Health Consultation

Very Low Frequency (VLF) Area of the Naval Computer and Telecommunications Area Master Station Atlantic Detachment
Cutler Facility, Maine

CUTLER, WASHINGTON COUNTY, MAINE

EPA FACILITY ID: ME5170024355

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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Prepared By:

Site and Radiological Assessment Branch
Division of Health Assessment and Consultation
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Introduction

Statement of Issues and Purpose

In June 2006, a concerned citizen petitioned the Agency for Toxic Substances and Disease Registry (ATSDR) to determine the potential exposure to the public from lead and polychlorinated biphenyls (PCB) released from paints at the Very Low Frequency (VLF) area of Naval Computer and Telecommunications Area Master Station Atlantic Detachment (NCTAMSLANT DET) Cutler facility. (Letter)

Site Visit

As part of our evaluation of the VLF area of NCTAMSLANT DET Cutler, ATSDR met with Maine Department of Environmental Protection (MDEP) on September 11, 2006 and met with base personnel and petitioner on September 13-14, 2006, respectively, to discuss the site. During the meeting with MDEP, they requested ATSDR look at PCB levels from paints and waste repair work on the VLF towers and its exposure to farm-raised salmon, clams, and lobster that are being harvested by private industry and local residents adjacent to the base.

Site Description and History

We compiled the information provided in this health consultation from the Recommended Sampling Design and Supporting Data Quality Objectives for the Phase I Remedial Investigation for the Installation Restoration Site 4 at NCTAMSLANT DET Cutler, Maine, September 2004, Battelle Environmental Restoration Department and the Final Background Study for Remedial Investigations for Installation Restoration Sites at NCTAMSLANT DET Cutler, Maine, March 2005, Battelle Environmental Restoration Department.

NCTAMSLANT DET Cutler was established in June 1961 as a major communications facility providing radio signal transmissions to U.S. ships and submarines primarily in the North Atlantic and Arctic Oceans and Mediterranean Sea. The VLF area of NCTAMSLANT DET Cutler is the site of the VLF transmitter and contains two VLF Antenna Arrays. NCTAMSLANT DET Cutler is located on Route 191 near the town of Cutler, Washington County, Maine.

The facility occupies approximately 3,000 acres of land on a rocky peninsula that separates Machias Bay to the west and Little Machias Bay to the east. NCTAMSLANT DET Cutler is divided among three areas: 1) the administration and housing area located along the west side of Route 191; 2) the High-Frequency (HF) Antenna Area, which includes three buildings and 19 antennas, located directly across from the administration and housing area on the east side of Route 191; and 3) the VLF Antenna Area (peninsula) located south of the administrative area which contains two antennas with 26 main supporting towers and associated winch houses and buildings. (Batelle, 2005)

The towers are painted alternating bands of international orange and international white to meet Federal Aviation Administration (FAA) marking requirements to alert aircraft of these obstructions. FAA standards require that surfaces be repainted when color changes noticeably or its effectiveness is reduced by scaling, oxidation, chipping, or layers of industrial contamination. In 1996, the Navy initiated a project to perform repair work on the VLF towers, including paint removal, miscellaneous structural repairs, repainting to conform to FAA standards, and

replacement of tower lighting systems. Testing of the water from water jetting and paint residue revealed the presence of lead, PCBs, cadmium, and chromium in the paint chips. (Battelle, 2005)

Environmental Data and Pathways for NCTAMSLANT Detachment Cutler

In this section, ATSDR evaluates whether site workers and/or community members are currently or will in the future be exposed to harmful levels of chemicals. ATSDR screens the concentrations of contaminants in environmental media (e.g., groundwater or soil) against health-based comparison values (CVs) (refer to text box). Because CVs are not thresholds of toxicity, environmental levels that exceed CVs would not necessarily produce adverse health effects. If a chemical is found in the environment at levels exceeding its corresponding CV, ATSDR further evaluates site-specific exposures and the likelihood of adverse health effects.

About ATSDR's Comparison Values (CVs)

CVs are not thresholds for adverse health effects. ATSDR CVs represent contaminant concentrations many times lower than levels at which no effects were observed in experimental animals or human epidemiologic studies. If contaminant concentrations are above CVs, ATSDR further analyzes exposure variables (for example, duration and frequency of exposure), the toxicology of the contaminant, other epidemiology studies, and the weight of evidence for health effects. Some of the CVs used by ATSDR scientists include:

EMEGs — environmental media evaluation guides

RMEGs — reference dose media evaluation guides,

CREGs — cancer risk evaluation guides, and

MCLs — EPA's maximum contaminant levels

MCLs, EMEGs, RMEGs, and CREGs are nonenforceable, health-based CVs developed by ATSDR for screening environmental contamination for further evaluation. MCLs are enforceable drinking water regulations developed to protect public health.

You can find out more about the ATSDR evaluation process by reading ATSDR's Public Health Assessment Guidance Manual at: http://www.atsdr.cdc.gov/HAC/HAGM/, or contacting ATSDR at 1-888-42ATSDR.

Pathways

Exposure pathways are the different ways that contaminants move in the environment and the different ways that people can come into contact with these contaminants—by touching, eating or drinking. When information shows that people have come into contact with a contaminant in soil, air, or water, a completed exposure pathway exists. Completed exposure pathways can occur in the past or in the present.

Surface Soil:

There is no access to the base except for employees and contractors. Workers involved with cleaning and maintenance of the towers may be exposed to surface soil contaminated with PCBs and metals.

Sediment:

Swimming and other water activities are not known to occur near NCTAMSLANT DET Cutler. Clamming is not allowed on Government Property. However, recreational/commercial harvesting of shellfish is allowed at Little Machias Bay and Machias Bay adjacent to NCTAMSLANT DET Cutler. People can potentially be exposed to contaminants when searching for clams during low tide. A perennial stream flowing from the base to Little Machias Bay carried paint chips and other contaminants from base. During the 2000 sampling event, MDEP found paint chip fragments near the stream. MDEP does not believe PCBs or lead is leaching out

of the chips. Limited sampling data conducted by MDEP showed PCB levels below ATSDR's Chronic EMEG.

Biota:

Although the data on aquatic species does not indicate the presence of a hazard, some data is lacking for some species, it is prudent that people follow the MDEP Fish Advisories and limit the consumption of Lobster Tomalley

Environmental Data

ATSDR reviewed data from three different documents. The Remedial Investigation provided data for soil. Data was reviewed from the MDEP 2000 sampling of mussel and clams and the 2005 Final Background Study for Remedial Investigations for Installation Restoration Sites at NCTAMSLANT Det Cutler, Maine.

Soil Sampling

Thirty samples were collected for analysis of 23 metals and 17 Polycyclic Aromatic Hydrocarbons. Twenty additional samples were collected for analysis of 21 pesticides, 11 herbicides and 7 PCBs. ATSDR reviewed all available soil data provided in the Final Background Study for Remedial Investigations for Installation Restoration Sites at NCTAMSLANT Detachment Cutler and compared it against ATSDR's CVs. All contaminants were found below ATSDR CVs.

Sediment

Nine sediment samples were collected for PCB analysis by MDEP in September of 2000. The samples were compared against ATSDR CVs. PCB levels were found below ATSDR's Chronic EMEG.

Biota

Clams:

Limited data were available; nine clam samples were collected for PCB analysis by MDEP in September of 2000. Clams are commercially and recreationally harvested adjacent to the VLF area of NCTAMSLANT DET Cutler. The U.S Food and Drug Administration (FDA) Center for Food Safety and Applied Nutrition (CFSAN) developed a safety tolerance level of 2 ppm for PCBs in clams (http://www.cfsan.fda.gov/~comm/haccp4x5.html). This safety level represents a point at or above which the agency will take action to remove products from the market. All samples (homologue and aroclor) are below CFSAN safety levels.

ATSDR conducted an exposure dose calculation using the 95% confidence interval (0.018ppm). ATSDR estimated that the total PCB exposure dose to be 0.00000668 (mg/kg/day) for adults and 0.0000156 (mg/kg/day) for children (Appendix A). This is below Chronic Oral Minimum Risk Level (MRL) of 0.02 (µg/mg/day) or 0.00002 (mg/kg/day).

Lead levels were found below CFSAN safety tolerance level of 1.7 ppm for clams.

Mussel:

Limited data were available; three samples were collected for PBC analysis by MDEP in September of 2000. Samples were below the CFSAN tolerance level of 2 ppm for PCB in mussel.

In addition, exposure dose calculation conducted by ATSDR showed that levels were below ATSDR's Chronic Oral MRL for PCB (0.02 µg/mg/day) (http://www.cfsan.fda.gov/~comm/haccp4x5.html).

Lead levels were found below CFSAN safety tolerance level of 1.7 ppm for mussels.

Lobster:

No sampling data was available for review. Although there are no published safety considerations when it comes to eating lobster meat, the Maine Division of Environmental Health advised people to refrain from eating the tomalley. The tomalley is a soft, green substance found in the body cavity of the lobster. Test results have shown that tomalley can accumulate contaminants found in the environment. (http://www.maine.gov/dhhs/eohp/fish/saltwater.htm). ATSDR considers that it would be prudent public health practice to follow the Maine Division of Environmental Health Safe Eating Guidelines.

Salmon:

No sampling data for PCBs or lead was available for review. Although studies have shown that farm-raised salmon contains higher concentration of contaminants (PCB, dioxins) than in wild salmon (Hites, 2004), the Maine Bureau of Health decided that "because of the health benefits associated with Omega-3 fatty acids and fish… "the committee did not recommend that people reduce their consumption of fatty fish below recommended two servings per week. (http://www.epa.gov/waterscience/fish/forum/2004/presentations/sunday/frohmberg.pdf.) The American Heart Association (AHA) also states that the benefits of fish consumption far outweigh the potential risk when amounts of fish are eaten within the recommendations established by the FDA and EPA. The AHA further recommends the removal of the skin and surface fat from salmon before cooking to prevent potential exposure to contaminants (Lichtenstein, 2006). ATSDR considers that it would be prudent public health practice to follow Maine Division of Environmental Health Safe Eating Guidelines.

Blueberries:

Lead: The effects of lead in soil and food are well understood; lead is not normally very mobile and direct exposure to contaminated soil has a stronger impact than does ingestion of food-plants grown in the soil (Sheppard 1991). Furthermore, Muffet (1989) found that there is no increase of blood lead levels for men, women, or children with an increased consumption of vegetables; indicating that there is no evidence of increased vegetable consumption contributing to a significant increase in blood lead levels. Currently there are institutional controls in place that do not allow Navy personnel to collect the blueberries or other fruits found on site.

PCBs: Although institutional controls are currently in placed to prevent base personnel from consuming wild berries found on site, ATSDR is proposing a research project to investigate the ability of berry-producing plants to take up and accumulate chemicals such as PCBs. Should the chemical uptake investigation occur the results will be used to steer future public health conclusions. In the absence of that information, it is a prudent public health practice for people to wash all fruits and vegetables prior to consumption.

Child Health Considerations

ATSDR recognizes that communities with contamination in water, soil, air, or food, infants and children may be more sensitive to exposures than adults. This sensitivity is the result of a number of factors. Children are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. Most children are shorter than adults, which mean children breathe dust, soil, and heavy vapors close to the ground. Children are also smaller, potentially resulting in higher doses of chemical exposure per unit body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. Most importantly, children depend completely on adults for risk identification and for management decisions, housing decisions, and access to medical care. Therefore, ATSDR is committed to evaluating children's special interests at sites such as NCTAMSLANT DET Cutler.

Like other people who play, live, and work at or near NCTAMSLANT DET Cutler, children may come in contact with contaminated soils or sediments. As discussed in the Pathways section of this Public Health Consultation, current and future exposures for children could include contact with contaminated soils or sediments while clamming at Little Machias Bay and Machias Bay areas resulting in ingestion of contaminated foods or non-food items (e.g., dirt).

To evaluate whether children may experience adverse health affects through current or future exposures to site contaminants, ATSDR estimated the potential doses for children. To estimate these doses, ATSDR used health-protective assumptions that likely overestimate the levels of actual exposure. The assumptions used and the estimated doses are found in Appendix A.

Discussion of Potential Public Health Issues

ATSDR reviewed the limited data available from The Remedial Investigation, the MDEP 2000 sampling of mussel and clams, and the 2005 Final Background Study for Remedial Investigations for Installation Restoration Sites at NCTAMSLANT DET Cutler, Maine. We found the levels of the contaminants to be below ATSDR CV's and the FDA Center for Food Safety and Applied Nutrition (CFSAN) safety tolerance level.

Confidence for health decisions are tipycally based on 30 samples. This is because when there are fewer samples, the coefficient of variance (sometimes called Relative Standard Error) is large. Since there are only nine clam samples, the coefficient of variance is higher than (20%) environmental protocols (EPA 1994). ATSDR does not expect that the levels will be near those that are considered hazardous. However, more samples will increase the reliability of the data.

To make a definitive health call, ATSDR recommends that additional biota data be collected in an attempt to gain more information on the potential impact to mussels, as well as other shellfish and farm-raised salmon. Thirty samples of each species will ensure good reliability. An update to this public health consultation will evaluate the newly collected data to determine whether ingestion of fish and shellfish is associated with adverse health effects. At the current time, ATSDR recommends that individuals continue to adhere to the fish and shellfish consumption advisories that already exist in the area.

Conclusion

ATSDR concludes that the VLF area of NCTAMSLANT DET Cutler is an indeterminate public health hazard for consumption of clams, mussels, lobster and salmon. Our evaluation is based on the limited amount of data available (too few samples). ATSDR considers that it would be prudent public health practice to follow Maine Division of Environmental Health Safe Eating Guidelines, MDEP Fish Advisories, and limit the consumption of lobster tomalley.

ATSDR concludes that the VLF area of NCTAMSLANT DET Cutler does not pose a public health hazard for onsite soil contamination. Our evaluation is based on the levels found and the institutional controls in placed that prevent people from coming into contact with contaminants of concern.

ATSDR concludes that the VLF area of NCTAMSLANT DET Cutler does not pose a public health hazard for consumption of wild berries by base personnel. Our evaluation is based on institutional controls in place that prevent base personnel from consuming wild berries found on site.

Recommendations

ATSDR recommends that:

- Additional biota (clams, and lobster) sampling be conducted for lead and PCBs. Note: ATSDR supports the Navy's future efforts to sample biota at NCTAMSLANT DET Cutler.
- Given that PCB levels in salmon are a regional issue, ATSDR could not determined if levels in farm-raised salmon are elevated compared to other locations and could not verified if other contaminants in feed are an issue. ATSDR recommends that MDEP conduct sampling of farmed-raised salmon and compare it to other data from other regions.
- Institutional controls remain in placed to prevent base personnel from contact with contaminants of concern from soil during maintenance activities.
- Institutional controls remain in place to prevent base personnel from eating wild berries that grow on the VLF area of NCTAMSLANT DET Cutler property.

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Appendix A: Exposure Calculation

We assumed that the parameters of the exposure dose formula represented the worst case scenario, given

$$ED = C \times IR \times EF \times \frac{AF}{BW}$$

Where

ED = Exposure Dose; at its maximum,

C = Contaminant Concentration; 95% Upper CL*,

EF = Exposure Factor, the frequency and duration of exposure; at its maximun

AF = Absorption Factor: the percentage of the chemical ingested that actually makes it into the bloodstream; and

BW= Body Weight in kilograms (kg), using ATSDR defaults of 70kg for adult and 16kg for children.

Fish Ingestion Exposure (PCB)							
		C (mg/kg)	IR (kg/day)	AF	EF	BW(kg)	D (mg/kg/Day)
Adult	Clam	0.018	0.026	1	1	70	**6.68571E-06**
	Mussel	0.009	0.026	1	1	70	**3.34286E-06**
Children	Clam	0.018	0.026	1	1	16	**0.00002925**
	Mussel	0.009	0.026	1	1	16	**0.000014625**

* 95% Confidence level was used to calculate the exposure dose for clams. For mussels, the highest concentration level was used.