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LETTER REGARDING THE RESULTS OF BACKGROUND METALS SAMPLING NAS  
OCEANA VA  
4/21/1994  
CH2M HILL

**TO:** Bob Stroud/EPA Region III

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**DATE:** April 21, 1994

**SUBJECT:** Results of Background Metals Sampling at Oceana

**PROJECT:** MAE20368.M0.11

One of the issues remaining after the first phase of the RFI at Oceana was whether metals concentrations in soils were a problem. Specifically, the concentrations of beryllium and arsenic at several sites were above risk-based screening concentrations (RBCs) published by EPA Region III. This was the focus of several comments by the DEQ. The DEQ mentioned burning of fuel oil or coal as a possible source of the high beryllium. Our contention was that the metals concentrations were not the result of any station activities but were naturally above RBCs. Our proposal to resolve this issue was to sample soils for metals at two locations distant from any RCRA sites or other activities that could cause contamination to determine background concentrations of metals in soils.

The results of the background soil sampling are now available. The results are consistent with past results at the RFI sites, that is, the concentrations of beryllium and arsenic were above RBCs at one or both of the locations. The locations of the samples are shown in Figure 1 and the results are tabulated in Table 1. Both samples were collected near the main gate entrance off of Oceana Boulevard. Sample BG-SOIL1 was collected northwest of the large white announcement sign just west of the guard station. BG-SOIL1 was collected at the edge of the woods at a depth of 2 to 3 feet from a silty clay zone. BG-SOIL2 was collected adjacent to the flag pole and blue-and-gold Oceana entrance sign just east of the guard station and the parking lot for the main gate pass office. It was collected from a clayey silt zone at a depth of 0.5 to 1 foot. Both samples were similar lithologically to the majority of the soils samples collected during the RFI and both were in areas of minimal human activity.

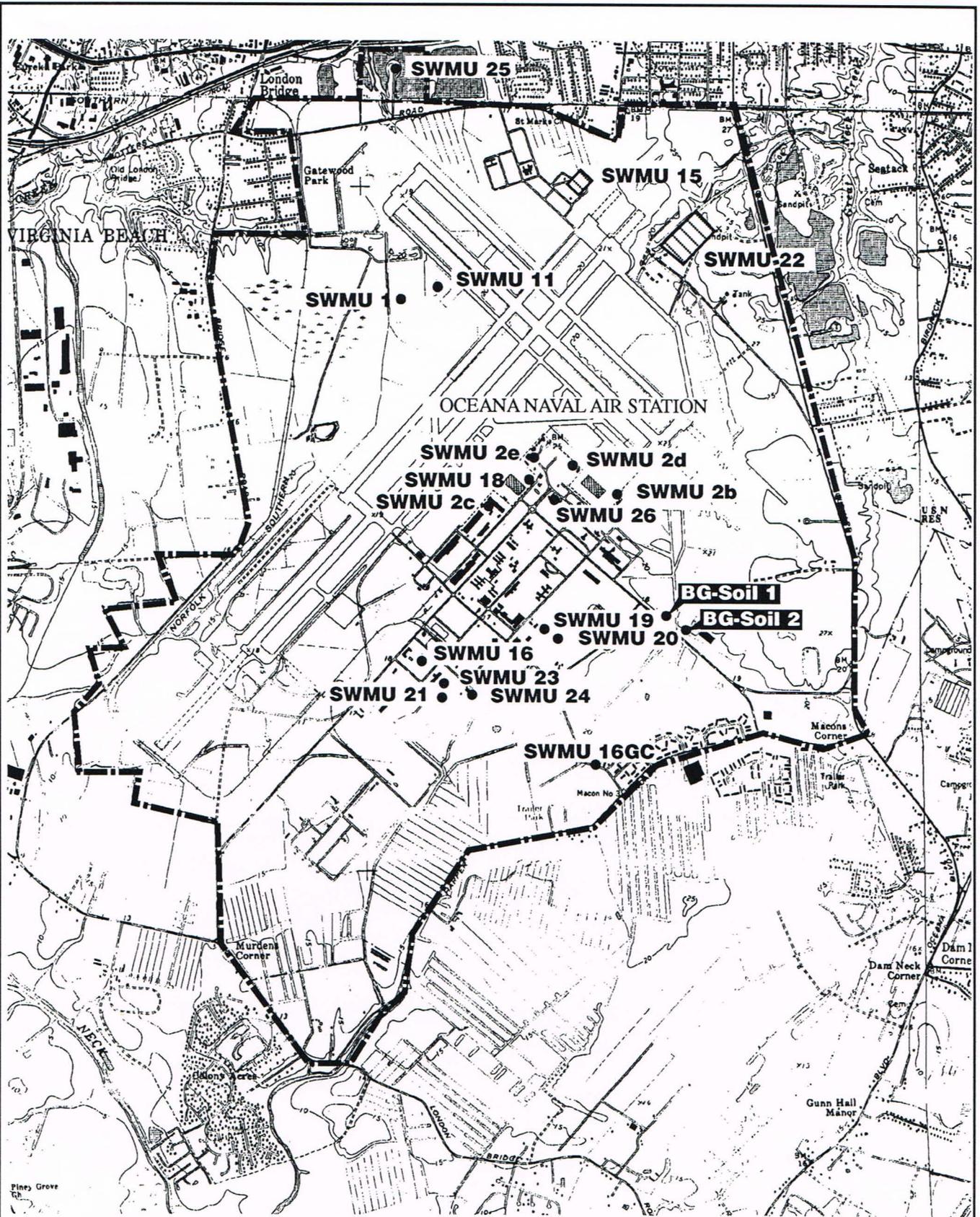
The analytical data are compared in Table 1 to the average concentration in the eastern United States (Shacklette and Boerngen, 1984) and to proposed RCRA action levels (*Federal Register*, July 27, 1990), the same criteria used in the Phase I report.

Beryllium, chromium, and lead were present above mean concentrations for the eastern United States. The concentration of arsenic was 0.62 ppm in BG-SOIL1 and 2.1 ppm in BG-SOIL2. The RBCs listed (EPA, first quarter 1994) for residential and industrial soils, were 0.37 ppm and 1.6 ppm for arsenic (as a carcinogen), 0.15 and 0.67 ppm for beryllium, 78,000 and 1,000,000 ppm for trivalent chromium and 390 and 5100 for hexavalent chromium. There is no RBC for lead.

It is apparent from the comparison of RBCs to the data that only beryllium and arsenic are above RBCs in the background soils. This was also true in the soil sampling during the RFI Phase I. Reference to Appendix A of the report shows that maximum concentrations in soils ranged from 1.2 to 22 ppm for arsenic and 0.24 to 1.2 for beryllium. The high concentration in both cases were from sites that have been removed from the RFI after consideration of overall concentrations, pathways, and site history. The concentrations at sites that are still active are 2.2 to 3.5 for arsenic and 0.29 to 0.63 ppm for beryllium.

Because the background soils were collected from clean background areas, are consistent with past concentrations, yet are above RBCs, we conclude that soils at Oceana are naturally above RBCs and, therefore, arsenic and beryllium concentrations above RBCs during the Phase I RFI do not indicate site contamination.

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**Figure 1**  
LOCATIONS OF BACKGROUND SOIL SAMPLES  
RCRA Facility Investigation—Naval Air Station, Oceana

**Table 1**  
**INORGANIC COMPOUNDS IN BACKGROUND SOILS AT NAS, OCEANA**  
**February 1994**  
**(All data in mg/kg, ppm)**

Analyte	BG-SOIL1	BG-SOIL2	Eastern United States Mean #	Proposed RCRA Action Levels &
Aluminum	28,700	16,500	33,000	ND
Antimony	< 2.9 n	<2.7 n	0.52	30
Arsenic	0.62 b	2.1 b	4.8	80
Barium	112	74.0	290	4,000
Beryllium	0.67 b	0.69 b	0.55	0.2
Cadmium	<0.81	<0.76	ND	40
Calcium	318 b	846 b	3,400	ND
Chromium	45.6	24.0	33	400
Cobalt	3.0 b	4.4 b	5.9	ND
Copper	12.1	10.6	13	ND
Iron	10,200	8,730	14,000	ND
Lead	12.5*	26.9*	14	ND
Magnesium	901 b	1,180 b	2,100	ND
Manganese	12.6	28.2	260	ND
Mercury	<0.04	0.05 b	0.081	20
Nickel	9.3 b	10.5	11.0	2,000
Potassium	448 b	726 b	12,000	ND
Selenium	0.68 b	<0.37	0.30	0.86
Silver	<0.67	<0.62	ND	200
Sodium	163 b	126 b	2,500	ND
Thallium	<0.34	0.43 b	ND	ND
Vanadium	35.3	26.3	43	ND
Zinc	17.5	28.4	40	ND

**Notes:**

< The constituent was not detected at the instrument detection limit (IDL).

b The reported value was less than the Contract Required Detection Limit (CRDL), but greater than or equal to the IDL.

\* Indicates duplicate analysis not within control limits.

n Indicates poor prespike recovery.

ND - No data.

# - Shacklette and Boerngen, 1984.

& - Federal Register, July 27, 1990.