In-situ Remediation Pilot Study Summary and Path Forward

Area of Concern I (AOC I)

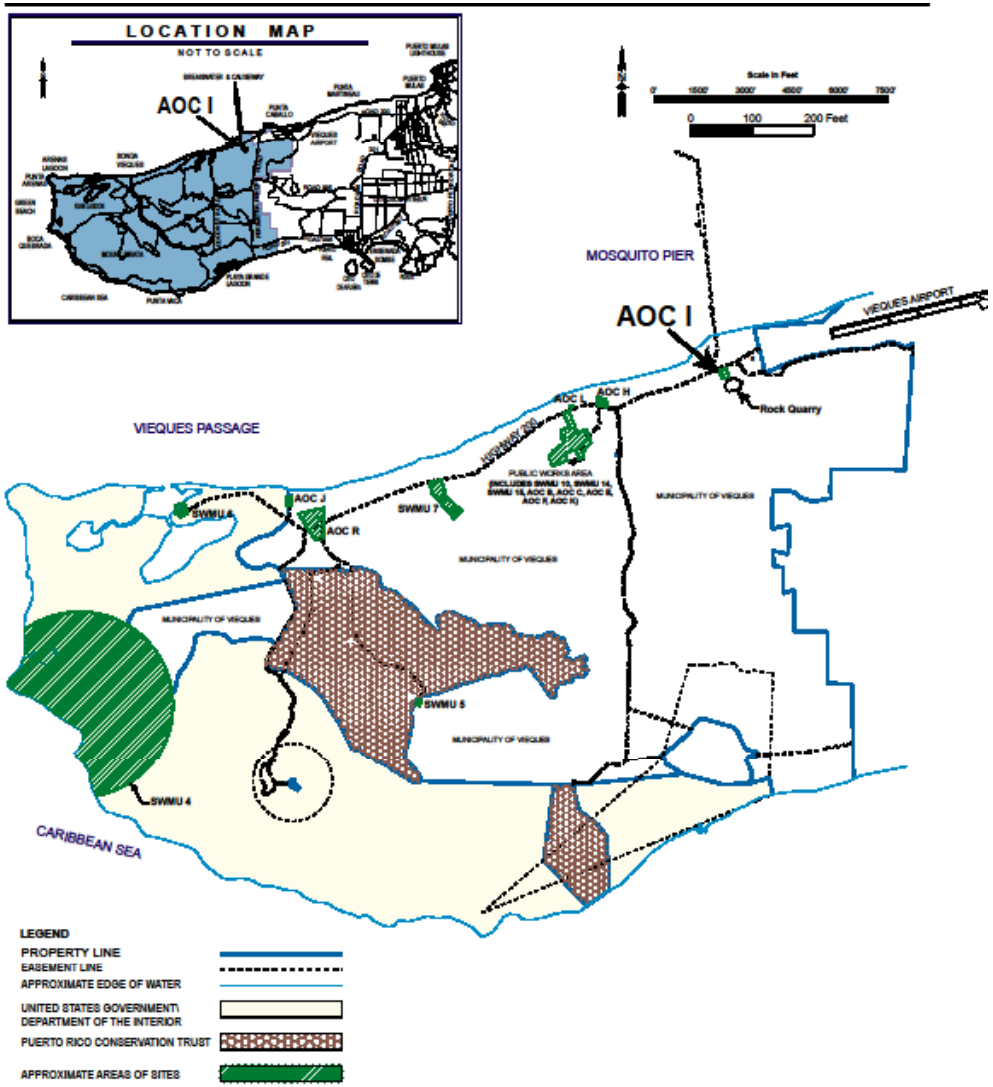
RAB Meeting

March 13, 2012

Objective

- **Summarize pertinent historical site information**
- **Summarize groundwater remediation pilot study approach**
  - **In-situ Chemical Oxidation (ISCO)**
  - **Enhanced In-situ Bioremediation (EISB)**
- **Summarize data (Sept. 2004 – Nov. 2011)**
  - **historical**
  - **baseline**
  - **post-ISCO and post-EISB**
- **Discuss path forward**

AOC I Location



Site Map

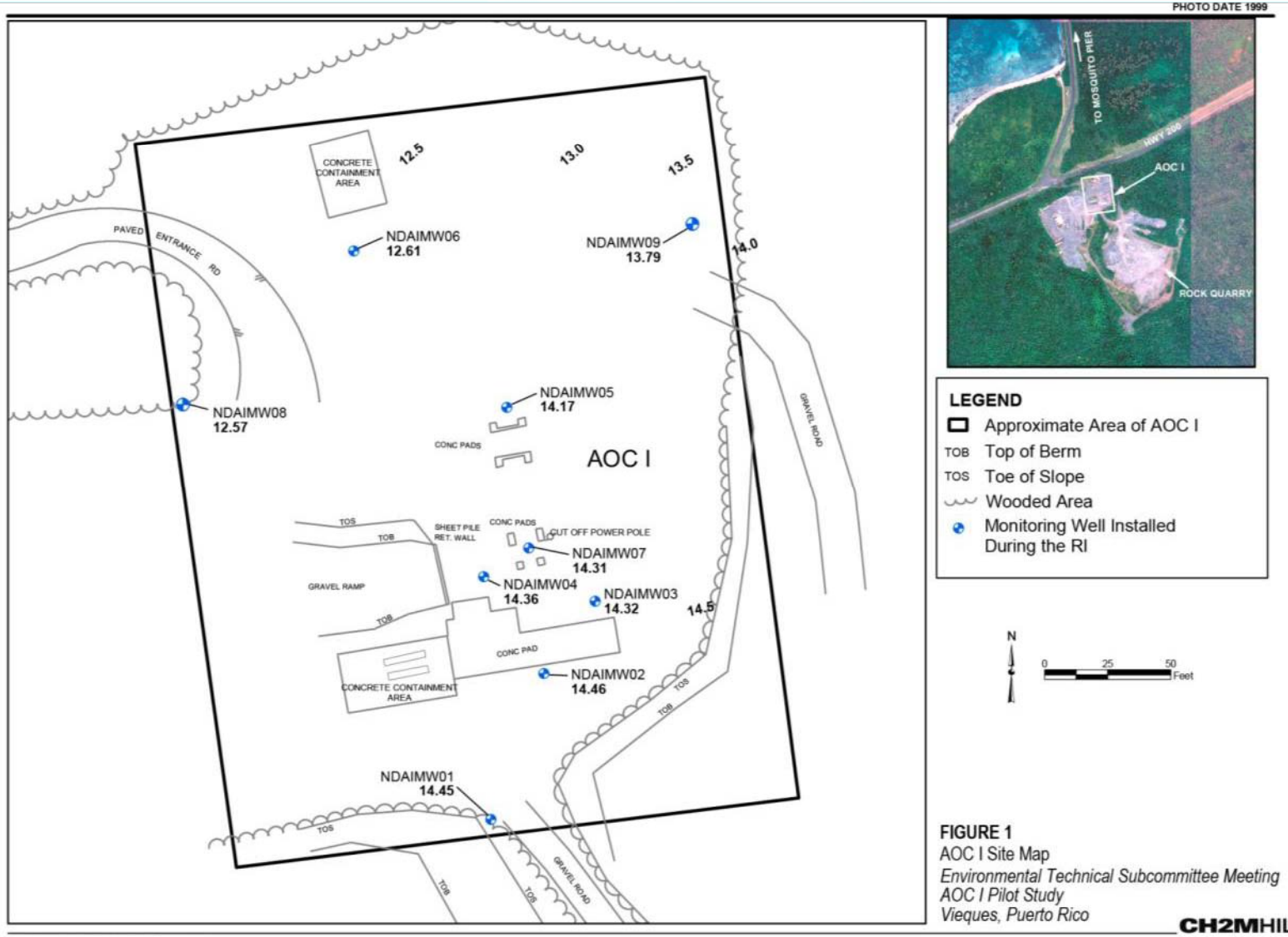


FIGURE 1
AOC I Site Map
Environmental Technical Subcommittee Meeting
AOC I Pilot Study
Vieques, Puerto Rico

CH2MHILL

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Site Background

- **AOC I is a former asphalt plant**
  - **within the former NASD**
  - **adjacent to an active rock quarry**
- **Operated from the 1960s through 1998**
- **Remedial Investigation (RI) in 2008 identified six Contaminants of Concern (COCs)**
  - **Groundwater:**

benzene	bis(2-ethylhexyl)phthalate	1,2-dichloroethane
1,2-dichloropropane	2-methylnaphthalene	naphthalene

  - **Soil: No COCs were identified**

Pilot Study Objectives

- **Determine if already low groundwater contaminant concentrations can be reduced to acceptable levels**

- **Determine if the groundwater cleanup timeframe can be reduced (relative to natural processes)**

Pilot Study Approach

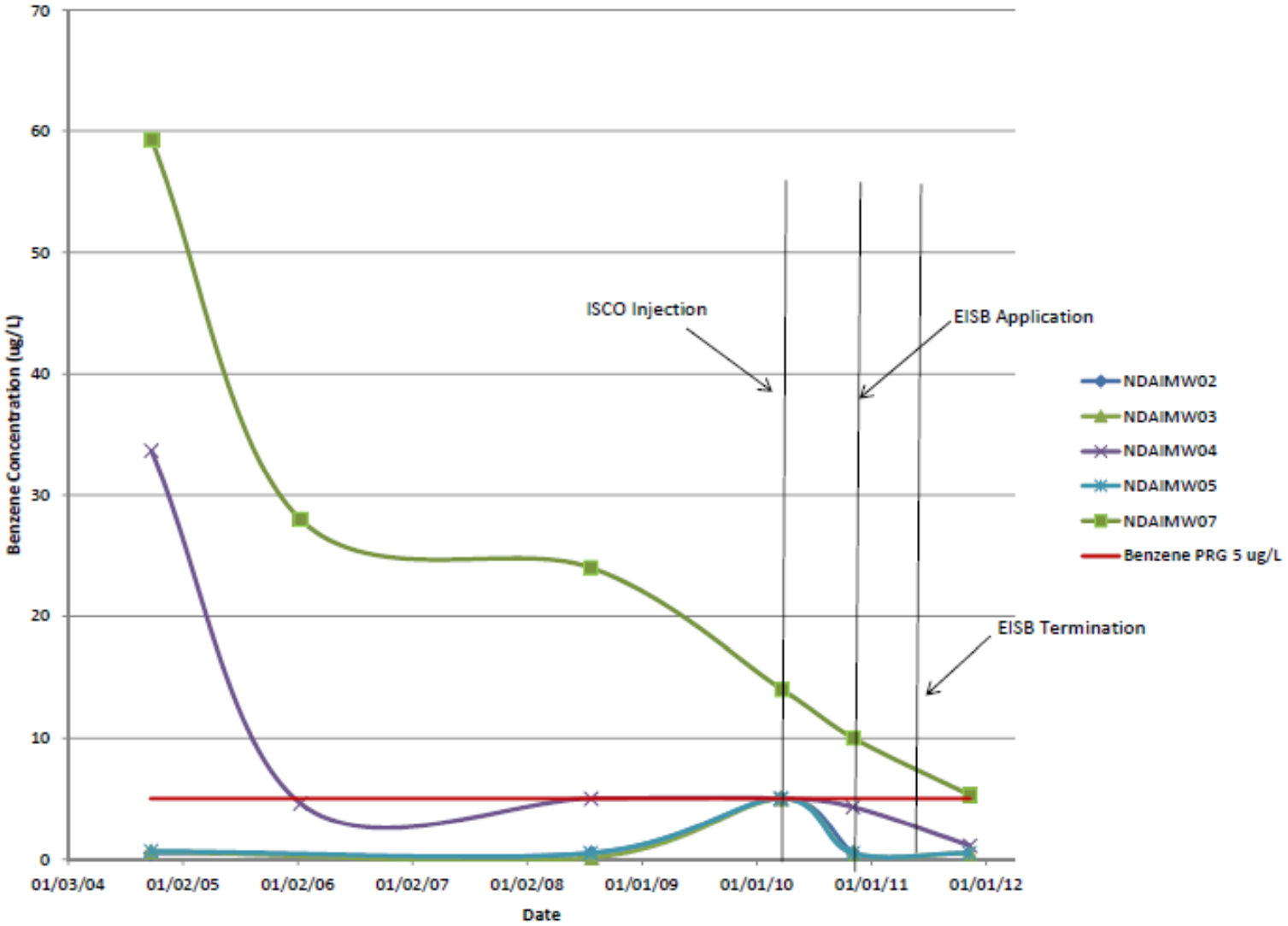
- **Collect baseline (pre-pilot study) groundwater samples for COC analysis**
- **Pump sodium persulfate mixture into contaminated groundwater (ISCO)**
- **Collect groundwater samples for COC analysis about 7 months later**
- **Install oxygen-releasing compound (ORC) “socks” in the wells (EISB)**
- **Remove socks from wells about 9 months later**
- **Collect groundwater samples for COC analysis about 4 months later**

Pilot Study Goals

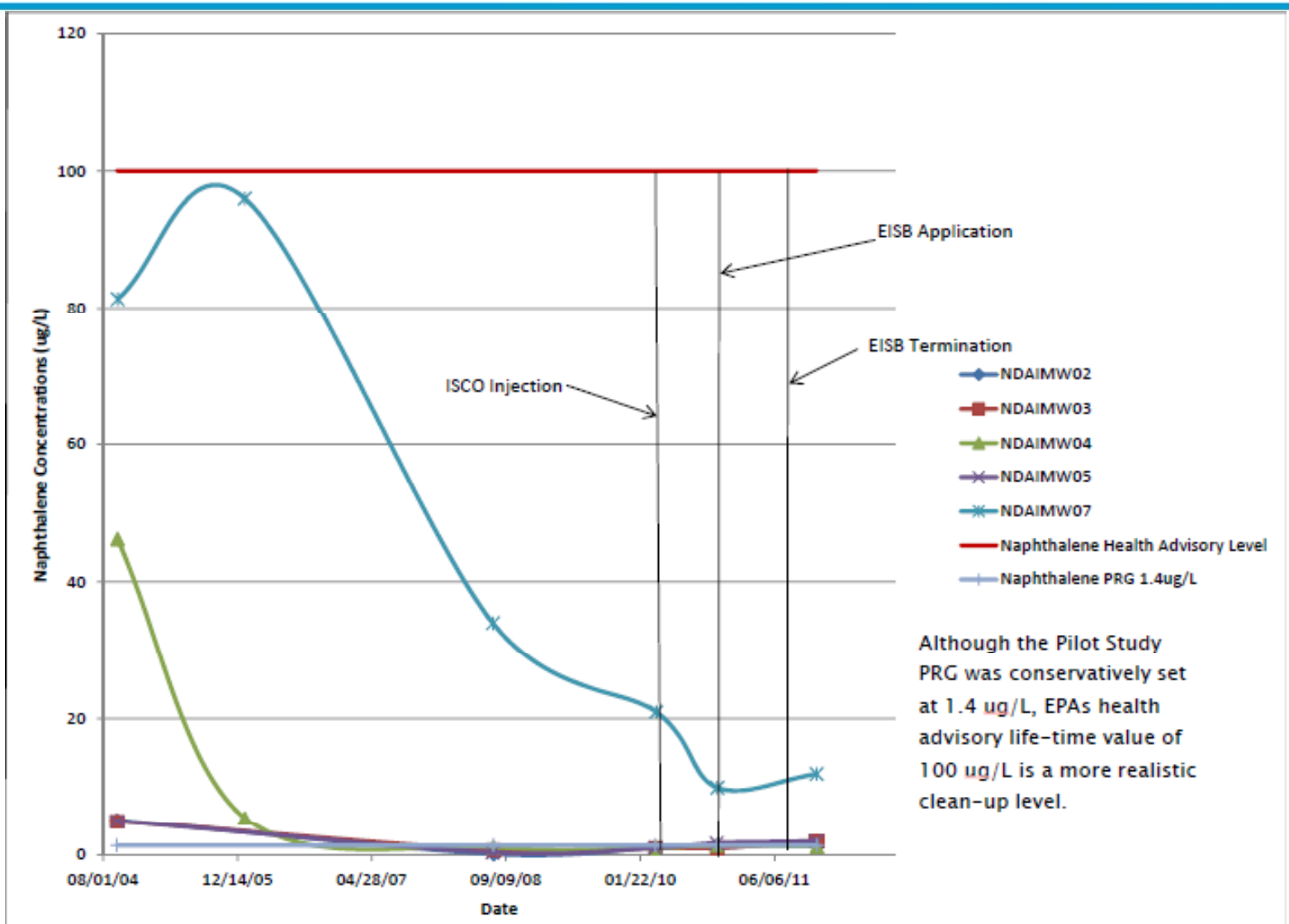
- **Benzene – 5 µg/L (MCL)**
- **Naphthalene – 1.4 µg/L (tap water RSL)**
  - **Note: Selected solely as a conservative benchmark to evaluate the pilot study technology; EPA's Health Advisory Lifetime Value for naphthalene is 100 µg/L, which is a more realistic clean-up level**
- **Bis(2-ethylhexyl)phthalate – 6 µg/L (MCL)**
- **1,2-Dichloroethane – 5 µg/L (MCL)**
- **1,2-Dichloropropane – 5 µg/L (MCL)**
- **2-Methylnaphthalene – 150 µg/L (tap water RSL)**

MCL – maximum contaminant level
RSL – Regional Screening Level

COC Trends: Benzene



COC Trends: Naphthalene



Although the Pilot Study PRG was conservatively set at 1.4 ug/L, EPAs health advisory life-time value of 100 ug/L is a more realistic clean-up level.

Conclusions

- **Concentrations of COCs declined on their own prior to the pilot study; additional decline of two most prevalent COCs (benzene and naphthalene) continued (and possibly accelerated) by ISCO and EISB.**
- **In the last sampling event, benzene was the only COC detected above the PRG of 5 µg/L. However, it was detected at only 5.3 µg/L (MW-07), which is essentially at the MCL.**
- **Naphthalene was detected above the PRG of 1.4 µg/L in one well (12 µg/L in MW-07); however, its concentration declined by an order of magnitude from a high of just below EPA's health-advisory life-time value of 100 µg/L.**
- **No other COC was detected above its PRG during the pilot study.**

Path Forward

- **To evaluate whether "rebound" occurs, perform two more rounds of groundwater sampling (around May 2012 and November 2012)**
  - **If no rebound occurs, prepare No Further Action Proposed Plan and Record of Decision**
  - **If rebound occurs, prepare Feasibility Study to evaluate remedial alternatives**