Vieques Restoration Advisory Board Meeting

Environmental Restoration Program Update

Vieques, Puerto Rico

August 9, 2007

Presentation Topics

- East Vieques Background Soil Inorganics Investigation Report
- Area of Concern (AOC) H Status and Next Steps
- Upcoming Environmental Restoration Program (ERP) Schedule of Document Submittal for RAB Review

East Vieques Background Soil Inorganics Investigation

Purpose of Background Investigation

- **Primary purpose is to develop a set of soil inorganics data to help distinguish releases of inorganics from discrete environmental sites from inorganics levels that are found elsewhere across Vieques**
  - Goal is to acquire a soil inorganics data set representative of the broad surrounding conditions, not affected by releases at environmental sites or other isolated releases

Key Term Definitions

- **Environmental Site**
  - Discrete site under investigation (not island-wide)
  - For example, Solid Waste Management Units (SWMUs), Areas of Concern (AOCs)
- **Background**
  - Representative of broad (large-scale) conditions (in other words, what inorganics concentrations would be there even if the environmental sites were not)
  - Not affected by releases from discrete environmental sites
  - Not affected by other isolated releases

Background Investigation Sample Collection and Analyses

- **Soil samples collected at 10 locations in each of the four soil types (for a total of 40 locations)**
  - Surface soil at each of the 40 locations
  - Subsurface soil at 39 of 40 locations
- **EPA collected split samples (surface and subsurface) at 20% of sample locations (2 locations per soil type, for a total of 8 samples) to provide independent verification of Navy sample results**
- **All soil samples were analyzed for inorganics and explosives, as well as several other parameters in case they were needed to interpret the data based on physical and chemical characteristics of the different soil types**

Split Sample Results

- **Comparison of split sample data (EPA and Navy) shows good correlation**
- **One explosive (2,6-DNT) detected at an estimated concentration in one split subsurface soil sample (TI-6). Actual presence is questionable because:**
  - Instrument reproducibility problems
  - No explosives detected in the surface soil at that location
  - No explosives reported in any of the other validated data collected by EPA or Navy
- **Potential presence of explosive did not alter inorganics concentrations in that sample**

Comparison of East and West Vieques Background Data

- **Good correlation between east Vieques and west Vieques background soil inorganics concentrations**
  - Information helps show that east Vieques background data are representative of broad background conditions

Statistical Analysis of Data

- **For each inorganic detected, statistical techniques were used to determine which soil types and which soil depths could be combined**
  - Analysis of Variance (ANOVA)
  - Scatter plots
  - Tukey's test
- **A significance level of 0.05 was used to determine what soil types and depths could be combined**
  - Most common significance level used in most statistical works, including EPA guidance

Combining Soil Types and Depths

- **Most soil types were combined for each inorganic**
  - TI soil type is most common soil type separated from others
  - This soil type is found along the coastline
- **Surface and subsurface soil data were combined for all inorganics except:**
  - Cyanide
  - Lead
  - Potassium
  - Sodium

Cyanide

- **In reality, surface soil and subsurface soil concentrations are similar**
  - KTd-Kv-Qa: 1.24 mg/kg (surface) vs 1.36 mg/kg (subsurface)
  - TI: 1.03 mg/kg (surface) vs 0.98 mg/kg (subsurface)
- **Differentiation between surface and subsurface soil concentrations due to consistent application of statistical process to concentrations that are so low**
- **All concentrations detected are three orders of magnitude below the EPA PRG for residential soil**

Potassium and Sodium

- Both inorganics are very prevalent in seawater and rainwater
- Neither inorganic is a contaminant of concern
- Both inorganics are readily dissolved in water
- Variations between surface and subsurface soil are likely due to depositional and post-depositional conditions, including leaching

Lead

- **Lead concentration is higher in surface soil than in subsurface soil**
  - KTd-Kv-Qa: 2.3 mg/kg (surface) vs 1.2 mg/kg (subsurface)
  - TI: 6.2 mg/kg (surface) vs 3.3 mg/kg (subsurface)
- **Variations between surface and subsurface soil are likely due to natural conditions as well as anthropogenic (caused by humans) sources**
  - Largest source of lead in the atmosphere is world-wide leaded gasoline combustion [EPA website]

Key Point

Other than lead and potassium, none of the inorganics shows a statistically higher concentration in the surface soil than in the subsurface soil.

Therefore, the data indicate the background sample locations have not been influenced by widespread aerial deposition (other than potentially by lead, as described previously).

However, even the highest lead concentration detected (11 mg/kg) is more than an order of magnitude below EPA's lead action level (400 mg/kg). This is the level below which it is considered safe for residential exposure.

Outlier Definition and Determination

- **An outlier is an inorganic concentration statistically dissimilar from the majority of concentrations**
  - It is important to note that an outlier does not necessarily mean the concentration is not part of the normal group of background data
  - Outliers were identified using a significance level of 0.5 and eliminated from the background data set simply as a conservative measure to ensure background concentrations were not artificially elevated
  - Outliers were further evaluated to determine if they could be representative of contamination at the particular location(s)

Outliers

- **10 inorganic outliers were identified**
  - Arsenic (five)
  - Barium (one)
  - Beryllium (five*)
  - Calcium (eight)
  - Magnesium (five)
  - Mercury (three)
  - Potassium (two)
  - Sodium (five)
  - Thallium (one)
  - Zinc (three)

Outlier Observations

- **More than half of the outliers are for calcium, magnesium, potassium, and sodium**
  - None are contaminants
  - All are the most common components of seawater, which reflects the marine influence on the soil formation
- **No high frequency of outliers in any particular sample**
- **None of the outliers indicates there has been a release at the location at which it was detected**
- **Beryllium outliers were identified only because there were some detects and some non-detects**
  - Therefore, beryllium “outliers” are not really outliers, so they are retained in the data set

Key Point

The outliers are very likely the upper end of the true background population.

So, removing the outliers is conservative because it reduces the calculated background concentrations.

The result is a more conservative background data set to use for comparison with environmental site data.

Summary

- **Statistically robust background data set has been collected for all inorganics**
- **Data set is representative of broad background conditions**
  - Similarity among soil types and depths on east Vieques
  - Similarity to same soil types on west Vieques
- **Surface and subsurface soil concentrations are statistically similar for vast majority of inorganics**
- **Lead and potassium are the only two inorganics whose mean surface soil concentrations are higher than the mean subsurface soil concentrations**

Summary

- **No evidence of impacts on background concentrations from widespread aerial deposition (other than lead)**
  - Lead concentrations well below EPA risk-based level
- **Explosives are not prevalent in background samples**
  - Only one sample contained an explosive and the sample's inorganic concentrations were not affected
- **Very few outliers were detected and the outliers are likely representative of the upper end of true background concentrations**
  - Outliers eliminated from background data set as a conservative measure

Area of Concern H

Site History

- Area of Concern (AOC) H is the former Power Plant located near the main operational area of the former Naval Ammunition Support Detachment (NASD)
- Originally used for power generation (early 1940s)
- Used from the 1960s until the 1980s for fire training
- Previous investigations at the site comprised the Environmental Baseline Survey (EBS), an ecological survey, the Preliminary Assessment/Site Investigation (PA/SI), and the Remedial Investigation (RI)

Status Summary

- All regulatory agency comments on Draft Remedial Investigation (RI) Report were addressed and incorporated into report to produce the Draft Final.
- Draft Final RI Report was submitted to the RAB in May 2007.
- Following the 30-day RAB review period, EPA approved the report on July 12, and the Final RI Report was submitted to the regulatory agencies and placed on the public website on July 19, 2007.

Findings

- **The proposed alternative represents the collective opinion of the Navy and regulatory agencies and is based on the findings for the site, including quantitative human health and ecological risk assessments.**
- **For AOC H, the risk assessments indicate there are no unacceptable risks, so the recommended alternative is no further action (NFA).**
  - Can be turned over to the Municipality of Vieques without any land use restrictions

Next Steps

- **The next step is to prepare the Proposed Plan, which is the document that summarizes the historical activities and data collected, conclusions drawn based on the data, and the recommended alternative for the site.**
- **Following regulatory review and approval of the Proposed Plan, it will be submitted to the public for a 30-day public comment period, during which a public meeting will be held to discuss the Plan and address comments/questions.**
- **Following the public comment period, the Navy, EPA, EQB, and the Municipality will consider public comments received and issue the Record of Decision for the site.**

Anticipated ERP Schedule

Please note that the schedule may change based on findings, report preparation schedules, and regulatory review schedules

Status of West Vieques Environmental Sites

- **AOC E**
  - Draft Remedial Investigation Report being prepared
- **AOC H**
  - Draft Proposed Plan being prepared
- **AOC I**
  - Draft Remedial Investigation Report being prepared
- **AOC J, AOC R, SWMU 6, SWMU 7**
  - Responses to regulatory agency comments and Draft Final Removal Action Work Plan being prepared
- **SWMU 4**
  - Initial screen of RI data has been completed
  - Summary of initial screen findings and recommendations being prepared for regulatory agency review

Status of East Vieques Environmental Sites

- **Background Soil Inorganics**
  - Draft Final Report submitted to RAB
- **12 Consent Order Sites**
  - Draft Preliminary Assessment/Site Inspection Report being prepared
- **8 PI/PAOC Sites**
  - Draft Preliminary Assessment/Site Inspection Report being prepared

ERP Documents for RAB Review

- **3rd Calendar Quarter (July – September) 2007**
  - Draft Final East Vieques Background Soil Inorganics Investigation Report
  - Draft Final AOC J, AOC R, SWMU 6, and SWMU 7 Removal Action Work Plan
- **1st Calendar Quarter (January - March) 2008**
  - AOC H Proposed Plan (public)
  - Draft Final Remedial Investigation (RI) Report for AOC E
  - Draft Final Remedial Investigation (RI) Report for AOC I
  - Draft Final Preliminary Assessment/Site Inspection (PA/SI) Report for 12 Consent Order and 8 PI/PAOC Sites