

Letter Health Consultation

PINEHURST AIR STUDY: METALS

Pinehurst, Shoshone County, Idaho

August 1, 2016

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response 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 report was supported in part by funds provided through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services. The findings and conclusions in these reports are those of the authors and do not necessarily represent the views of ATSDR or the U.S. Department of Health and Human Services. This document has not been revised or edited to conform to ATSDR standards.

You may contact the Environmental Health Education and Assessment Program, Idaho
Department of Health and Welfare

208-334-5682

LETTER HEALTH CONSULTATION

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PINEHURST, SHOSHONE COUNTY, IDAHO

Prepared By:

Environmental Health Education and Assessment Program
Bureau of Community and Environmental Health
Idaho Department of Health and Welfare
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August 1, 2016

Mark Boyle, Regional Air Program Manager
State of Idaho Department of Environmental Quality
2110 Ironwood Parkway, Coeur d'Alene, ID 83814

Dear Mr. Boyle,

The Environmental Health Education and Assessment Program (EHEAP) of the Idaho Department of Health and Welfare (IDHW) developed this letter of health consultation to address health questions regarding air toxics data gathered by the Idaho Department of Environmental Quality (IDEQ) from Pinehurst, ID (**Figures B1 & B2**). IDEQ's interest in airborne metals at this location originated from the initial results of speciated ambient fine particulate matter (PM_{2.5}) data evaluated to support Clean Air Act attainment planning requirements for the area. Historical mining activity in the area and subsequent wide-spread environmental contamination (EPA, 2016a) increased IDEQ's interest in assessing airborne metals. IDEQ had air filter samples from January 2011 to December 2013 (a total of 73 samples) analyzed for metal content, and requested the EHEAP assess this data set. This assessment is limited to those metals tested for by IDEQ. This assessment focuses on the residential inhalation exposure to the metals tested for over the course of the sampling period. The objective of this assessment is to identify any human health risks associated with residential exposures to the metals tested for, and detail actions (if any) that residents should take to ensure the protection of health from potential exposures to metals in the air at the site.

The EHEAP concludes that based upon the available sampling data, residential exposures to the metals tested for are **not expected to result in adverse human health effects**. Detailed support of this conclusion follows.

TOXICOLOGICAL EVALUATION

The EHEAP assumes adequate data quality assurance/quality control procedures were followed with regard to data collection, chain of custody, laboratory procedures, and data reporting.

The EHEAP assessed potential risks to human health by comparing data against health-based comparison values (CVs) generated by the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) (ATSDR, 2016), as well as risk-based regional screening levels (RSLs)

developed by the U.S. Environmental Protection Agency (EPA) (EPA, 2016b). For some metals, neither ATSDR nor EPA have developed screening values. In these instances, the EHEAP compared sampling results to National Institute of Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs) (OSHA, 2016). The EHEAP adjusted these occupational values for use in a residential exposure scenario. Details of this adjustment are included in **Table A1**. A CV is a concentration of a substance in air, water, food, or soil that is unlikely to cause harmful health effects in exposed people. It should be stressed, however, that CVs are screening tools, not thresholds of toxicity. While levels at or below a CV may reasonably be considered safe, it does not necessarily follow that concentrations above a CV would be expected to cause harmful health effects. Rather, levels above a CV indicate the need for further investigation and assessment.

For potential cancer health effects, the EHEAP compared reported chemical concentrations to ATSDR Cancer Risk Exposure Guidelines (CREGs) where available (ATSDR, 2016), and EPA regional carcinogen screening levels (EPA, 2016b) in the absence of a CREG.

Non-cancer Health Effects:

None of the chemicals detected above their reported Method Detection Limits (MDLs) exceeded existing non-cancer health guidelines or remediation standards (**Table A1**). Therefore, the EHEAP finds that non-cancer adverse health effects are not likely to occur at this site due to exposures to the chemicals that were analyzed in the air sampling from January 2011 to December 2013.

Detected Metals Without Established Standards or Guidelines:

The alkali earth metals cesium and strontium, as well as the rare earth metals europium, lanthanum, rubidium, samarium, scandium, and terbium were detected in some air samples collected. There are no health-based standards or guidelines for the inhalation of these metals (TOXNET, 2016). These metals are not found in the environment in their native elemental state, but rather contained in mineral deposits in their oxide form. The oral toxicities of these mineral metal oxides are relatively low (ATSDR, 2004a; ATSDR, 2004b; EPA, 2012). Therefore, due to the low oral toxicity and very low concentrations detected in this study (**Table A1**), the EHEAP concludes that adverse health effects are not likely to occur at this site due to inhalation exposures to these metals.

Arsenic Inhalation Cancer Risk:

Arsenic is an International Agency for Research on Cancer (IARC) class 1 carcinogen (known human carcinogen) (ATSDR, 2007). The EPA has set an acceptable cancer risk range of 1×10^{-4} to 1×10^{-6} (1 in 10,000 to 1 in 1,000,000); EPA considers excess cancer risks that are below 1×10^{-6} to be so small as to be negligible (EPA, 1991). Based upon available sampling data from January 2011 to December 2013, arsenic particulate was detected intermittently. At the highest intermittent concentrations detected, excess cancer risk for arsenic inhalation at this site, based upon this data, is within EPA's acceptable cancer risk range (EPA, 2016c; **Table 1**). Therefore, the EHEAP concludes that the cancer risk due to arsenic inhalation at this site is not expected to represent a significant excess cancer risk.

Table 1: Estimated cancer risk from arsenic inhalation exposures.

Contaminant	Range of Concentrations (µg/m ³)	EPA Arsenic Risk Level Concentration (µg/m ³)	EPA Calculated Excess Cancer Risk Lifetime Exposure (70 yrs.)	EPA Acceptable Cancer Risk Range
Arsenic	ND-0.0054	0.02	(1 in 10,000)	1 x 10⁻⁴ to 1 x 10⁻⁶
		0.002	(1 in 100,000)	
		0.0002	(1 in 1,000,000)	

UNCERTAINTIES AND LIMITATIONS

This assessment relies on data collected from one sampling location and may overestimate, or underestimate, the exposure to area residents.

It is essential to note that this consultation relies on the existing air sample data which does not encompass all possible air contaminants that can be found in the environment. It remains possible that other, untested contaminants are present in concentrations high enough to present a risk to the health of humans.

CONCLUSIONS AND RECOMMENDATIONS

Based on an evaluation of the available air sampling data from January 2011 to December 2013, the EHEAP concludes that exposure to outdoor residential air for the chemicals tested at this site is not expected to harm human health. Arsenic detection values intermittently exceeded their respective ATSDR CREG value. As the highest of these intermittently detected values are within EPA’s acceptable excess cancer risk range for a consistent lifetime exposure, the EHEAP concludes that the cancer risk due to arsenic inhalation at this site is not expected to represent a significant excess cancer risk. No chemical tested in this assay exceeded non-cancer health-based guidelines or standards.

Based on the above conclusions, the EHEAP has no health-based recommendations or actions related to these testing results. Based upon the historical context of this area (legacy mining activity), continued air-metals monitoring is of interest, but not supported by these data.

If you have any questions regarding this report, please contact Dr. Craig J. Dietrich at (208) 334-5682 or by email at dietrich@dhw.idaho.gov.

Sincerely,
 Craig J. Dietrich, Ph.D., DABT
 State Health Toxicologist
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 Idaho Dept. of Health and Welfare

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APPENDIX A: DATA TABLES

Table A1: Site air sample results of metals.

Detected Metals	MDL ($\mu\text{g}/\text{m}^3$)	Result Range Min-Max ($\mu\text{g}/\text{m}^3$)	Residential Exposure Guidelines, Standards & Classifications				
			ATSDR Chronic EMEG/MRL ^a ($\mu\text{g}/\text{m}^3$)	ATSDR CREG ^a ($\mu\text{g}/\text{m}^3$)	EPA RfC ^b ($\mu\text{g}/\text{m}^3$) [origin]	Residential Adjusted NIOSH REL ($\mu\text{g}/\text{m}^3$) ^{c,d}	IARC Cancer Classification ^a
Metals							
Aluminum	0.0187	ND-0.14	-	NA	5.0 PPRTV	-	NC
Arsenic	0.0006	ND-0.0054	-	0.00023	0.015 CalEPA	-	1
Barium	0.0026	ND-0.0044	-	NA	0.5 HEAST	-	NC
Calcium (as Calcium Silicate)	0.0030	ND-0.0779	-	NA	-	238.1	NC
Cerium (as Cerium Oxide)	0.0017	ND-0.0187	-	NA	0.9 IRIS	-	1
Cesium	0.0024	ND-0.0064	-	NA	-	-	NC
Chromium	0.0016	ND-0.0021	-	NA	-	11.9	3
Copper	0.0018	ND-0.0105	-	NA	-	23.81	NC
Europium	0.0055	ND-0.0378	-	NA	-	-	NC
Iron	0.0032	ND-0.1032	-	NA	-	119.05	NC
Lanthanum	0.0018	ND-0.0076	-	NA	-	-	NC
Lead	0.0039	ND-0.0106	-	NA	0.15 NAAQS	-	2B
Magnesium (as Magnesite)	0.0473	ND-0.1728	-	NA	-	238.1	NC
Nickel	0.0005	ND-0.0009	0.09	NA	0.014 CalEPA	-	2B
Rubidium	0.0011	ND-0.0019	-	NA	-	-	NC
Samarium	0.0036	ND-0.0271	-	NA	-	-	NC
Scandium	0.0081	ND-0.0142	-	NA	-	-	NC
Selenium	0.0012	ND-0.0026	-	NA	20 CalEPA	-	3
Silica	0.0061	ND-0.3552	-	NA	3.0 CalEPA	-	NC
Strontium	0.0026	ND-0.0084	-	NA	-	-	NC
Terbium	0.0041	ND-0.012	-	NA	-	-	NC
Titanium	0.0014	ND-0.0124	-	NA	-	57.14	NC
Vanadium	0.0003	ND-0.0015	0.1	NA	0.1 ATSDR	-	NC
Yttrium	0.0016	ND-0.0017	-	NA	-	23.81	NC
Zinc	0.0016	ND-0.025	-	NA	-	119.05	NC

^a(ATSDR, 2016)^b(EPA, 2016b)^c(OSHA, 2016)^dNIOSH occupational REL modified for residential exposure. 10hr/day, 40hr/wk. REL divided by 4.2 (168 hr/wk divided by 40hr/week), divided again by 10 for human variability.

Key

	Value exceeds guideline or standard
µg/m³:	micrograms/cubic meter-note that ng/L (nanograms/liter) is equivalent to µg/m³
MDL:	Method Detection Limit
EMEG:	ATSDR Environmental Media Evaluation Guideline
MRL:	ATSDR Minimal Risk Level
CREG:	ATSDR Cancer Risk Evaluation Guideline
RfC:	EPA Reference Concentration
REL:	Recommended Exposure Limit
NA:	A value is Not Applicable for this compound because it is not a known or suspected carcinogen, or there is insufficient data to develop a value
NC:	The substance has not yet been classified by the IARC
IARC 1:	Known human carcinogen
IARC 2B:	Possible human carcinogen
IARC 3:	Not classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity is inadequate in humans and inadequate in animals to warrant the classification as a carcinogen.

APPENDIX B: MAPS AND FIGURES

Figure B1: Location of Pinehurst Air Monitoring Station.

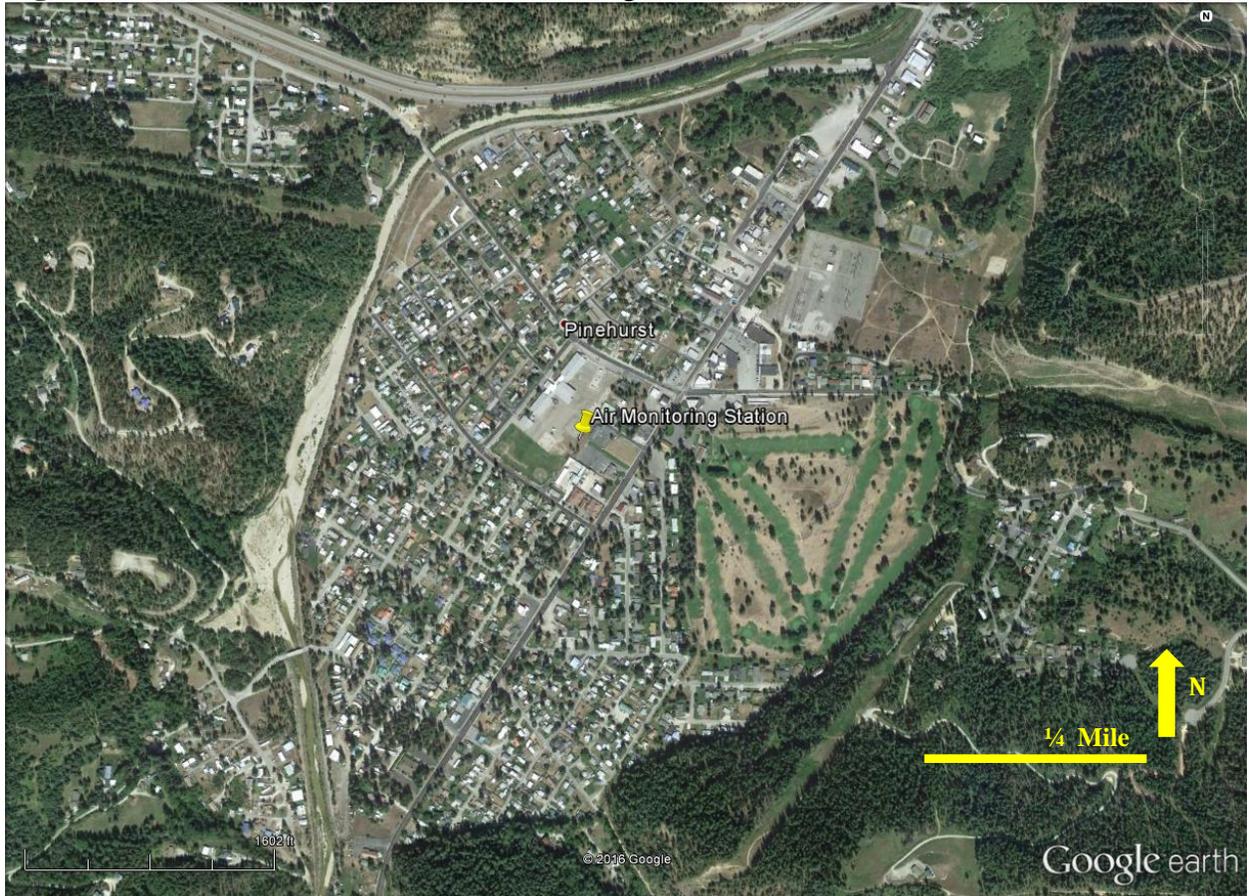


Figure B2: Pinehurst Air Monitoring Station.

