02/05/08

Site 1 Facilitated Technical Meeting No. 2 Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage

NYSDEC, Albany, NY
February 5, 2008

February 2008

AGENDA

1. Meeting Goals / Introductions / Ground Rules (Glenn) – 30 minutes
2. AOC 22 – Proposed Remedial Action (Dave) – 30 minutes
3. Status of Site 1, Soil Vapor and Groundwater Testing (Dave) – 30 minutes
4. GM 38 Construction
5. Net Environmental Benefits Analysis (NEBA) (Kathy) – 30 minutes
6. Next RAB/TAC Meeting (group) – 15 minutes
7. Additional Items/Issues (Steve) – 60 minutes
8. Conclusion (group) – 15 minutes

GROUND RULES

1. Stay on Topic
2. Treat Each Other with Respect
3. Take Turns Speaking (One at a Time)
4. Listen
5. Be Honest
6. Have an Open Mind
7. Participate
8. Focus on Issues (Not on People)
9. Identify a Problem AND a Possible Solution
10. Make Progress/Move Forward

Items

AOC 22

Site 1

GM 38

NEBA

-RAB/TAC meeting

-GM75INV.

wellhead treatment at ONCT

FFSRA - Grumman long term O&M

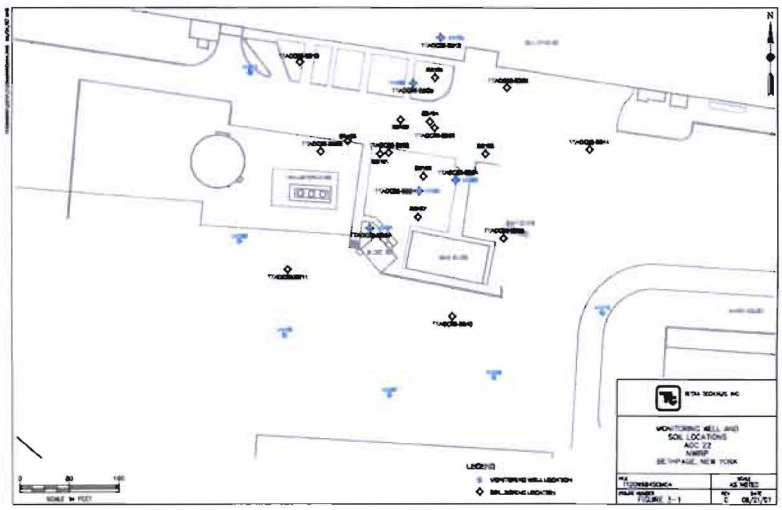
AOC 22/SITE 4 – FORMER USTs SITE HISTORY

- Three No. 4/6 Fuel Oil Underground Storage Tanks.
- Tanks removed between 1980 and 1984.
- Northrop Grumman first confirmed presence of soil contamination at the site in 1997.
- Primary contaminants are total petroleum hydrocarbons and Polynuclear Aromatic Hydrocarbons (PAHs)
- Limited free product detected in two area monitoring wells.

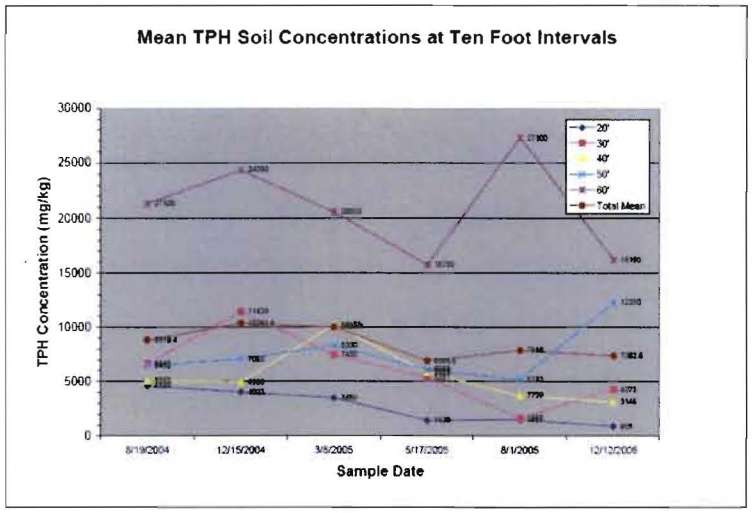
AREA OF CONCERN (AOC) 22/SITE 4 – FORMER USTs – SITE HISTORY

- In-situ enhanced bioremediation pilot-test conducted in 2004 to 2006.
- Test involved surfactants and enhanced aerobic bioremediation of petroleum.
- Test achieved limited removal of petroleum (17 percent).
- Groundwater testing shows no organic impact to groundwater.

AOC 22/SITE 4 – RESULTS



AOC 22/SITE 4
INVESTIGATION RESULTS



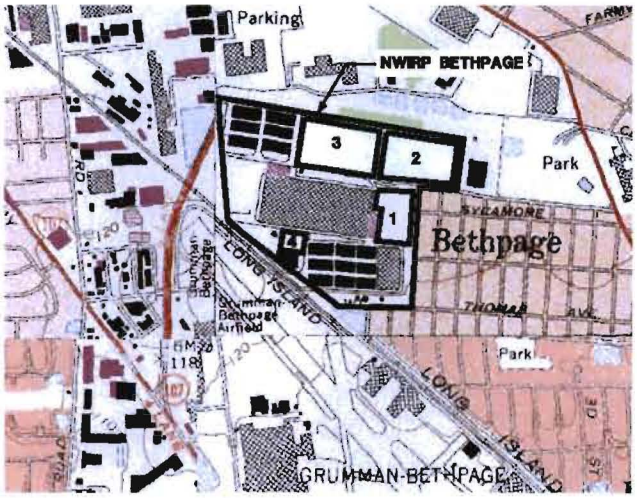
AOC 22/SITE 4
REMEDIAL ACTIONS

- Cover, Groundwater, and Use Restriction
- Cover, Bioventing, Groundwater Monitoring, and Use Restrictions.

SITE 1 HISTORICAL REVIEW

- Northrop Grumman Operations from 1940s to 1998
- Navy Caretaker Status from 1998 to present
- Initial Assessment Study 1986
- Remedial Investigations 1991 to 1993
- Feasibility Study 1994
- OU 1 (Soils) Record of Decision 1995
- Air Sparing/Soil Vapor Extraction System 1996 to 2001
- Pre-Remedial Design Soil Investigations 1995 to 2002
- Navy Re-evaluating Site 1 ROD Implementation 2003 to 2007
- Soil Vapor Intrusion Concerns 2008

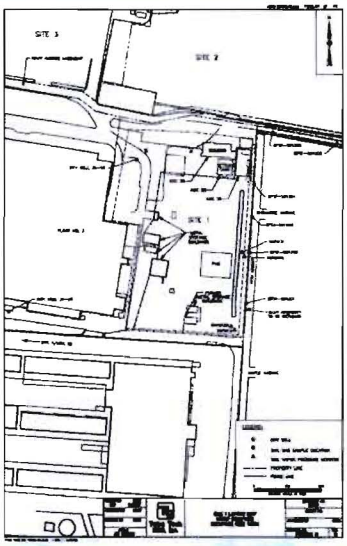
SITE 1 LAYOUT



SITE 1 AERIAL

SITE 1 SOIL GAS TESTING

- Conducted January 21 to 31, 2008

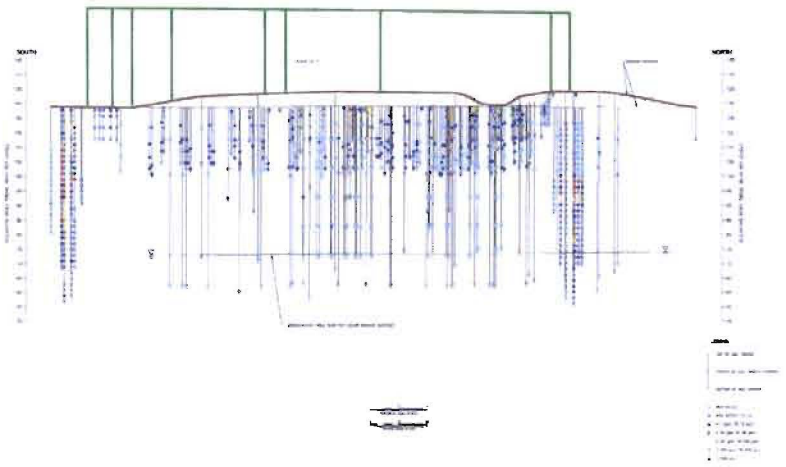


SITE 1 GROUNDWATER TESTING

- Sampled January 28 and 29, 2008

SITE 1 PCB RESULTS

SITE 1 PCB RESULT – CROSS SECTION



INNOVATIVE TECHNOLOGY SCREENING

Response	Technology/ Objective	Contaminant Class App	Technology Status	Representative Process	Applicability
NO ACTION	N/A	N/A	N/A	N/A	N/A
EXISTING CONTROLS	**Institutional Controls –** Control access of receptors to impacted soils **Environmental Monitoring** – Provide early warning of potential GW impacts	ALL	Conventional	•Environmental Easement •Zoning / Ordinance •Defined Site Use •Site Mgmt Plan •GW Monitoring •MNA	Applicable

INNOVATIVE TECHNOLOGY SCREENING

Response	Technology/ Objective	Contaminant Class App	Technology Status	Representative Process	Applicability
Removal	Mechanical Excavation	All	Conventional	Backhoe and Clamshell Excavation Equipment	Applicable – for deep soils, shoring required Deep Saturated Soils-dewatering required
Following Removal – On-Site Treatment and Placement of Treated Material	•Ex-Situ Solid/Stabil	All	Emerging	Pug-mill or Excavator mixing w/Portland, bentonite, fly ash, slag, act carbon, blend	Possibly Applicable (Following Excavation)
	•Biol Trtmt – destroy PCBs w/Fungal / bacterial trtmt in bioreactors / land-farming	PCBs	Emerging	Anaerobic / Aerobic Dechlorination	N/A – emerging ex-situ processes requires time & land area

INNOVATIVE TECHNOLOGY SCREENING

Response	Technology/ Objective	Contaminant Class App	Technology Status	Representative Process	Applicability
Following Removal – On-Site Treatment and Placement of Treated Material	Chemical Treatment – destroy PCBs in soil	PCBs	Emerging	Oxidation – H2O2/Fenton's/Permanganate (KMnO4)	N/A – low effectiveness
				Base Catalyzed Decomposition (BCA)	Possibly Applicable (Following Excavation)
Following Removal – On-Site Treatment and Placement of Treated Material	Chemical Treatment – destroy PCBs in soil	PCBs	Experimental	Mechanical-Chemical Treatment	N/A – experimental
			Discontinued	Lime addition	N/A – low effectiveness because of volatilization

INNOVATIVE TECHNOLOGY SCREENING

Response	Technology/ Objective	Contaminant Class App	Technology Status	Representative Process	Applicability
Following Removal – On-Site Treatment and Placement of Treated Material	Physical Treatment – Concentration of PCBs, Cadmium, Chromium to allow volume reduction	All	Experimental	Soil flushing / Surfactant Solvent Washing & Recovery	N/A – experimental; low effectiveness
Following Removal – On-Site Treatment and Placement of Treated Material	Combined Treatment – destroy PCBs in soil	PCBs	Experimental	Chemical Oxidation / Biological Treatment Surfactant Washing / Chemical Treatment	N/A – experimental; low effectiveness

INNOVATIVE TECHNOLOGY SCREENING

Response	Technology/ Objective	Contaminant Class App	Technology Status	Representative Process	Applicability
Off-Site Treatment / Disposal	Off-Site Treatment / Disposal in Permitted Facility	All	Conventional	Permitted Treatment and Disposal Facilities	Applicable (Following Excavation and Transport)
In-Situ Treatment	In-situ Solidification •Prevents contact between sat soils and GW •Possibly Cad/Chromium •PCBs tightly sorbed to soil, little benefit	Cadmium / Chromium	Emerging / Experimental for depths > 50 feet	Auger Rig Mixed w/ Portland Cement, bentonite, fly ash, slag, activated carbon, blend Pressure / Jet Grout w/ Portland Cement, bentonite, fly ash, slag, activated carbon, blend	No benefit because PCBs tightly sorbed No benefit because PCBs tightly sorbed-app to areas w/obstructions; beneath bldgs not advised because of damage

INNOVATIVE TECHNOLOGY SCREENING

Response	Technology/ Objective	Contaminant Class App	Technology Status	Representative Process	Applicability
In-Situ Treatment (con't)	**In-situ Solidification** •Prevents contact between sat soils and GW •Possibly Cad/Chromium •PCBs tightly sorbed to soil, little benefit	Cadmium / Chromium	Emerging Experimental	Bucket / Blender Mixed – Portland, bentonite, fly ash, slag, activated carbon, blend Chemical Fixation with Polymer	No benefit because PCBs tightly sorbed; applicable to surface soils only; low mixing effectiveness for deeper soils Not applicable – too experimental
In-Situ Treatment (con't)	**In-situ Thermal Treatment – Removal of PCBs**	PCBs	Experimental	Steam Stripping, Contained Removal of Wastes (CROW)	Not applicable – experimental for PCBs, low effectiveness

INNOVATIVE TECHNOLOGY SCREENING

Response	Technology/ Objective	Contaminant Class App	Technology Status	Representative Process	Applicability
In-Situ Treatment (con't)	**Biological Treatment – destroy PCBs in sat soil using fungal or bacterial treatment**	PCBs	Emerging	Sequential Anaerobic / Aerobic Dechlorination	Not Applicable – emerging ex-situ processes, low effectiveness

INNOVATIVE TECHNOLOGY SCREENING

Response	Technology/ Objective	Contaminant Class App	Technology Status	Representative Process	Applicability
In-Situ Treatment (con't)	**Chemical Treatment of Saturated Soil**	**All**	**Experimental**	**Oxidation – H2O2 / Fenton's / Permanganate (KMnO4)** **Soil Flushing / Surfactant Solvent Washing & Recovery**	**N/A – low effectiveness** **N/A – experimental; insufficient hydraulic control**
In-Situ Treatment (con't)	**Chemical Treatment of Saturated Soil**	**All**	**Experimental**	**Chemical Fix / Stabilization** **Vitrification**	**N/A – Experimental & Impracticable**

INNOVATIVE TECHNOLOGY SCREENING

Response	Technology/ Objective	Contaminant Class App	Technology Status	Representative Process	Applicability
In-Situ Treatment (con't)	**Combined Treatment – destruction of PCBs in Saturated Soil**	**PCBs**	**Experimental**	**Chemical Oxidation / Biological Treatment** **Surfactant Washing / Chemical Treatment**	**Not applicable – experimental, low effectiveness**
Containment – Soil	**Capping** **•Physical barrier to direct contact** **•Decrease surface water infiltration to deeper soils**	**All**	**Conventional**	**Asphalt Cap** **Gravel** **Clay Cap** **RCRA Landfill Cap**	**Applicable**

INNOVATIVE TECHNOLOGY SCREENING

Response	Technology/ Objective	Contaminant Class App	Technology Status	Representative Process	Applicability
Containment – GW	**Containment Cell Bottom –** In combo w/ vertical barriers; prevents contact between sat soils and GW	All	Experimental	Pressure Grouting w/ Portland, Bentonite or Blend; Cell bottom, placed in combo w/ vertical barriers and impermeable cap	Not applicable – not a proven technology at depths below 30 ft; N/A if cap is perm, due to "bathtub effect"
Containment – GW	**Slurry Wall** •In combo w/ cell bottom & impermeable cap, prevents contact between sat soils and GW; •prevents vapor migration in vadose zone	All	Conventional	Pumped – Portland, Bentonite or Blend	No GW benefit without impermeable cap and cell bottom

INNOVATIVE TECHNOLOGY SCREENING

Response	Technology/ Objective	Contaminant Class App	Technology Status	Representative Process	Applicability
Containment – GW	**Grout Curtain** •In combo w/ cell bottom & impermeable cap, prevents contact between sat soils and GW; •prevents vapor migration in vadose zone	All	Conventional	In-situ Solidification – Portland, Bentonite or Blend	No GW benefit without impermeable cap and cell bottom
Containment – GW	**Sheet Pile Wall** •In combo w/ cell bottom & impermeable cap, prevents contact between sat soils and GW; •prevents vapor migration in vadose zone	All	Conventional	Steel HDPE	No GW benefit without impermeable cap and cell bottom N/A – HDPE only better than steel in low pH GW; also required depth

INNOVATIVE TECHNOLOGY SCREENING

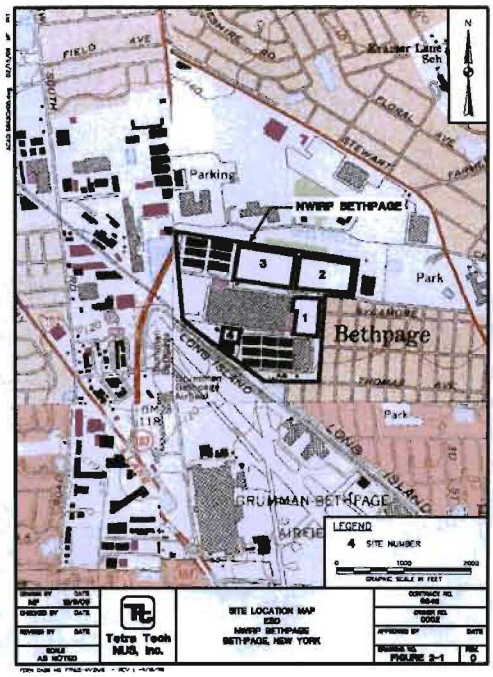
Response	Technology/ Objective	Contaminant Class App	Technology Status	Representative Process	Applicability
Containment – GW	**Hydraulic Curtain – prevents potential migration of impacted GW**	**All**	**Conventional**	**Downgradient Pump & Treat Capture Zone**	**N/A to Surface Soil**

SITE 1 ALTERNATIVES

- Implement ROD.
- Risk-based Cleanup (375-6 – Remedial Program Soil Cleanup Objective) – Including Cover, Partial Excavation, Groundwater Monitoring, Use Restrictions.
- Risk-based Cleanup (375-6) – with Innovative In-situ Treatment.

AOC 22/Site 4 – Former Underground Storage Tanks Update

NWIRP Bethpage
February 1, 2007



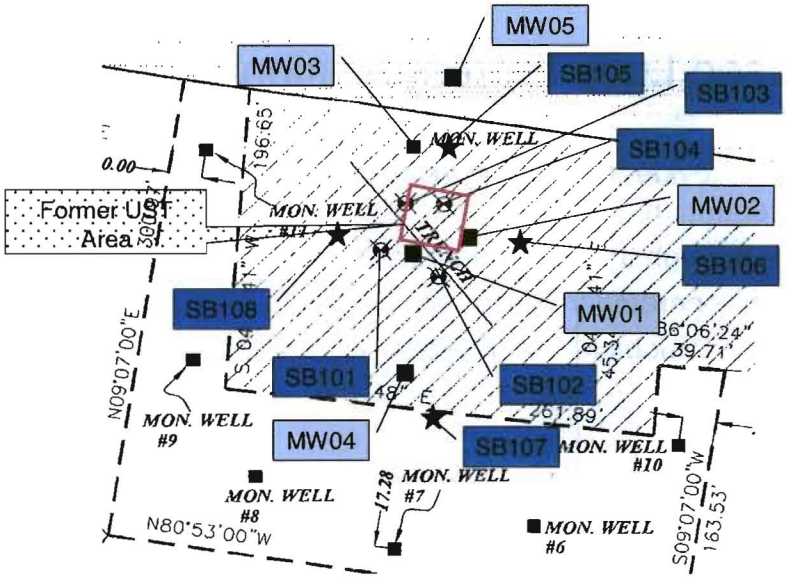
Site History

- Underground storage tanks active in 1940s to 1960s.
- Contained No. 6 Fuel Oil.
- Tanks were removed at an unknown time, probably early 1980s.

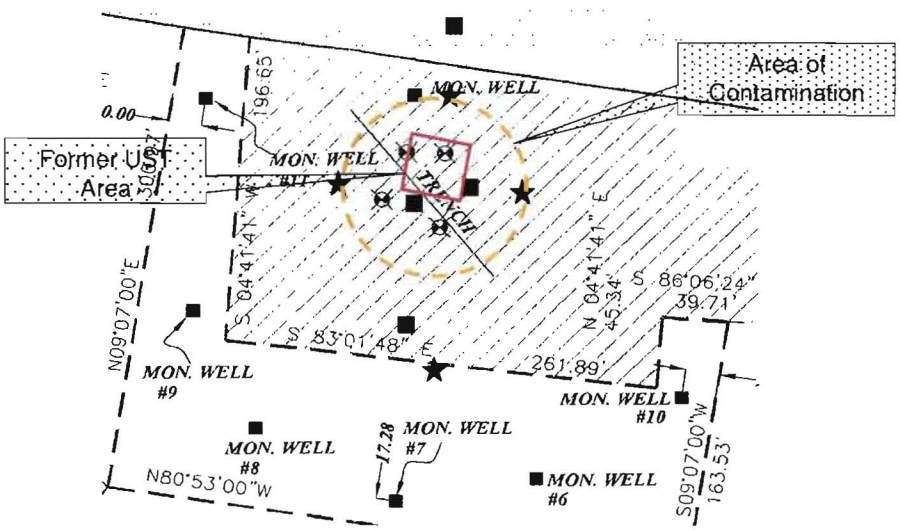
AOC 22 Area

Environmental Concerns

- Gross petroleum contamination (total petroleum hydrocarbons).
- Polynuclear aromatic hydrocarbons (PAHs)
- Majority of contamination is near the water table (60 feet below ground surface)
- Limited impact to groundwater.



AOC 22, Soil Boring and Groundwater Sampling
NWIRP Bethpage, New York



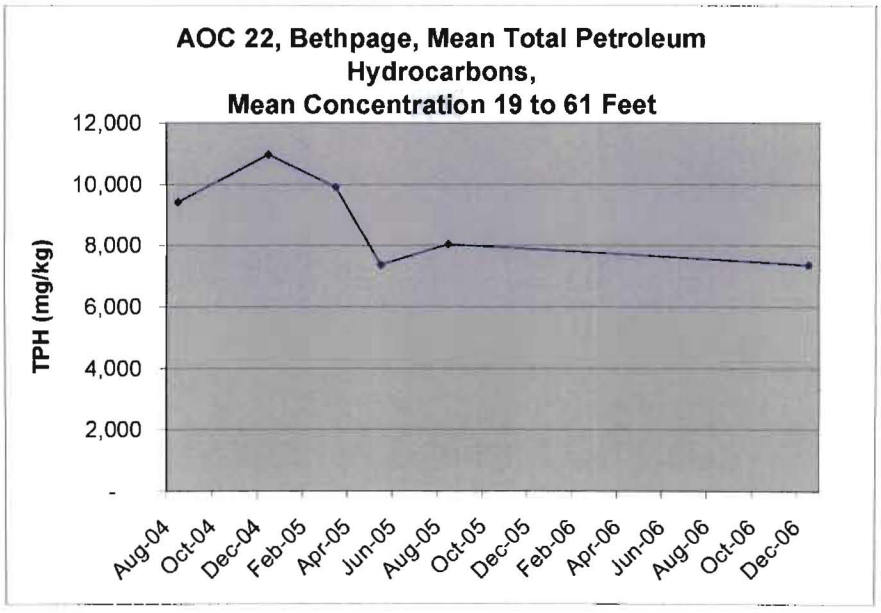
AOC 22, Soil Boring and Groundwater Sampling
NWIRP Bethpage, New York

Closed Loop Bioremediation System

- Goal: Provide 90 percent reduction in TPH concentration.
- Treat through the use of surfactants and aeration.
- System operated from fall 2004 to spring 2006.
- System demobilized from site in August 2006.

December 2006 Preliminary Results

- Potential 22% removal of hydrocarbons.
- Shallow soil contamination moved deeper.
- Tar layer present in MW-01 and -02.
- No evidence of groundwater impacts.



Next Steps

- Data report in spring 2007.
- No significant change to the February 2002 RFA/FFS.