

Health Consultation

Fairchild Air Force Base Atlas E Missile Site Sprague, Lincoln County, Washington

May 14, 1999

**Prepared by
The Washington State Department of Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry**



FOREWORD

The Washington State Department of Health (DOH) has prepared this Health Consultation in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR is part of the U.S. Department of Health and Human Services and is the principal federal public health agency responsible for health issues related to hazardous waste. This Health Consultation was prepared in accordance with methodologies and guidelines developed by ATSDR.

The purpose of this Health Consultation is to identify and prevent harmful human health effects resulting from exposure to hazardous substances in the environment. The Health Consultation allows DOH to respond quickly to a request from concerned residents for health information on hazardous substances. It provides advice on specific public health issues. DOH evaluates sampling data collected from a hazardous waste site, determines whether exposures have occurred or could occur, reports any potential harmful effects, and recommends actions to protect public health.

For additional information or questions regarding DOH, ATSDR or the contents of this Health Consultation, please call the Health Advisor who prepared this document:

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Background and Statement of Issues

The Washington State Department of Health (DOH) has prepared this health consultation at the request of the Washington State Department of Ecology (Ecology) to evaluate potential health hazards posed to residents living at or near the former Fairchild Air Force Base Atlas E Missile site in Lincoln County, Washington. DOH prepares health consultations under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR).

The missile complex was constructed in 1959 on 238 acres of high prairie located four miles north of Sprague, Washington. The Air Force dismantled and salvaged the site in 1967. In 1970, the Government Services Administration sold for private use a 33 acre parcel of the site containing the former launch complex buildings. This parcel (considered below as the “site”) was used for unknown purposes until 1991 when it was sold and converted to its current use, a private residence. The launch operations building (LOB) is used as a home while the launch service building (LSB) is both a garage and a storage area. A metal storage shed is also located on the site (see Figure 1).[1]

Initial investigations at the site by the United States Army Corps of Engineers (USACE) began in 1986 when an inspection revealed large amounts of debris left over from salvage operations and evidence of an oil spill in the LOB. A Preliminary Assessment released in February 1996 by the Environmental Protection Agency concluded that no further action was necessary at the site. [2] This assessment, however, did not include any environmental sampling. The USACE contracted for further investigation of the site based on information gathered from similar installations that had shown contamination of soil and groundwater.

Sampling of the site in November 1998 revealed contamination of surface water and soil with volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH) and metals. Sampling locations are shown in Figure 2 and were selected based on proximity to two sumps, a septic drain field and a culvert outfall. In addition, two composite surface soil samples were collected from a debris pile and the base of a metal storage shed. Maximum concentrations of contaminants of concern in soil and surface water are given below in Table 1. Analysis of the on-site drinking water well for VOCs and metals detected only barium at a level consistent with background. Analysis of soil gas for VOCs detected trace levels of trichloroethylene (TCE), benzene, ethylbenzene, toluene and xylene (BTEX).

Contaminants of concern were chosen based on a comparison of levels detected in soil and surface water with the corresponding ATSDR comparison value. If a chemical exceeds its comparison value in *one* media (i.e., air, soil, surface water, groundwater) then it will be considered a contaminant of concern in *all* media. Contaminants of concern do not necessarily represent a public health hazard, but signify the need for further evaluation.

Table 1. Maximum levels of contaminants of concern detected in soil and surface water at the Fairchild Air Force Base Atlas E Missile site.

Contaminant	Surface water ^a			Surface Soil			
	Conc. (ppb)	Comparison Value (ppb)	Location	Conc. (ppm)	Comparison Value (ppm)	Location	Background
1,1,-Dichloroethylene	1.6	0.06	S-LSB-SW-1	NS	NA	NA	NA
cis-1,2-Dichloroethylene	520	70	S-LSB-SW-1	NS	NA	NA	NA
Polychlorinated biphenyls	ND	NA	NA	2.4	0.3	S-DEBRIS-SS-1 ^b	NA
Trichloroethylene	9.7	3	S-LSB-SW-1	NS	NA	NA	NA
Vinyl chloride	0.4	0.02	S-LSB-SW-1	NS	NA	NA	NA
TPH - Diesel	5100	1000	S-LOB-SW-1	960	100	S-LOBE-SS-1 ^b	NA
TPH - Oil	6500	1000	S-LOB-SW-1	5900	200	S-LOBE-SS-1 ^b	NA
Metals							
Arsenic	< 1	0.02	NA	2.5	0.5	S-DEBRIS-SS-1 ^b	9.3
Cadmium	5.2	2	S-LSB-SW-1	5.8	10	S-DEBRIS-SS-1 ^b	0.72
Lead	15.3	15	S-LSB-SW-1	115	400	S-LOBE-SS-10 ^c	14.9

a = Samples taken from a sump and an oil-water separator.

b = Depth at 0 - 0.5 feet

c = Depth at 0 - 1 feet

ND = Not detected

NA = Not applicable

ppb = parts per billion

ppm = parts per million

Discussion

Low levels of contaminants were found in on-site surface water and soil. No contaminants were detected in the on-site drinking water well. The following discussion evaluates the potential for exposure to contaminants of concern and the likelihood that adverse health effects could result from such exposure.

Soil

Of the all the contaminants of concern listed for soil in Table 1 above, only polychlorinated biphenyls (PCBs) and arsenic exceed their respective screening values. The maximum amount of arsenic detected in soil (2.5 ppm) was found at the base of a debris pile located (S-DEBRIS-SS-1) north of the LOB. This exceeds the comparison value of 0.5 ppm given for arsenic but is below the level that is considered normal for the area (i.e., background). *Considering that the maximum level of arsenic found in soil is consistent with what would be found in soils throughout the region, no adverse health effects are expected to result from exposure to arsenic in soil at the site.*

The maximum detected level of polychlorinated biphenyls (PCBs) in soil (2.4 ppm) was also found at the base of the debris pile (S-DEBRIS-SS-1). This amount exceeds its respective comparison value of 0.3 ppm which is based on a cancer risk of one person per one million persons exposed over a lifetime. Of the other two soil samples analyzed for PCBs, levels of 0.16 and 0.15 ppm were detected in samples S-LOBE-SS-1 and S-LOBE-SS-10, respectively. A dose was estimated for a child growing to adulthood over a 30-year period exposed through ingestion and skin contact to the maximum level of PCBs found in soil. Such an exposure results in a cancer risk estimate of about 1 person in 100,000 exposed getting cancer. This dose also is also approximately 3-fold higher than EPA's oral Reference Dose (RfD). RfDs are set by the Environmental Protection Agency (EPA) as a level below which non-cancerous adverse health effects are not anticipated. [3]

Oral Reference Dose (RfD)
An oral reference dose (RfD) is a level of exposure to chemicals below which non-cancerous effects are not expected. RfDs are set by the Environmental Protection Agency (EPA).

The RfD is based on decreased immune response in monkeys given high doses of PCBs in their diet. The RfD is set well below this dose to provide ensure that it is protective of when used to evaluate human exposure. Other health effects such as chloracne (a sever type of skin rash) and liver damage have been found in workers exposed to much higher doses than would be expected at this site. There is some evidence that exposure resulting from ingestion of PCB contaminated fish by pregnant women can cause a decrease in gestation time and birth weight. Adverse impacts on the nervous system were noted in two populations exposed through ingestion of PCB contaminated rice oil. [4]

The exposure assumptions made above likely overestimate both cancer and non-cancer risk associated with exposure to PCBs in soil. Children are not likely to be living at the site through adulthood and exposure at the maximum level of detection is also unlikely. However, more realistic exposures would also carry a slight increased cancer risk if the maximum level of PCBs found in soil is indicative of other areas around the site. Since only three soil samples were analyzed for PCBs, it is not possible to determine if areas that are more likely to result in exposure (e.g., doorways, gardens, play areas) have similar levels of PCBs. *Based on the limited data available, PCBs in surface soil are not expected to cause any adverse health effects.*

Surface water

Several contaminants of concern were detected in on-site water including total petroleum hydrocarbons and several volatile organic chemicals (VOCs). The contaminants were found in an oil-water separator that received water from a sump beneath the LOB and in a wastewater sump near the LSB. The comparison values used for these surface water contaminants assume that the water is used for drinking purposes. However, no VOCs were found in the on-site drinking water well and the sump and oil-water separator are obviously not drinking water sources and are not likely to be frequently contacted. VOCs contamination in groundwater or soil beneath buildings does have the potential to vaporize and contaminate indoor air. The

highest levels of VOCs were found in LSB which was used only for storage purposes. Only trace levels of VOCs were found in the oil-water separator located near the LOB. *Exposure to contaminants found in on-site water is not expected to result in any adverse health effects.*

Exposure Pathways and Children

The potential for exposure and subsequent adverse health effects are often increased for young children as opposed to older children or adults. For example, children are far more likely to engage in activities that involve “getting dirty.” Playing in dirt, combined with frequent hand-to-mouth activity, provides toddlers with an increased chance of exposure to soil contaminants by way of ingestion and skin contact. In addition to the potential for higher exposures of young children, the risk of adverse health effects is also increased. ATSDR and DOH recognize that children are susceptible to developmental toxicity that can occur at levels much lower than those causing other types of toxicity.

As noted above, children could be exposed to PCBs in soil at levels that pose a very low risk for cancer and non-cancer health effects. *This evaluation is expected to be protective of children as well as adults.*

Conclusions

A *potential* public health hazard exists for residents exposed to polychlorinated biphenyls in soil. Exposure to the maximum detected levels of polychlorinated biphenyls represents a very low risk for both cancer and non-cancer health effects. This maximum level was detected at the debris pile which is not expected to be a high contact area. More soil sampling is necessary to determine the extent of contamination around the Launch Operations Building which is currently used as a residence.

No public health hazard exists from exposure to contaminants found in on-site water. Contamination found in the sump and oil-water separator are not expected to be available for frequent contact and no VOCs were found in the drinking water supply well.

Recommendations

Soil or any other materials in the debris pile should not be used for any purpose. Contact with soil and materials in the debris pile should be avoided.

Additional soil samples (0-3") should be taken in the area surrounding the Launch Operations Building and analyzed for PCBs to ensure that exposure is below a level of health concern. Sampling should focus on high use areas, if any are present (e.g., gardens, doorways, play areas).

Actions: DOH will evaluate any further sampling at the site.

Preparer of Report

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CERTIFICATION

The Fairchild Air Force Base Atlas E Missile site Health Consultation was prepared by the Washington State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry. It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

Technical Project Officer, SPS, SSAB, DHAC

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation, and concurs with its findings.

Section Chief, SPS, SSAB, DHAC, ATSDR

References

1. Hart Crowser. Draft Management Plan Environmental Site Investigation Former Fairchild AFB Atlas E Sprague, Washington. Prepared for The U.S. Army Corps of Engineers Seattle District. August 31, 1998.
2. URS Consultants. Preliminary Assessment Report for the Fairchild Air Force Base Atlas E Missile Facility S-4. Prepared for the U.S. Environmental Protection Agency. February 23, 1996.
3. U.S. Environmental Protection Agency. Integrated Risk Information System (IRIS). Last updated: 5 October 1998. URL: <http://www.epa.gov/iris/index.html>.
4. Agency for Toxic Substances and Disease Registry. Toxicological profile for polychlorinated biphenyls. September 1997.