Vieques RAB Meeting
Environmental Restoration Program

Vieques, Puerto Rico

June 8, 2006

Navy, EPA, and EQB Responses to Public Comments on Background Soil Inorganics Investigation Work Plan

RAB Meeting

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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

Key Points

- Primary purpose is to develop a set of inorganics data to help distinguish releases of inorganics from discrete environmental sites from inorganics levels that are found elsewhere across Vieques
  - Goal is inorganics data set that is representative of broad surrounding conditions
  - Not affected by releases at environmental sites or other isolated releases
- Background comparisons will be done for only inorganics
  - Consistent with EPA guidance
  - Detections of inorganics statistically above background will be attributed to releases from environmental site
  - Detections of other (non-inorganic) constituents will be attributed to releases at the individual sites and addressed accordingly

Key Points

- Analytical parameters and quantity of data will help identify if each “background” sample is truly representative of background
  - All samples will be additionally analyzed for explosives
    - If detected, inorganics data will be excluded from data set and may be investigated further
  - Outliers will be eliminated from data set
- Dual sample depths for comparability to samples from environmental sites and to provide additional assurance of representation of background conditions
  - Background surface and subsurface soil samples to be collected at comparable depths to surface and subsurface samples at environmental sites
  - Dual sample depths and quantity of samples may help determine if any location has been affected by aerial deposition

Key Points

- Quantity of samples and locations of samples are appropriate for intended use
  - Background samples collected within same geologic zones as samples from environmental sites
    - 10 surface and 10 subsurface samples per zone, for a total of 20 samples per geologic zone (80 total background samples for all four zones)
  - Quantity of samples will permit statistical testing
    - Statistically comparable data will be combined to increase the statistical robustness
- Inorganics are naturally occurring
  - Most common naturally occurring constituents
  - Make up most or all soil and rocks in the world

Specific Comments

- Comment
  - Quantity of samples seems low compared to the area of potential contamination
- Response
  - Background inorganics data are to be used to help identify releases of inorganics at discrete environmental sites, which make up a very small percentage of the total area of east Vieques
    - Quantity of samples proposed is statistically appropriate
  - Each geologic zone will have 10 surface and 10 subsurface samples
    - Statistically valid as discrete data sets
    - Will be combined to improve statistical robustness if discrete data sets are statistically comparable

Specific Comments

- Comment
  - Quantity of samples is based on methodology designed for use where contamination is homogeneous, which is not applicable to Vieques
- Response
  - Quantity of samples is based on the number of samples necessary to provide statistically robust background data set(s) for each geologic zone regardless of the degree of homogeneity or heterogeneity

Specific Comments

- Comment
  - Quantity of samples appears to be disproportionate to the area of the geologic zones and the depths at which bedrock may be encountered
- Response
  - One objective is to obtain a statistically robust data set for each geologic zone
    - Quantity of samples proposed for each geologic unit will achieve this objective
  - Regardless of the depth to bedrock, the background sampling depths will be similar to those encountered (and sampled) at the environmental sites, which will result in comparable data sets

Specific Comments

- Comment
  - Quantity of samples is low and other chemical parameters should be part of the testing
- Response
  - The quantity of samples proposed is statistically appropriate
  - Only background inorganics will be compared to site-specific inorganics data
    - All other detected constituents will be attributed to the site
  - To address concern that entire east side of Vieques has been affected by former bombing activities, explosives analysis will be included for all background samples
    - If explosives detected in any sample, the sample will be eliminated from background data set

Specific Comments

- Comment
  - Background sampling should not take place on Vieques because proposed sample locations may in close proximity to impacted areas
- Response
  - None of the proposed sample locations are within 100 feet of environmental sites, roadways, or other known or suspected areas of use during former Navy operations
  - None of the background locations are located in areas potentially affected by former activities at discrete environmental sites
  - Quantity of data to be collected will allow identification of outliers (in other words, anomalously high inorganics concentrations compared to rest of data)
    - Outliers will be removed from the data set

Specific Comments

- Comment
  - Off-island background sampling is more appropriate than on-island background sampling because of the extensive military use of Vieques
- Response
  - Data collected to date do not indicate military use of Vieques has resulted in island-wide contamination from inorganics (or any other constituent)
  - On-island background sampling (not influenced by releases from discrete environmental sites) is most appropriate means of developing a representative background data set
  - Off-island background sampling would introduce a source of uncertainty (and potentially non-representative data and error) in the background data set because of potential differences in physical conditions (for example, geologic, ecological, atmospheric, and anthropogenic conditions)
  - Explosives analysis and outlier testing will be used to ensure data set is representative of background

Specific Comments

- Comment
  - If off-island background sampling is not favored, then increase the number of samples and depth of samples
- Response
  - As stated previously, the number of samples is statistically appropriate
  - The sample depths correspond to the depths samples are collected at discrete environmental sites
    - Based on potential human and ecological exposure scenarios
    - Subsurface soil from 4 to 6 feet (common depth of common subsurface activities such as installing utilities and building foundations) or just above bedrock, if encountered at shallower depth

Specific Comments

- Comment
  - Analyze background samples for additional constituents (explosives, pesticides, VOCs, SVOCs) to ensure background locations not be influenced by anthropogenic activity
- Response
  - Not critical that background locations not be influenced by anthropogenic activity; critical that background locations not be influenced by releases of inorganics from discrete environmental sites or other isolated releases of inorganics
  - Samples will be analyzed for explosives to address concern that bombing activities affected all of east Vieques
    - Samples containing explosives or anomalously high inorganics concentrations will be eliminated from background data set
  - Non-inorganic constituents (for example, VOCs, SVOCs) detected in samples collected from discrete environmental sites will be attributed to the environmental sites and addressed accordingly rather than comparing them to background

Specific Comments

- Comment
  - Some background locations will reach bedrock before the proposed 4-to-6-foot subsurface sampling depth
- Response
  - The proposed 4-to-6-foot subsurface sampling depth is approximate (a default based on risk assessment exposure scenario)
  - Goal is to sample at depths comparable to sampling depths at discrete environmental sites, which are located within the same geologic zones
  - If bedrock is encountered before 4-to-6 feet, subsurface samples will be shallower, just like they may be at environmental sites in the same geologic zone

Specific Comments

- Comment
  - If objective of subsurface sampling is to find a depth isolated from human activity, proposed plan will fail
- Response
  - The goal of subsurface sampling is to collect samples at comparable depths sampled at discrete environmental sites to facilitate comparison
  - The reason both surface and subsurface sampling is done is to provide data for the exposure scenarios used in human health and ecological risk assessments

Specific Comments

- Comment
  - Analyzing for only inorganics will not permit understanding of whether elevated inorganics (outliers) are due to contamination or other reason
- Response
  - Explosives analysis will be performed on all samples
  - Samples containing explosives will be eliminated from background data set
  - Regardless of reason for outliers, they will be eliminated from background data set so that data set is not skewed toward higher inorganics concentrations and so that final data set is representative of broad background conditions

Specific Comments

- Comment
  - RAB site visit in May 2005 identified a proposed location near a suspected bomb crater, so how is location representative of background?
- Response
  - First step to identifying background locations was to mark on map
  - Second step was to verify locations in field
    - Sample location near suspected bomb crater (as well as several others) was relocated based on site visit with agency and RAB members

Specific Comments

- Comment
  - Control site must not be contaminated in order to gather reliable data
- Response
  - If non-inorganics are detected at discrete environmental sites, they will be attributed to releases from the site and addressed accordingly (versus potentially eliminated by a background comparison)
  - To address concern that bombing activities impacted all of east Vieques, explosives analysis will be done for all background samples
    - Any sample containing detectable explosives will be eliminated from background data set

Specific Comments

- Comment
  - Study is incomplete without collecting samples of other media (for example, groundwater)
- Response
  - The purpose of this particular background investigation is to determine background inorganics concentrations for soil
  - Other media, such as groundwater, surface water, and sediment, are being included in investigations of discrete environmental sites
  - A comprehensive study of Vieques groundwater is not necessary in order to identify groundwater contamination at discrete environmental sites
    - Where background data for groundwater (and other media) are necessary, they will be collected on a site-specific basis

Specific Comments

- Comment
  - Do the 11 existing soil samples proposed for inclusion in the background data set meet the selection criteria for the background samples to be collected during the upcoming study?
- Response
  - The existing soil samples do not meet the selection criterion of being at least 100 feet from roadways
  - 11 new locations will be sampled to replace the existing 11
  - If the data for the 11 existing samples are statistically comparable to the newly collected data, they will be combined with the new data

Specific Comments

- Comment
  - Are there unknown sources of contamination that may affect the ability to collect data representative of background
- Response
  - The number of samples and outlier evaluation will ensure that if an unknown source of contamination has affected the inorganics concentrations at any particular sample location, the inorganics data for that sample will be eliminated from the background data set