

7/30/91 - 00356

**RCRA FACILITY INVESTIGATION
FOR UNITS 5, 10, 16, AND 17 AT THE
MARINE CORPS AIR STATION
CHERRY POINT, NORTH CAROLINA**

**TECHNICAL REVIEW COMMITTEE PRESENTATION
JULY 30, 1991**

**DEPARTMENT OF THE NAVY
CONTRACT NO. N62470-90-C-7635**



CP-00356-09.03-07/30/91

MEDIA THAT EXCEED RFI RISK GOALS

Unit 5	None
Unit 10	Groundwater (vinyl chloride and antimony)
Unit 16	Groundwater (TCE, vinyl chloride, and arsenic)
Unit 17	None

PCBs in soil/sediment at Units 5 and 17 will be carried through CMS phase because risks exceeded 10^{-6} .

UNIT 17
DEFENSE REUTILIZATION AND MARKETING OFFICE

RECOMMENDATIONS FOR FUTURE WORK

- **Media Considered for Evaluation in a CMS Report**
 - **Soil: Corrective Measures, including No Action, will be evaluated in a CMS Report.**

The Navy is currently awaiting EPA approval of this recommended next step.

UNIT 17 RISK SUMMARY

<u>EXPOSURE ROUTE</u>	<u>CANCER RISK</u>	<u>HAZARD INDEX</u>
Soil/Sediment		
- dermal	5.2×10^{-6}	-
- ingestion	3.7×10^{-7}	-

UNIT 17
DEFENSE REUTILIZATION AND MARKETING OFFICE

SUMMARY OF RISK ASSESSMENT

- **The total incremental cancer risk for adult Air Station personnel (accounting for both soil and sediment contact) would be 5.5×10^{-6} which is less than the RCRA risk goal of 1×10^{-4} .**
- **However, PCBs are present in soil at concentrations that exceed the calculated action levels.**
- **No groundwater risks were identified.**

UNIT 17

DEFENSE REUTILIZATION AND MARKETING OFFICE

SUMMARY OF NATURE AND EXTENT OF CONTAMINATION

- **Soil - PCBs were detected in almost all of the soil samples, but were found at the highest concentrations in the upper six inches of soil.**
- **Sediment - PCBs were also detected in the sediments of Schoolhouse Creek, but at concentrations below the action levels.**
- **Groundwater - PCBs were not detected in the groundwater.**
- **Surface Water - Surface water was not present.**

UNIT 17
DEFENSE REUTILIZATION AND MARKETING OFFICE

SUMMARY OF FIELD ACTIVITIES

- **Installed two monitoring wells; sampled and analyzed groundwater from both wells.**
- **Collected and analyzed 27 soil samples from 17 locations from the area adjacent to the DRMO Hazardous Waste Storage Facility.**
- **Collected and analyzed 18 sediment samples along Schoolhouse Creek.**
- **Obtained water level measurements.**
- **Conducted rising head slug tests.**
- **Surveyed the locations of the two new wells.**

UNIT 17
DEFENSE REUTILIZATION AND MARKETING OFFICE

DESCRIPTION OF THE UNIT

- **DRMO storage area and an associated drainage ditch.**
- **Approximately 1 acre in size.**
- **Previous investigations indicated that Unit 17 is contaminated with PCBs.**

**UNIT 16
LANDFILL AT SANDY BRANCH**

RECOMMENDATIONS FOR FUTURE WORK (continued)

- **Soil/Source:** The next step planned is to conduct an infiltration and leakage study of the sewer system within the industrial area. This system may be a major contributor to the environmental contamination. Sampling activities will be planned after the infiltration and leakage study is completed.
- **The infiltration and leakage study activities have been initiated. The Navy is currently awaiting EPA approval of the other recommended activities for this Unit.**

UNIT 16 LANDFILL AT SANDY BRANCH

RECOMMENDATIONS FOR FUTURE WORK

- **Media Considered for Additional Field Investigation**
 - **General:** Continued investigation will not focus on the Landfill at Sandy Branch, as it does not appear to be a major contributor to the environmental contamination. Instead, the area upgradient of the landfill, the industrial area, will be the focus of ongoing activities. Also, the former Plating Shop investigation results will be evaluated with the overall investigation of the industrial area as Unit 16.
 - **Groundwater:** The extent of the groundwater contamination is not sufficiently defined to prepare a CMS Report. Further field investigation is planned.

UNIT 16 RISK SUMMARY

<u>EXPOSURE ROUTE</u>	<u>CANCER RISK</u>	<u>HAZARD INDEX</u>
Groundwater	1.2×10^{-3}	2.7×10^{-1}
Surface water		
- fish	1.3×10^{-8}	5.0×10^{-4}
- dermal	6.7×10^{-7}	3.7×10^{-4}
- ingestion	2.2×10^{-6}	1.2×10^{-3}

UNIT 16 LANDFILL AT SANDY BRANCH

SUMMARY OF RISK ASSESSMENT

- **The total incremental cancer risk for groundwater ingestion was estimated at 1.2×10^{-3} , which is above the guideline of 1×10^{-4} . The calculated Hazard Index exceeded unity, therefore noncarcinogenic health effects are also of concern.**
- **Ingestion of fish from Slocum Creek or Sandy Branch and the recreational exposures to surface water were also evaluated and found not to be of concern.**

**UNIT 16
LANDFILL AT SANDY BRANCH**

**SUMMARY OF NATURE AND EXTENT
OF CONTAMINATION (continued)**

- **Former Plating Shops - Soil:** The available analytical data indicate the presence of some volatile organics in the soil around the former Plating Shop 93103A, while the soil around former Plating Shop 93103B is basically clean. Because the sump associated with former Plating Shop 93103A appears to be intact, it is unlikely that this was a major source of the contamination that was detected.

Groundwater: The groundwater around both Plating Shops is considered to be contaminated with volatile organics.

6-8/91

UNIT 16 LANDFILL AT SANDY BRANCH

SUMMARY OF NATURE AND EXTENT OF CONTAMINATION

- **Soil - Ten soil samples were collected. The detections were sporadic and the concentrations found were low.**
- **Sediments - Sediments were found not to be contaminated.**
- **Groundwater - Groundwater contamination was found to be upgradient of the landfill in the industrial complex. Trichloroethene and 1,2-dichloroethene were the two most commonly detected groundwater contaminants. Other halogenated aliphatics were also detected.**
- **Surface Water - Surface water samples were also found to contain halogenated aliphatics, such as those found in the groundwater.**

UNIT 16

LANDFILL AT SANDY BRANCH

SUMMARY OF FIELD ACTIVITIES (continued)

- **Conducted a separate investigation of the former Plating Shops within the industrial complex. This investigation was not required by the Consent Agreement, but was conducted by the Navy to evaluate environmental conditions associated with the former Plating Shops.**
 - **Two monitoring wells and five soil borings were installed, sampled, and analyzed.**
 - **Groundwater level measurements were obtained from 12 monitoring well locations (three newly installed and nine existing within the industrial complex).**
 - **Surveyed the locations of the new monitoring wells.**

UNIT 16 LANDFILL AT SANDY BRANCH

SUMMARY OF FIELD ACTIVITIES

- **Conducted a soil gas survey.**
- **Installed seven additional wells; sampled and analyzed the seven new and nine existing wells.**
- **Drilled ten soil borings and collected samples for analyses.**
- **Collected and analyzed four surface water and sediment samples from Slocum Creek and Sandy Branch.**
- **Obtained groundwater level measurements.**
- **Performed rising head slug tests (new wells only).**
- **Surveyed new well and boring locations.**

UNIT 16 LANDFILL AT SANDY BRANCH

DESCRIPTION OF THE UNIT

- **Landfilling activities occurred between 1946 and 1948.**
- **The landfill is approximately 11 acres in size.**
- **Previous investigations indicated that contamination (chlorinated volatile organics and cyanide) was present in the landfill area. However, an upgradient source or sources was suspected.**

UNIT 10 OLD SANITARY LANDFILL

RECOMMENDATIONS FOR FUTURE WORK (continued)

- **Media Considered for Interim Measures**
 - **Sludge:** The former impoundment will be handled as an interim measure (IM). Performing activities as an IM will expedite cleanup activities of this known source area. This activity will also include placing a fence along the south side of the Unit.
- **The Navy is currently awaiting EPA approval of these recommended activities.**

UNIT 10 OLD SANITARY LANDFILL

RECOMMENDATIONS FOR FUTURE WORK

- **Media Considered for Evaluation in a CMS Report**
 - **Groundwater: Corrective Measures, including No Action, will be evaluated in a CMS Report. To supplement this report, a treatability study is planned to evaluate the effectiveness of mobile treatment units for groundwater remediation.**

- **Media to be Further Investigated**
 - **Soil/Source: Based on the areas that exhibit groundwater contamination, an attempt to locate the source or sources of contamination will be made through the use of soil borings and/or test pits.**

UNIT 10 RISK SUMMARY

<u>EXPOSURE ROUTE</u>	<u>CANCER RISK</u>	<u>HAZARD INDEX</u>
Groundwater	1.7×10^{-4}	1.4×10^{-1}
Surface water		
- fish	-	1.4×10^{-1}
- dermal	3.1×10^{-7}	4.8×10^{-4}
- ingestion	1.1×10^{-6}	1.6×10^{-3}

= vinyl chloride

**UNIT 10
OLD SANITARY LANDFILL**

SUMMARY OF RISK ASSESSMENT

- Exposure to the source material that was identified in the former impoundment area is not possible because of the depth at which the material was encountered.
- No human health risks associated with surface water or sediments were calculated in the Health and Environmental Assessment.
- The total incremental cancer risk for ingestion of groundwater is 1.7×10^{-4} , which is slightly above the recommended goal of 1×10^{-4} .

UNIT 10 OLD SANITARY LANDFILL

SUMMARY OF NATURE AND EXTENT OF CONTAMINATION

- **Soil - Soil borings drilled in the area of the former impoundment indicate, by visual inspection as well as chemical analyses, that source material remains in this area. Both soil and sludge were analyzed.**
- **Sediment - Low concentrations of several organic chemicals were noted in both Turkey Gut and Slocum Creek.**
- **Groundwater - No significant differences were noted between the previous sampling results and the 1990 effort in the types of contaminants present. Generally, the wells downgradient of the former impoundment contain halogenated aliphatics (such as methylene chloride), and the wells in the eastern portion of the Unit contain the maximum concentrations of xylenes. Benzene is found primarily in the southern part of the Unit. Other organics were found sporadically around the Unit. Metals were found at elevated concentrations throughout the Unit.**
- **Surface Water - Low concentrations of several organic chemicals were noted in both water bodies.**

UNIT 10 OLD SANITARY LANDFILL

SUMMARY OF FIELD ACTIVITIES

- **Conducted a soil gas survey.**
- **Installed 12 additional monitoring wells; sampled and analyzed groundwater from the 12 new and 23 existing wells.**
- **Drilled four soil borings in the former impoundment area and obtained samples for analyses.**
- **Collected and analyzed six surface water and sediment samples from Turkey Gut and Slocum Creek.**
- **Obtained groundwater level measurements.**
- **Conducted rising head slug tests (new wells only).**
- **Surveyed new well and boring locations.**

UNIT 10 OLD SANITARY LANDFILL

DESCRIPTION OF THE UNIT

- **Primary disposal site at the Air Station from 1955 until the mid to late 1970s. Contaminated material and POL were land spread, burned, stored in unlined pits, and buried.**
- **Approximately 40 acres in size.**
- **Previous investigations indicated that Unit 10 is contaminated with volatile organics, naphthalene, beta- BHC, arsenic, cadmium, and other metals.**

**UNIT 5
PETROLEUM, OIL, AND LUBRICANT STORAGE TANKS**

RECOMMENDATIONS FOR FUTURE WORK

- **Media Considered for Evaluation in a CMS Report**
 - **Soil and Sediments: Corrective Measures, including No Action, will be evaluated in a CMS Report.**

The Navy is currently awaiting EPA approval of this recommended next step.

UNIT 5 RISK SUMMARY

<u>EXPOSURE ROUTE</u>	<u>CANCER RISK</u>	<u>HAZARD INDEX</u>
Soil		
- dermal	4.4×10^{-6}	7.3×10^{-5}
- ingestion	2.6×10^{-7}	4.5×10^{-6}
Surface water		
- fish	-	3.6×10^{-2}
- dermal	7.4×10^{-10}	8.1×10^{-5}
- ingestion	2.4×10^{-9}	2.4×10^{-4}

UNIT 5 PETROLEUM, OIL, AND LUBRICANT STORAGE TANKS

SUMMARY OF RISK ASSESSMENT

- **The total incremental cancer risk for adult Air Station personnel was calculated to be 4.7×10^{-6} for soil exposures, which is within the range considered acceptable for RCRA corrective action. However, the potential risk associated with PCBs exceeds 1×10^{-6} .**
- **Exposure to sediments is highly unlikely because recreational use of Slocum Creek in the area near this Unit is not considered to be likely. The presence of PCBs in the sediments of Slocum Creek may, however, present an environmental concern because they are highly bioaccumulative.**
- **Groundwater exposures are not expected to cause adverse health effects based on the screening performed in the Health and Environmental Assessment.**
- **The potential risks resulting from ingestion and dermal contact with surface water was calculated to be 3.1×10^{-9} , which is well below the 1×10^{-6} risk goal.**

RFI RISK GUIDANCE

Cancer Risk

- **Total risk from all chemicals not to exceed 1×10^{-4}**
- **No individual chemical risk to exceed 1×10^{-6}**

Hazard Index

- **Not to exceed 1.0**

REALISTIC EXPOSURE ROUTES - BASE PERSONNEL

Soil (<2 feet deep) (Table 2-6)*

- **Dermal Contact**
- **Incidental Ingestion**

Groundwater (Table 2-7)

- **Ingestion**

Surface Water (Table 2-8, Table 2-9)

- **Fish Ingestion**
- **Dermal Contact**
- **Incidental Ingestion**

*** Adolescent trespassers also evaluated**

RISK ASSESSMENT

- **Data Evaluation**
- **Toxicity Assessment**
- **Exposure Assessment**
- **Risk Characterization**

HEA SURFACE WATER

Compare Cmax to

- **AWQC - Fish ingestion**
- **AWQC - Protection of aquatic life
(acute effects/chronic effects)**
- **NC State Standards for Class SC Waters**

HEA SOIL AND GROUNDWATER

SOIL

Compare Cmax to

- **Calculated "action" level**

GROUNDWATER

Compare Cmax to

- **MCL, if available**
- **Calculated "action" level**
- **NC State Standards for Class GA Waters**

CALCULATIONS OF "ACTION" LEVELS

CARCINOGENS

$$\text{Conc.} \left(\frac{\text{mg}}{\text{L}} \right) \text{ or } \left(\frac{\text{mg}}{\text{kg}} \right) = \frac{10^{-6}}{\text{CSF} \left(\frac{\text{kg-day}}{\text{mg}} \right)} \times \frac{\text{Body Weight (kg)}}{\text{Intake Rate} \left(\frac{\text{mg}}{\text{day}} \right) \text{ or } \left(\frac{\text{L}}{\text{day}} \right)}$$

NONCARCINOGENS

$$\text{Conc.} \left(\frac{\text{mg}}{\text{L}} \right) \text{ or } \left(\frac{\text{mg}}{\text{kg}} \right) = \text{RFD} \left(\frac{\text{mg}}{\text{kg-day}} \right) \times \frac{\text{Body Weight (kg)}}{\text{Intake Rate} \left(\frac{\text{mg}}{\text{day}} \right) \text{ or } \left(\frac{\text{L}}{\text{day}} \right)}$$

NOTE: 10^{-6} for Class A/B carcinogens
 10^{-5} for Class C carcinogens

HEA INTAKE ASSUMPTIONS

Soil Ingestion

- 0.1 g/day over 70 years for 70 kg adult.
- 0.2 g/day over 5 years for 16 kg child.

Groundwater Ingestion

- 2 L/day over 70 years for 70 kg adult.

HEA EXPOSURE ROUTES

Medium	Exposure Route
Surface Soil	Ingestion
Groundwater	Ingestion
Surface Water	Ingestion Fish Consumption

* Volatile emissions would be minimal because surface soil samples contained only low concentrations of volatiles.

UNIT 5 PETROLEUM, OIL, AND LUBRICANT STORAGE TANKS

SUMMARY OF NATURE AND EXTENT OF CONTAMINATION

- **Soil - PCBs were detected in 21 of 33 soil samples collected from depths of less than 5 feet. None were found at greater depths. A number of other contaminants were detected, but none were found frequently or at high concentrations.**
- **Sediment - PCBs were also detected in several sediment samples from Slocum Creek.**
- **Groundwater - The groundwater at Unit 5 was generally free of contamination during this phase of field activities. This is consistent with the results obtained during previous sampling episodes.**
- **Surface Water - Surface water at this Unit historically did not exhibit site-related contamination and was, therefore, not sampled during this phase of field activities.**

UNIT 5 PETROLEUM, OIL, AND LUBRICANT STORAGE TANKS

SUMMARY OF FIELD ACTIVITIES

- **Conducted a soil gas survey.**
- **Installed four additional wells; sampled and analyzed groundwater from ten wells.**
- **Drilled 18 soil borings and collected samples for analyses at various depths.**
- **Collected and analyzed six sediment samples from Slocum Creek.**
- **Obtained water level measurements.**
- **Conducted rising head slug tests.**
- **Surveyed new well and boring locations.**

UNIT 5 PETROLEUM, OIL, AND LUBRICANT STORAGE TANKS

DESCRIPTION OF THE UNIT

- **Previously included a 100,000-gallon storage tank for waste petroleum, oil, and lubricants (POL). Also contains a storage tank for No. 6 fuel oil and other possible sources of environmental contamination (i.e., transformer station and old steam plant).**
- **Approximately 10 acres in size.**
- **Previous investigations indicated that Unit 5 is contaminated with PCBs.**

MEETING OBJECTIVES

- To provide an update of recent field activities at Units 5, 10, 16, and 17.
- To provide a summary of the nature and extent of contamination at each of the four Units.
- To provide an overview of the risk assessments performed for each of the Units.
- To present the plans for the next step to be taken at each of the four Units.