

ET-R-D 8 Jan 77 JB
No CELRN but IT was there

RESTORATION ADVISORY BOARD for PLUM BROOK ORDNANCE WORKS

Summary of the RAB Meeting, December 9, 1998

Meeting Time: 7:00 p.m.
Meeting Location: Firelands College Library

Attendees: Mark Bohne, co-Chair
Rick Meadows (USACE), co-Chair
Lisa Humphreys (USACE)
John Blakeman
Keith Peecook (NASA)
David Jorgenson (ICI)
Lee Yeckley
George Parker
Gil Steinen
Ron Nabors (Ohio EPA)
Peg Kingsley
Janet Bohne
Mikael Spangberg (IT Corp.)

Agenda

1. Introduction
2. RAB Support Contractor
3. Technical Assistance Public Participation
4. Site Ground Water Study
5. Other Issues (Open Discussion)
6. Schedule Next Meeting
7. Adjourn

Meeting Highlights

1. Introduction:
 - Co-chairman Mark Bohne introduced Rick Meadows from the US Army Corps of Engineers (USACE), Huntington District, as the RAB co-chairman. The USACE is responsible for managing restoration activities at the site, and the Huntington District will play a supportive role on the RAB. Rick introduced Lisa Humphreys as the USACE representative who will be attending most RAB meetings as the USACE representative.
 - Rick Meadows explained that the Plum Brook site falls under the Defense Environmental Restoration Program (DERP) as a Formerly-Used Defense Site (FUDS), and is therefore the

responsibility of the USACE.

- Self-introductions were made by the remaining attendees.

2. RAB Support Contractor:

- Rick Meadows explained the role of the RAB Support Contractor. USACE has limited funds to support the activities of the RAB. This support includes: distributing RAB meeting minutes, preparing meeting agendas, preparing public announcements regarding the site, attending public information meetings, and preparing informational materials on Plum Brook for the public.
- International Consultants, Inc. (ICI) from Dayton, Ohio, will be the RAB Support Contractor, and will be the point of contact for the RAB. The ICI representative attending this meeting was David Jorgenson.

3. Technical Assistance Public Participation (TAPP):

- Rick Meadows explained that grant money is available through the TAPP program to provide technical support to the RAB. The USACE will hire a contractor selected by the RAB to provide technical assistance to the RAB in the form of document reviews, independent literature investigations, data interpretation, representation at technical meetings, etc.
- The TAPP grants have a lifetime cap of \$100,000 and a per-year cap of one percent of the project costs, not to exceed \$25,000. There are limited USACE funds to support a number of RABs for different projects, therefore it would be best to get TAPP grant applications in early. Rick Meadows circulated TAPP informational brochures.
- An **agenda item** for the next RAB meeting will be for USACE to provide more detail on the TAPP grants, including the application procedure.

4. Site Ground Water Study:

- Mike Spangberg, IT Corporation, presented a status report on the ground water monitoring studies conducted at the site. His presentation slides are attached.
- A question arose regarding continuing monitoring of the ground water at the site. IT Corporation is not funded for ongoing monitoring, and USACE has no plans at this time to continue the monitoring program. The RAB, however, believes that it is important to continue the monitoring program in some fashion in order to develop a statistical basis for making site decisions, and asked Rick Meadows of the USACE to request funding for continued ground water monitoring. Continued ground water monitoring will be an **agenda item** at the next RAB meeting.
- As a result of Mike Spangberg's presentation, the RAB requested that the USACE provide a map of the site showing the locations of the monitoring wells and the levels of contamination found in the wells. This map will be presented as an **agenda item** at the next RAB meeting.

5. Other Issues:

- The membership of the RAB was discussed. It was pointed out that there are a number of persons who attended only one or two of the early RAB meetings and have not attended since. The group

felt that "re-training" individuals after a long absence from the RAB meetings would not be practical, and it was suggested that non-attendees be dropped from the RAB membership. The RAB moved and approved that five persons who attended only the first RAB meeting be dropped from the membership roles. The persons thus removed from the roles are:

Tom Ferrell
Larry Bruns
Judith Bruns
Charlie Pascoe
Ralph Rashong

- An **agenda item** for the next RAB meeting is to establish a protocol for dropping RAB members who have not been attending meetings.
 - The RAB was reminded that all RAB meetings are open to the public, and public announcements will be made for all subsequent meetings. An **agenda item** for the next meeting is to establish procedures and rules for RAB meetings to accommodate visitor participation.
6. **The next RAB meeting is scheduled for March 31, 1999, at 7:00 p.m., at the Firelands College Library.**
 7. The meeting adjourned at 9:25 p.m

Scope of the Site-Wide GW Investigation

**PRELIMINARY RESULTS OF THE SITE-WIDE
GROUNDWATER INVESTIGATION AT THE
FORMER PLUM BROOK ORDNANCE WORKS**

Presented to

RAB

December 9, 1998



Purpose and Objectives

- Determine if hazardous substances are present in groundwater at concentrations above RBCs
- Refine Site Conceptual Model
- Determine current and future routes of exposure as part of a site conceptual exposure model

NOTE: Draft Annual Groundwater Investigation Report to be issued in January 1999. Therefore, findings, recommendations, and conclusions presented herein are preliminary and are subject to revision.



Scope of the Site-Wide GW Investigation

- **Monitoring Well Installation**
 - Install 3 overburden and 8 bedrock monitoring wells
 - One proposed overburden well was dry
- **Groundwater Level Measurements**
 - Quarterly measurements of 58 overburden wells and 19 bedrock wells
- **Groundwater Sampling**
 - Semi-annual sampling of 38 overburden and 17 bedrock monitoring wells (November 1997 & May 1998)



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Groundwater Level Measurements

- **Four Quarterly Measurement Events Completed**
 - August & November 1997
 - February & May 1998
- **Results of the Groundwater Level Measurements**
 - Groundwater flow in the bedrock is generally to the north with flow on the west side of the site toward a groundwater trough trending west to northeast
 - Groundwater flow in the overburden generally mirrors flow in the bedrock with the predominant flow direction to the north



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Risk-Based Screening Concentrations (RBC)

- RBCs are a screening tool
 - Determine need for additional investigation or remedial action
 - Reduce number of constituents carried to risk assessment
- PBOW RBCs adapted from published EPA Region 3 RBCs using lifetime excess cancer risk of 10^{-6} and hazard index (HI) of 0.1 (published RBCs use cancer risk of 10^{-6} and HI of 1.0)
 - EPA considers lifetime cancer risk of 10^{-4} to 10^{-5} "acceptable"
 - HI of 0.1 addresses concern of exposure to multiple non-carcinogenic contaminants
- RBCs do not replace human health or ecological risk assessments



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Groundwater Sampling Results

- Sampled Areas
 - West Area Red Water Ponds Area (5 overburden / 1 bedrock)
 - Pentolite Road Red Water Ponds Area (4 / 1)
 - TNT Area A (5 / 2), TNT Area B (4 / 2), TNT Area C (6 / 1)
 - Acid Area 1 (2 / 2), Acid Area 2 (3 / 2), Acid Area 3 (1 / 1)
 - Burning Grounds (2 / 2)
 - Upper Toluene Tank Area (1 / 1)
 - Reactor Facility (1 / 1)
 - Disposal Area 3 (4 / 0)
 - PB-BED-GW020 (0 / 1)



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Site-Wide Monitoring Well Locations



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West Area Red Water Ponds Area Results

■ Five overburden wells sampled

→ IT-MW02, IT-MW08, IT-MW10, PB-WA-MW01, PB-WA-MW02

- Low levels of VOCs in IT-MW02, IT-MW10, PB-WA-MW02
- SVOCs above RBCs in IT-MW02, IT-MW10, PB-WA-MW02
- Explosives above RBCs in IT-MW02, PB-WA-MW02
- At least one metal (manganese) exceeded RBCs in all wells; highest concentrations and largest suite evident in PB-WA-MW02
- Cyanide and nitrate above RBCs in PB-WA-MW02

■ One bedrock well sampled

→ PB-BED-MW014

- Low levels of VOCs detected; benzene above RBC
- Explosives above RBCs under the SVOC analysis
- Several metals detected but did not exceed RBCs
- Nitrate detected at concentration above RBC



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Pentolite Road Red Water Ponds Area Results

■ Four overburden wells sampled

→ IT-MW05, PB-PR-MW07, PB-PR-MW08, PB-PR-MW09

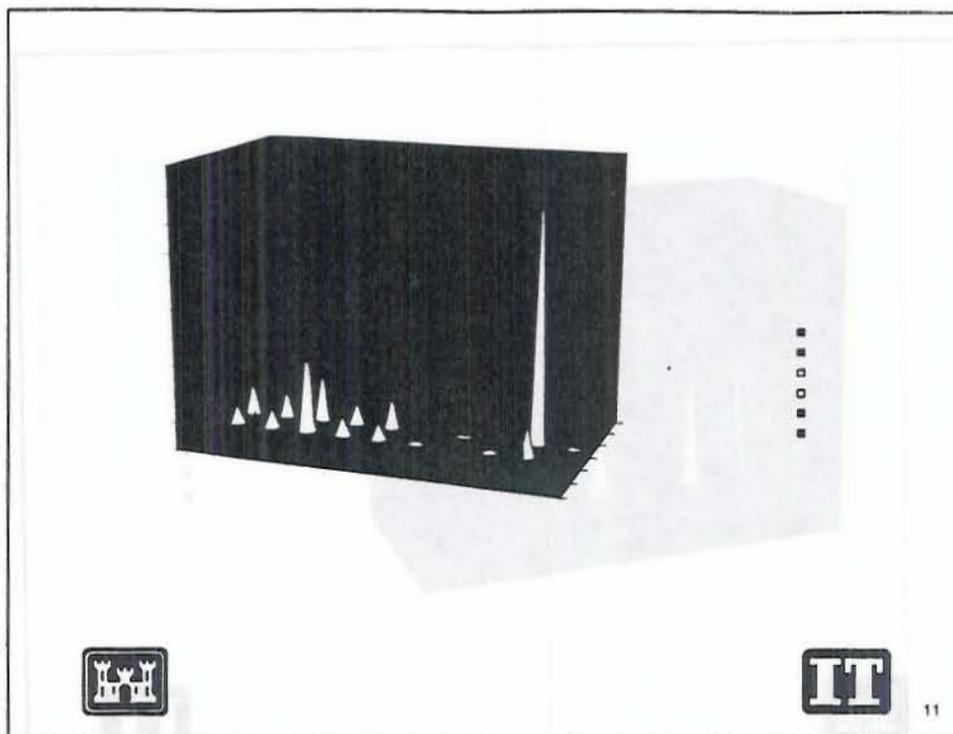
- Low levels of VOCs in all wells; benzene above RBC in PB-PR-MW09
- SVOCs and explosives above RBCs in PB-PR-MW07, -MW08, and -MW09
- Several metals (total and dissolved) exceeded RBCs in all wells; highest concentrations and largest suite evident in PB-PR-series wells
- Cyanide above RBCs in PB-PR-MW07 and PB-PR-MW08

■ One bedrock well sampled

→ PB-BED-MW015

- VOCs and SVOCs detected at concentrations above RBCs
- 2,4-DNT and 2,6-DNT detected below RBCs during May 1998 sampling event
- Barium and sodium (total and dissolved) exceed RBCs; chromium, iron, and manganese exceeded RBCs in unfiltered sample but not detected in filtered sample.





TNT Area A Results

■ Five overburden wells sampled

→ MK-MW22, -MW23, -MW24, PB-TNTA-MW10, PB-TNTA-MW11

- Low levels of VOCs were detected but all below RBCs
- One SVOC (bis(2-ethylhexyl)phthalate) exceeded RBC in MK-MW23 (May 98)
- Six explosives detected in MK-MW22; 4-amino-2,6-DNT exceeded RBCs
- Several metals (total and dissolved) exceeded RBCs in all wells

■ Two bedrock wells sampled

→ PB-BED-MW017, PB-BED-MW018

- Benzene, methylene chloride, toluene, and bis(2-ethylhexyl)phthalate > RBCs
- 1,3-DNB and nitrobenzene exceeded RBCs in PB-BED-MW018 (Nov 97); nitrobenzene also detected in PB-BED-MW017 (< RBC) in November 1997
- Three metals (barium, iron, manganese) have exceeded RBCs
- Cyanide exceeded RBC in PB-BED-MW017 (Nov 97); not detected in other samples.



TNT Area B Results

■ Four overburden wells sampled

→ MK-MW14, MK-MW15, MK-MW16, MK-MW17

- VOCs detected below RBCs; one SVOC (bis(2-ethylhexyl)phthalate) exceeded RBC in MK-MW15 during both sampling events
- Three nitroaromatic explosives detected in MK-MW17; 4-amino-2,6-DNT exceeded RBCs during both sampling events
- Several metals (total and dissolved) exceeded RBCs; highest concentrations and largest suite detected in MK-MW17

■ Two bedrock wells sampled

→ IT-TNTB-BED-GW001, IT-TNTB-BED-GW002

- Of detected VOCs, benzene exceeded RBCs in IT-TNTB-BED-GW002 (Nov 97)
- Detected SVOCs below RBCs; nitroaromatics were not detected in either well
- Several total metals exceeded RBCs; however, only barium, iron, and manganese exceeded RBCs in the dissolved phase (filtered sample).



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TNT Area C Results

■ Six overburden wells sampled

→ IT-MW09, MK-MW12, PB-TNTC-MW03, PB-TNTC-MW04, PB-TNTC-MW05, PB-TNTC-MW06

- Detected VOCs below RBCs; one SVOC (bis(2-ethylhexyl)phthalate) detected above RBC in IT-MW09, MK-MW12, and PB-TNTC-MW06
- Nitroaromatic compounds were not detected
- Several metals (total and dissolved) exceeded RBCs
- Nitrate above RBC in IT-MW09 and PB-TNTC-MW04 (Nov 1997)

■ One bedrock well sampled

→ PB-BED-MW013

- VOCs (benzene and toluene) and bis(2-ethylhexyl)phthalate exceeded RBCs
- Nitroaromatic compounds were not detected
- Barium (total and dissolved) only metal to exceed RBCs.



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Acid Areas Results

■ Six overburden wells sampled

→ AA1: IT-AA1-GW002 MK-MW19; AA2: MK-MW09, MK-MW10, MK-MW11; AA3: IT-AA3-GW002

- Chloroform and bis(2-ethylhexyl)phthalate above RBCs in MK-MW10; 1,1,1-trichloroethane and 1,1-dichloroethane above RBCs in MK-MW19
- Nitroaromatic compounds were not detected
- Several metals (total and dissolved) exceeded RBCs

■ Five bedrock wells sampled

→ AA1: IT-AA1-BED-GW001, IT-MNTA-BED-GW001; AA2: IT-AA2-BED-GW001, PB-BED-MW019; AA3: IT-AA3-BED-GW001

- Four VOCs above RBCs (benzene, chlorobenzene, chloromethane, methylene chloride); one SVOC (bis(2-ethylhexyl)phthalate) exceeded RBC
- Explosives detected in four of five sampled wells (except IT-AA3-BED-GW001); RBCs exceeded for 1,3-dinitrobenzene and RDX
- Several metals (total and dissolved) exceeded RBCs.



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Burning Grounds Areas Results

■ Two overburden wells sampled

→ IT-ABG-GW002, IT-MW01

- VOCs detected in both wells; benzene exceeded RBCs in IT-ABG-GW002
- SVOCs and nitroaromatic compounds were not detected
- Several total metals exceeded RBCs; only iron and manganese exceeded RBCs in the dissolved phase (filtered samples).

■ Two bedrock wells sampled

→ IT-ABG-BED-GW001, IT-BG8-BED-GW001

- VOCs and SVOCs detected in both wells; none exceeded RBCs
- Nitroaromatic compounds were not detected
- Several total metals exceeded RBCs; barium, iron and manganese exceeded RBCs in the dissolved phase (filtered samples)
- Nitrate exceeded RBC in IT-BG8-BED-GW001 (May 98).



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Upper Toluene Tank Area Results

■ One overburden well sampled

→ MK-MW20

- VOCs (toluene and chloroform) and SVOCs (2-methylphenol, 4-methylphenol, bis(2-ethylhexyl)phthalate) exceeded RBCs
- Nitroaromatic compounds were not detected
- Several total metals exceeded RBCs; iron and manganese exceeded RBCs in the dissolved phase (filtered samples)

■ One bedrock well sampled

→ PB-BED-MW016

- Benzene, ethylbenzene, methylene chloride, and toluene exceeded RBCs
- 1,3-Dichlorobenzene and bis(2-ethylhexyl)phthalate exceeded RBCs
- Nitroaromatic compounds were not detected
- Several total metals exceeded RBCs; barium, thallium, and vanadium exceeded RBCs in the dissolved phase (filtered samples).



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Reactor Facility Results

■ One overburden well sampled

→ IT-MW06

- One VOC (toluene) detected but below RBC
- SVOCs and nitroaromatic compounds were not detected
- Total iron and manganese exceeded RBCs; dissolved metals below RBCs

■ One bedrock well sampled

→ REACTOR 1

- Two VOCs (benzene and methylene chloride) and one SVOC (bis(2-ethylhexyl)phthalate) exceeded RBCs
- Nitroaromatic compounds were not detected
- Total and dissolved barium, iron and manganese exceeded RBCs.



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Disposal Area 3 Results

■ Four overburden wells sampled

→ GCL-MW01, GCL-MW02A, GCL-MW02B, GCL-MW03

- Detected VOCs below RBCs
- One SVOC (bis(2-ethylhexyl)phthalate) exceeded RBC in GCL-MW01
- Nitroaromatic compounds were not detected
- Several total metals exceeded RBCs; only iron and manganese exceeded RBCs in dissolved phase.



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Southeast Bedrock Well Results

■ One bedrock well sampled

→ PB-BED-MW020

- Benzene (VOC) and bis(2-ethylhexyl)phthalate (SVOC) exceeded RBCs
- Nitroaromatic compounds were not detected
- Total and dissolved barium, iron and manganese exceeded RBCs.



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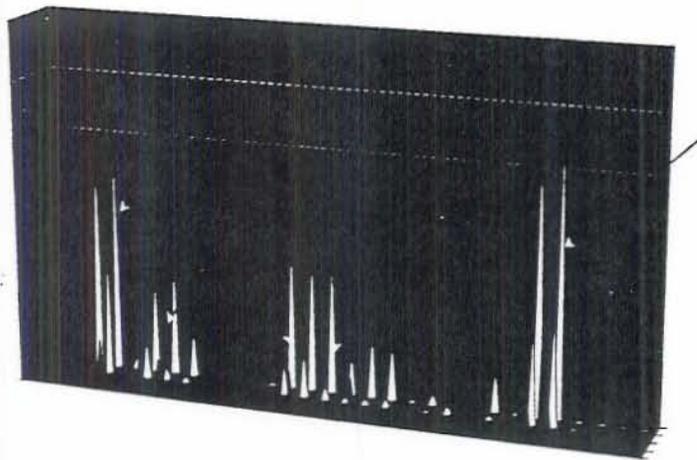
Conclusions & Recommendations (preliminary)

■ Conclusions

- Nitroaromatic explosives contaminants present primarily at the two Red Water Ponds Areas; lesser concentrations evident at TNT Area A, TNT Area B, and Acid Areas (bedrock)
- Cyanide appears to be present above RBCs in groundwater exhibiting explosives above RBCs and "red water"
- Natural petroleum and corresponding low levels of BTEX constituents is prevalent in bedrock across much of the site
- Higher BTEX concentrations (> 200 ug/L) evident in certain areas and are believed to be site-related
- Detected metals concentrations are believed to be naturally occurring but require additional study



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Conclusions & Recommendations (preliminary)

■ Recommendations

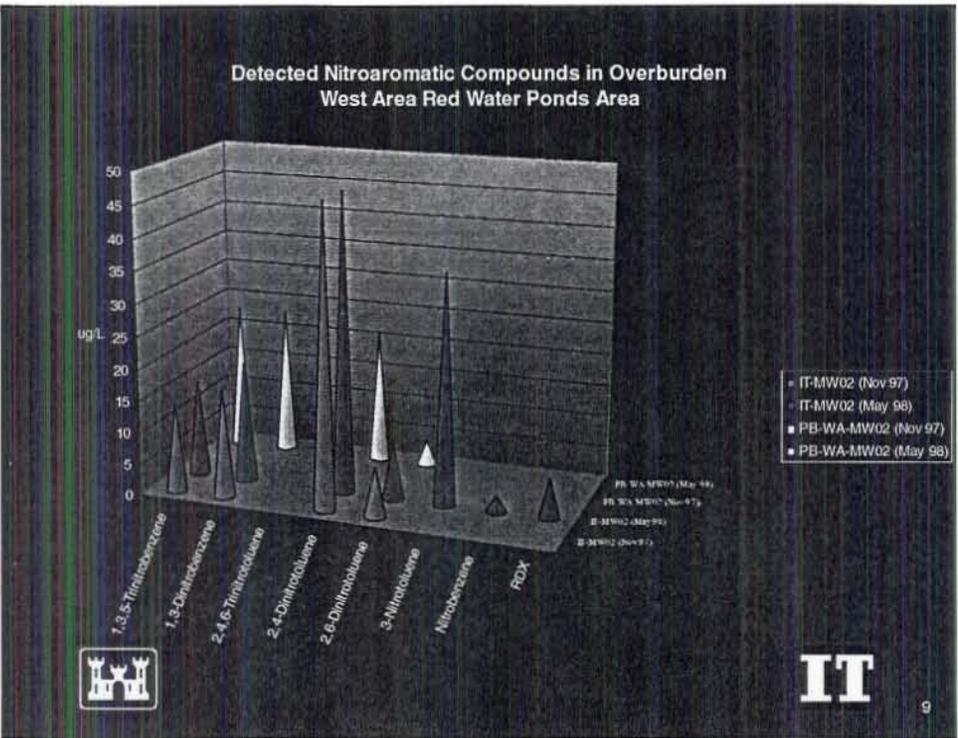
→ Establish site-specific background for metals and BTEX constituents in groundwater

- Install 2 additional bedrock and 2 additional overburden wells for "background"
- Use three (3) current bedrock wells (BED-MW020, TNTB-BED-GW002, & BG8-BED-GW001) and three (3) current overburden wells (IT-MW01, MK-MW14, & MK-MW09) for background sampling
- Collect four rounds of samples (quarterly) from the five bedrock and five overburden wells to establish background concentrations in the two water-bearing zones; background samples should be analyzed for metals and BTEX

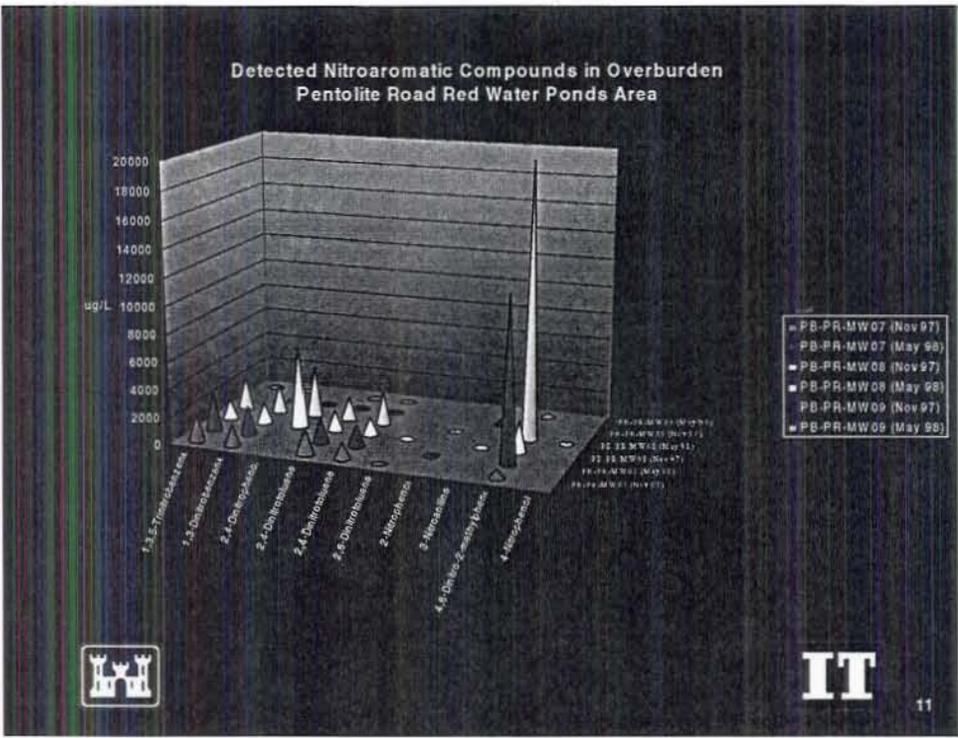
→ Conduct human health risk assessment for site-wide groundwater



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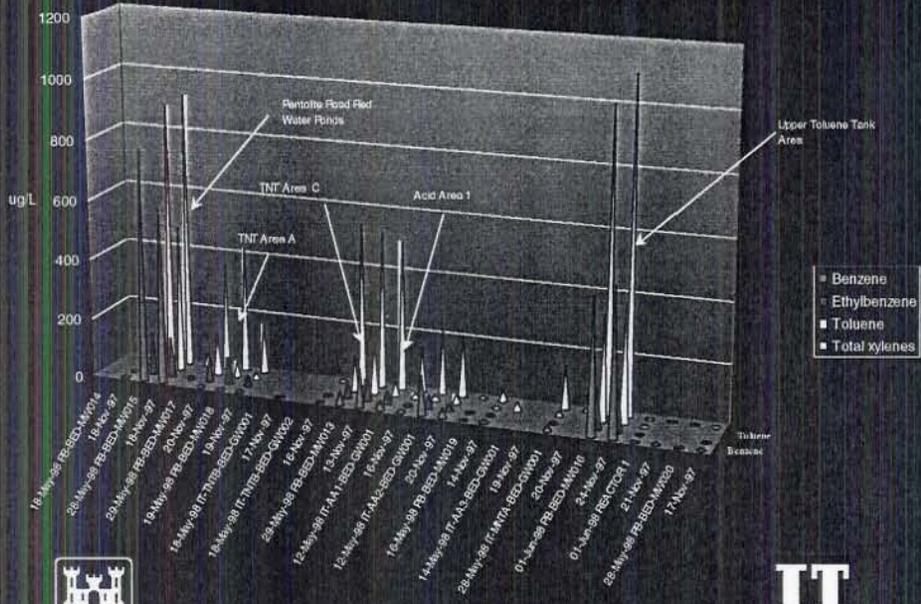


IT



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Detected BTEX Constituents in Bedrock Monitoring Wells



IT