# MEETING MINUTES

## RESTORATION ADVISORY BOARD
## For
## PLUM BROOK ORDNANCE WORKS

**Meeting Date**: March 27, 2002
**Meeting Time**: 7:00 p.m.
**Meeting Location**: BGSU Firelands
**Meeting Attendees**:

Mark Bohne, RAB Co-Chairperson
Rick Meadows, USACE, RAB Co-Chairperson
Richard Pitsinger, RAB
Starr Truscott, RAB
Lisa Olemacher, RAB
George Parker, RAB
Gil Steinen, RAB
Starr Truscott, RAB
Lisa Humphreys, USACE
Linda Ingram, USACE
Lannae Long, USACE
Ron Nabors, OEPA
Robert Lallier, NASA
Mikael Spangberg, PES
Mike Gunderson, PES
Steven Downey, IT Corporation
William Anderson, IT Corporation
Helen Owens, ICI
Larry Holkenborg, Visitor
Eugene Dahs, Visitor
Frank Lylte, Visitor

- The RAB Meeting was held on Wednesday March 27, 2002 at BGSU- Firelands, located in Huron, Ohio. The meeting was opened by Mr. Mark Bohne and Mr. Rick Meadows USACE, RAB Co-Chairpersons.

- The agenda for the evening included the following presentation:
  *Summary – Groundwater Remedial Investigation – TNT and Red Water Ponds Areas* – presented by Mike Gunderson of Pacific Environmental Services, Inc.

  A copy of the presentation material is included in this mailing.

- Mark Bohne, RAB Co-Chairperson, briefly summarized the agenda from the Eastern FUDS Forum, which he and Rick Meadows attended in late February. Specifically, Mark commented on the PBOW RAB as one of the top RABs in the FUDS program due to the cohesiveness of the group (RAB, USACE, OEPA, and the contractors) and their commitment to doing a thorough job at the site. Mark commented that the largest obstacle facing FUDS projects is funding. He encouraged RAB members to write their congresspersons to petition for sustained budgets to allow the FUDS activities to progress to completion.

- Mark Bohne asked RAB members if there was a need to add members to the RAB. The subject was presented as a result of decline in membership and the upcoming increase in the level of activities at the site as the project progresses. The RAB members were asked to invite interested individuals that may want to participate in the RAB activities.

# *PLUM BROOK ORDNANCE WORKS*
# *Restoration Advisory Board*

## *Quarterly Fact Sheet* *October through December 2001*

### SITE DESCRIPTION

The former Plum Brook Ordnance Works is located four (4) miles south of Sandusky, Ohio, near Lake Erie. Nitro-aromatic explosives produced at the site included TNT, DNT, and pentolite; other products produced at the ordnance works included nitric and sulfuric acid. The plant operated for four years from 1941 to 1944, and was decontaminated by the end of 1945. Possession of the property was transferred to the Ordnance Department in 1946, then to the War Assets Department, and finally to the GSA in 1949. NASA acquired the property in 1963 and presently maintains and utilizes 6453.5 of the original 9009 acres.

### SITE HISTORY

The U.S. Army entered into a contract with Trojan Powder Company for the purpose of manufacturing this ordnance. The official title for the site during this time was the Plum Brook Ordnance Works (PBOW). Groundbreaking to construct the facilities to support the manufacturing of ordnance began on April 15, 1941. Production began on December 16, V-J Day (1941). During the production period more than one billion pounds of ordnance was manufactured.

PBOW was placed in standby condition from 1945 to 1946. Throughout this time, the Army conducted decontamination and decommissioning (D&D) of many of the buildings and structures associated with the manufacturing of ordnance. Decontamination efforts on all TNT and DNT lines began in September 1945. Decontamination of TNT lines, acid lines, pentolite lines, and DNT lines was halted during the last quarter of 1945. Typical D&D methods for buildings and structures involved removal and relocation of all explosives to a burning ground where they were burned. Where possible, remaining buildings and structures were burned to the ground. Steam lines, drain lines, etc., were flushed and dismantled. There is no indication in PBOW historical records of where lines were flushed.

It is estimated that 65 percent of the necessary decontamination of PBOW was completed by December 1945. On midnight of December 17, the physical custody of the PBOW was transferred from Trojan Powder Company to the U.S. Army Ordnance Department. The Ordnance Department became the accountable agency and the U.S. Army Corps of Engineers assumed responsibility for maintenance and custodial duties at the PBOW from January 1 through June 30, 1946.

After further decontamination efforts were completed, and the extent of contamination certified, PBOW was transferred to the War Assets Administration in August 1946. From 1946 to 1949 the property was protected and maintained by Matthew-Levio and Sons. In 1949 it was transferred to the General Services Administration (GSA), which maintained oversight of the facility. Ravenna Arsenal conducted further decontamination efforts from 1945 to 1958. NASA accepted the facility in 1963 after Ravenna Arsenal certified that the PBOW had been completely decontaminated and was suitable for unrestricted future use. After acceptance of the PBOW, NASA identified further areas that required decontamination. In 1964, NASA continued site decontamination and the removal of structures.

In 1956 an agreement was made to lease 500 acres of the north portion of the site to construct and operate the Plum Brook Reactor Facility (PBRF). NASA operated the PBRF from 1963-1973 under a license agreement with the Atomic Energy Commission (AEC). NASA currently has a license agreement with the Nuclear Regulatory Commission (NRC) for the safe protective storage of the PBRF. NASA acquired an additional 6,000 acres of the former PBOW on March 15, 1963, for the purpose of conducting various aerospace research activities. NASA continues to use the site today.

## SUMMARY OF ACTIVITIES

*Red Water Ponds Area*

- Feasibility Study

  The Final Phase II Ecological Risk Assessment was finalized on October 31, 2001and is being incorporated into the Administrative Record (AR). USACE is proceeding with the Feasibility Study (FS) on the Pentolite Road Red Water Ponds and with a management decision on the West Area Red Water Ponds based on the discussions between OEPA, USACE Huntington and Nashville Districts, and IT Corporation in late August. The draft FS is expected by mid February 2002.

*TNT Area B*

- Remedial Investigation/Feasibility Study

  The Feasibility Study has been finalized and being incorporated into the AR. USACE will proceed with an Action Memo instead of a Decision Document. USACE Nashville has prepared a draft Action Memo for the soils removal, which is currently being reviewed by USACE Huntington. Upon completion of the groundwater investigation, a Decision Document will be developed that will correlate potential groundwater issues to the contaminated soil removal effort.

*TNT Area A and TNT Area C*

- Remedial Investigation

  The Final Remedial Investigation Report Volume I, Volume II (Human Health Risk Assessment), and Volume III (Ecological Risk Assessment) was issued in late October 2001 and is being incorporated into the AR. A draft of the Feasibility Study (Volume IV) is being prepared and is expected to be available for USACE internal review in late January 2002. The revised delivery date was necessary to address additional questions on the risk assessment

*Groundwater Remedial Investigation for TNT A, B and C & Red Water Ponds Areas*

- Fieldwork was completed in mid-October 2001. The summary report is expected to be available for USACE internal review by late January 2002. The next round of sample collection is scheduled for mid-January 2002.

*Restoration Advisory Board*

A RAB meeting was held on December 12, 2001 and IT Group presented the findings from the ecological risk assessments (RA) conducted at TNT Areas A and C, and Red Water Ponds. IT also presented findings from the human health risk assessment conducted at TNT Area A and C. In addition to the RA presentations, IT also presented a summary of Groundwater Remedial Investigation, which is on-going in TNT and the Red Water Ponds Areas.

## PBOW WEBSITE

USACE Huntington continues to maintain the website which is dedicated to keeping the public informed about the PBOW activities. This site is being updated regularly with new project information, as well as the PBOW fact sheets, investigation schedules and the Annual FUDS Newsletter. To find out the latest news on the PBOW project, please visit the website at the following address: www.lrh.usace.army.mil/PM/PBOW.

## PBOW TOLL FREE NUMBER

USACE Huntington now has a toll-free number in place for your use. If you have any information such as personal knowledge, photographs, maps, newspaper articles of past activities or other information you would be willing to share, or you just have questions about current activities at the site, please feel free to use the toll free number. We're interested in hearing from you, so call toll free 1-800-822-8413 and ask for Lisa Humphreys or Frank Albert.

## PROJECT CONTACT

The PBOW project manager is Richard L. Meadows, Huntington District (CELRH-PM-P) at (304) 529-5388, fax (304) 529-5715 or via email at Richard.L.Meadows@Lrh01.usace.army.mil. He may be reached during the hours of 8:00 a.m. to 5:00 p.m, Monday - Friday. You may also call the toll free number listed above and ask to be transferred directly to his office.

# Summary

# Sitewide Groundwater Remedial Investigation
# Plum Brook Ordnance Works
# Sandusky, Ohio

**Presented to**

**PBOW Restoration Advisory Board**

**27 March 2002**

# Objectives of the Sitewide Groundwater Remedial Investigation

- Determine if hazardous substances are present at the site that may constitute unacceptable risk to human health and the environment
- Define site physical features and characteristics
- Evaluate fate and transport pathways
- Determine the nature and extent of source areas
- Define current and future routes of exposure
- Determine whether contaminant distribution is consistent with DOD activities

# Background Information Used to Scope the Remedial Investigation

- Groundwater RI built on the findings from previous studies
  - ➔ Sitewide Groundwater Monitoring (1996 and 1998)
  - ➔ TNT Areas Investigations (1997-2001)
  - ➔ Redwater Ponds Investigations (2000)

# Summary of Proposed and Actual Fieldwork

- Direct push piezometers and groundwater samples
  - ➔ 45 samples for nitroaromatic explosives planned for each of the TNT Areas (A, B, and C)
    - TNT A - 13 piezometers installed, only two had sufficient water for analysis
    - TNT B - 5 piezometers installed, only two had sufficient water for analysis
    - TNT C - 14 piezometers installed, only two had sufficient water for analysis
    - USACE and Ohio EPA agreed the remaining overburden piezometers would not be installed due to dry conditions

# Summary of Proposed and Actual Fieldwork (continued)

- Bedrock monitoring wells
  - ➔ 10 bedrock monitoring wells were planned for the TNT Areas (A, B, and C), Pentolite Road Red Water Pond, perimeter (downgradient) monitoring and for determining background conditions
- Groundwater sampling
  - ➔ Sampling of 49 monitoring wells planned
  - ➔ 34 monitoring wells were actually sampled
- Groundwater elevation surveys
  - ➔ Collected quarterly by the USACE

# Summary of Proposed and Actual Fieldwork (continued)

- Soil sampling
  - → 24 soil samples were collected as planned
- Free-phase sampling - 2 unplanned samples collected
- Other activities included permeability testing, land surveying and IDW management

# Analytical Program

- Groundwater (direct push sampling)
  - ➔ Nitroaromatics (screening analysis) and Volatile Organic Compounds
- Groundwater (monitoring well sampling)
  - ➔ Volatile organic compounds, semivolatile organic compounds, nitroaromatics, metals, and wet chemistry
- Free Phase
  - ➔ Volatile organic compounds, gasoline and diesel range organics

# Analytical Program (continued)

- Soil
  - ➔ Volatile organic compounds, semivolatile organic compounds, nitroaromatics, metals, and SPLP nitroaromatics
- IDW
  - ➔ Volatile organic compounds, semivolatile organic compounds, metals, ignitability, corrosivity,and reactivity

# Site Hydrogeology

- Overburden water-bearing zone
  - ➔ Discontinuous "pockets" of water present in 2001
  - ➔ Extent highly dependent on precipitation
  - ➔ Flow is to the north-northeast (mimics bedrock flow)
  - ➔ Data suggest there are varying degrees of connectivity with the bedrock water-bearing zone
    - Low degree of connectivity in the north and west portions of the site
    - High degree of connectivity in the south and central portions of the site

# Site Hydrogeology (continued)

- Bedrock water-bearing zone
  - ➔ Continuous water-bearing zone across the site
  - ➔ Three geologic units identified at the site - the Ohio Shale, the Olentangy Shale, and the Delaware Limestone
  - ➔ Flow is to the north-northeast

# Summary of Analytical Results

| Area | Analytes Exceeding Preliminary Remediation Goals in 2001 Sampling | |
|---|---|---|
| | Overburden Water Bearing Zone | Bedrock Water Bearing Zone |
| West Area Red Water Ponds | No samples collected | Arsenic and thallium |
| Penotolite Road Red Water Ponds | No samples collected | Benzene, methylene chloride, acetone, toluene, naphthalene, bis(2-ethylhexyl)thalate, arsenic and manganese |
| TNT Area A | 2,4,6-TNT, 2,4-DNT, 2,6-DNT, 4A-2,6-DNT, 2A-4,6-DNT, arsenic and iron | Methylene chloride, benzene, toluene, xylenes, naphthalene, bis(2-ethylhexyl)phthalate, chrysene, 2,6-DNT, arsenic and manganese |
| TNT Area B | Acetone, ideno(1,2,3-cd)pyrene, 2,4,6-TNT, 2,4-DNT, 4A-2,6-DNT, 2A-4,6-DNT, arsenic, iron and manganese | Benzene, arsenic, iron, lead and manganese |
| TNT Area C | 2,4,6-TNT, arsenic, iron, manganese and thallium | Benzene, methylene chloride, bis(2-ethylhexyl)phthalate, naphthalene, arsenic, and thallium |

# Summary of Analytical Results (continued)

| Area | Analytes Exceeding Preliminary Remediation Goals in 2001 Sampling | |
|---|---|---|
| | Overburden Water Bearing Zone | Bedrock Water Bearing Zone |
| Acids Areas/Maintenance Shops | No samples collected | Benzene, bis(2-ethylhexyl)phthalate, chloromethane, methylene chloride, naphthalene, arsenic, manganese and thallium |
| Additional Burning Grounds | No samples collected | Benzo(a)pyrene, dibenzo(a,h)anthracene, and indeno(1,2,3-cy)pyrene. |
| Upper Toluene Tanks | No samples collected | Acetone, benzene, methylene chloride, xylenes, naphthalene, and thallium. |
| Downgradient Perimeter Wells | No samples collected | Benzene, methylene chloride, naphthalene, 2,4-DNT, 2,6-DNT, arsenic and iron |
| Background Monitoring Wells | No samples collected | Benzene, methylene chloride, chloroform, arsenic and barium |

# Conclusions

- Site-related contaminants have impacted the Overburden Water Bearing Zone to varying degrees across the site.
  - ➔ Based on historical data, it is apparent that water in the Overburden is discontinuous
- To a lesser degree, contaminants have also impacted the Bedrock Water Bearing Zone.
  - ➔ Analytical data indicates that low levels of nitroaromatics are migrating to offsite areas
  - ➔ Potential exists for continued leaching of nitroaromatics into the Bedrock Water Bearing zone, particularly in the central and southern portions of the site

# Planned Activities

- Complete remaining two quarterly background sampling events of first annual (2001 - 2002) sampling program
- Evaluate all background samples after fourth quarter sampling to determine if data is sufficient to establish background metals concentrations or if additional year is required (2002 - 2003)
- Complete remaining "wet season" sampling event, currently planned for April 2002
- Complete sitewide groundwater model (2003)
- Complete sitewide groundwater risk assessment (2003)

# Recommendations

- Conduct an off-site private well survey
- Evaluate off-site migration through private well sampling (if available) and potential discharge locations (i.e., springs)
- Evaluate/confirm detection of nitroaromatics in perimeter wells following April 2002 sampling event
- Collect additional data on Reactor sump well pumping to support groundwater modeling