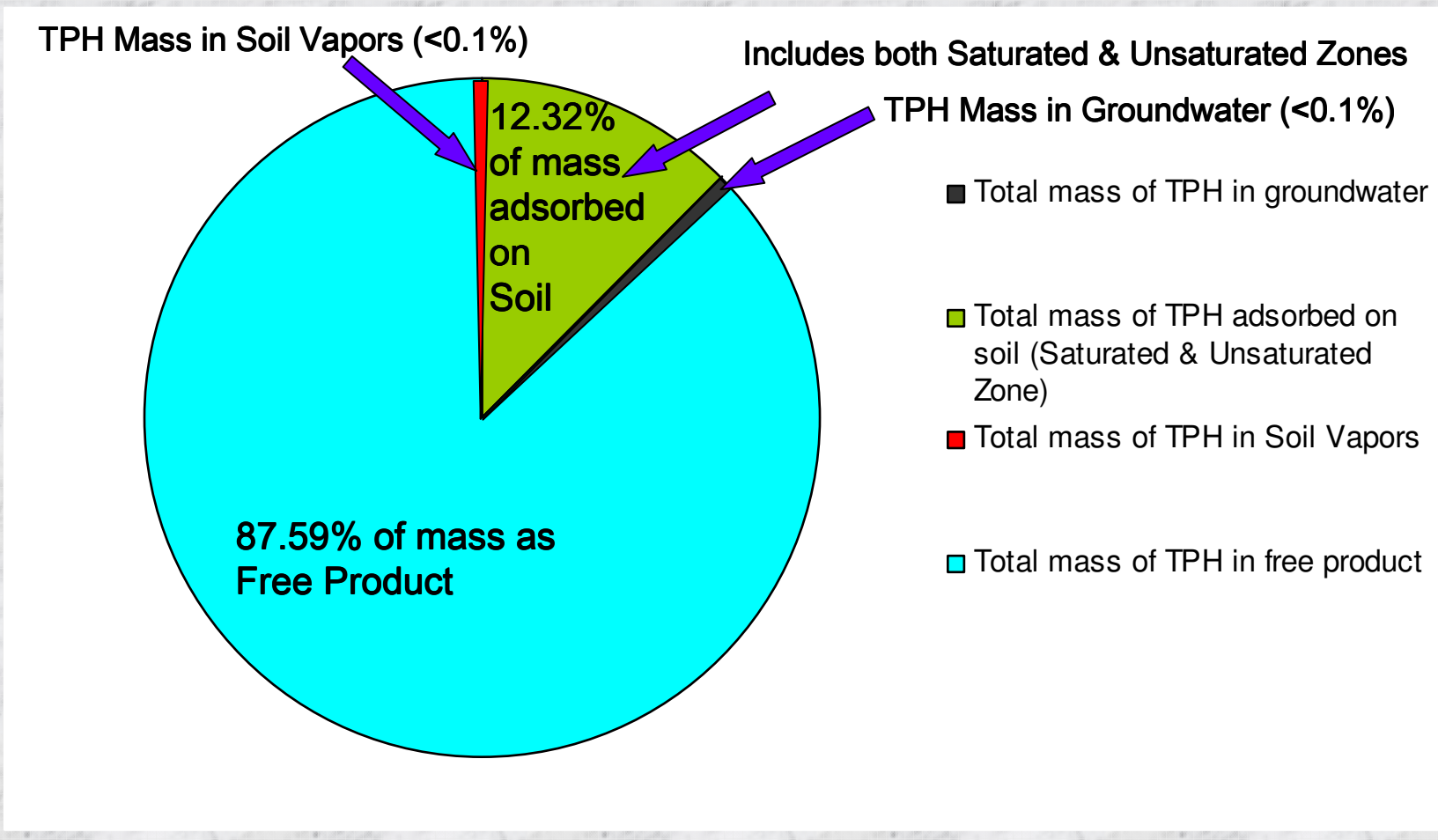


Cumulative Mass of Hydrocarbons removed from Fourth Quarter 2003 to Fourth Quarter 2005 = 114,292 pounds

TPH Mass Distribution

Description	Units	Data Value				Total
TPH Isoconcentration Groundwater Plume	µg/l	>10000	>5000 & <10000	>1000 & <5000	>500 & <1000	N/A
Groundwater TPH Concentration Assumed	µg/l	10,000	7,500	3,000	750	N/A
TPH Isoconcentration Plume	mg/l	10.0	7.5	3.0	0.8	N/A
Area of TPH plume	ft^2	95,500	62,300	246,105	154,944	558,849
Volume of groundwater and soil within the impacted saturated zone	ft^3	477,500	311,500	1,230,525	774,720	2,794,245
GROUNDWATER TPH MASS CALCULATIONS						
Total mass of TPH in groundwater	µg	135,212,943,050	66,155,233,131	104,533,763,401	16,453,220,614	322,355,160,195
Total mass of TPH in groundwater	lbs	300.47	147.01	232.30	36.56	**716.34**
SOIL TPH MASS CALCULATIONS						
Mass of soil (Saturated & Unsaturated zone)	kg	121,691,650	79,386,281	313,601,293	197,438,649	712117873.3
Mass of TPH adsorbed per kg of soil	mg/kg	160	120	48	12	N/A
Total mass of TPH adsorbed on soil (Saturated & Unsaturated Zone)	lbs	43,268	21,170	33,451	5,265	**103,154**
SOIL VAPOR TPH MASS CALCULATIONS						
Concentration of TPH in Soil Vapors	mg/L	0.438	0.329	0.132	0.033	N/A
Total mass of TPH in Soil Vapors	lbs	2.63	1.29	2.04	0.32	**6.28**
Net Mass of TPH (Vapor, Soil & Groundwater)	lbs					103,876
TPH AS FREE PRODUCT MASS CALCULATIONS						
		Average 2 feet Free Product Area		**Average 1 feet Free Product Area**		
Area of TPH Free Product Plume	ft^2	24,890		28,533		53,423
Total mass of TPH in free product	lbs	466,117		267,170		733,287
Volume of TPH as free product	gallons	74,471		42,685		**117,156**
Total Volume of TPH impacts at the Site	**gallons**					**133,752**
Total Volume of TPH impacts at the Site	**Barrels**					**3,185**

TPH Mass Distribution



Estimated Closure Time Vs. Estimated Workload

Number of Wells Currently Used for Remediation					
Area of Concern	**Groundwater Monitoring Wells**	**Groundwater Extraction Wells**	**SVE/Biovent Wells**	**Biosparge Wells**	**Estimated time for Closure**
Tank Farm Area	89	12	12	32	**8 Years**
Truck Fill Stand	5	0	9	0	
Eastern Boundary	6	0	0	0	
Northeastern Boundary	0	0	0	0	
Western Boundary	8	0	0	0	

Estimated Number of Additional Wells (to complete remediation in 1 Year)					
Area of Concern	**Groundwater Monitoring Wells**	**Groundwater Extraction Wells**	**SVE/Biovent Wells**	**Biosparge Wells**	**Estimated time for Closure**
Tank Farm Area	6	11	50	60	**1 Year**
Truck Fill Stand	4	25	16	20	
Eastern Boundary	4	8	15	30	
Northeastern Boundary	4	10	12	25	
Western Boundary	4	5	12	45	

Estimated Number of Additional Wells (to complete remediation in 5 Years)					
Area of Concern	**Groundwater Monitoring Wells**	**Groundwater Extraction Wells**	**SVE/Biovent Wells**	**Biosparge Wells**	**Estimated time for Closure**
Tank Farm Area	3	11	25	32	**5**
Truck Fill Stand	4	15	8	10	
Eastern Boundary	4	5	6	8	
Northeastern Boundary	1	5	6	8	
Western Boundary	2	3	5	5	

Discussion