Letter Health Consultation

Indoor Air Quality Evaluation of an Idaho Fish and Game Housing Unit in Hagerman, Idaho

February 11, 2014

Prepared by

Idaho Department of Health and Welfare
Division of Public Health
Bureau of Community and Environmental Health
Under Cooperative Agreement with
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

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February 11, 2014

Mr. Joe Chapman
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Idaho Department of Fish and Game Magic Valley Regional Office
324 South 417 East - Suite 1
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RE: Health Consultation
Indoor Air Quality Evaluation–Idaho Fish and Game Housing in Hagerman, Idaho

Dear Mr. Chapman:

This letter has been prepared as a consultation to evaluate human health impacts from indoor air contaminants in Idaho Fish and Game (IDFG) housing unit in Hagerman, Idaho. The Idaho Department of Health and Welfare's priority is to ensure Idahoans have the best information possible to safeguard their health.

Background and Statement of Issues

In November 2013, Teklab Inc. from Collinsville, Illinois analyzed two air canister samples. This sampling was done in response to concerns of Mr. Chapman regarding health concerns as a result of air quality issues (i.e., diesel residual smell) in an IDFG housing unit in Hagerman, Idaho. In November 2013, Mr. Chapman, requested that the Bureau of Community and Environmental Health (BCEH) evaluate laboratory results to determine whether toxic air pollutants detected in indoor air pose a public health threat to people living in the IDFG housing unit in Hagerman, Idaho. The purpose of this letter health consultation (LHC) is to review the laboratory results from Teklab Inc., and to provide relevant public health conclusions and recommendations.

Four indoor air quality parameters were evaluated: benzene, toluene, ethylbenzene, and total xylenes (BTEX). This letter health consultation evaluates the health impacts of exposure to the

pollutants that were detected in indoor air inside the housing unit. BCEH determined that the pathway of exposure for the occupants of the housing unit is inhaling (breathing) contaminated air contaminated with BTEX. This is a complete pathway of exposure because of the identified contamination in indoor air. Visitors who frequent the housing unit can also be exposed inhaling (breathing) contaminated air contaminated with BTEX.

To determine the likelihood of possible health effects of site-specific chemicals, the Agency for Toxic Substances and Disease Registry (ATSDR) has developed health-based comparison values (CVs). These CVs include Minimal Risk Levels (MRLs) for non-cancerous health effects [acute (14 days or less), intermediate (15-365 days), and chronic (> 365 days)], and for cancer effects ATSDR Cancer Risk Evaluation Guides (CREGs) (ATSDR, 2005). If a contaminant concentration exceeds the comparison value (CV) it is selected for further evaluation. Contaminant concentrations below CVs are considered safe and are not evaluated further. Concentrations above the available CVs are not necessarily a health concern, but further investigation is needed to ensure people who are exposed will not be harmed. Site specific exposure scenarios are part of the evaluation, and they are incorporated into health risk estimations.

Results and Discussion

In November 2013, two samples (one from the living room area and one from the family room in the basement) were collected. The air samples were collected in specially-prepared stainless steel canisters. All samples were analyzed by Teklab Inc using a modified EPA TO-15 method (TekLab, 2013), and a high resolution gas chromatograph (GC) coupled to a mass spectrometer. Results of the indoor and ambient air sampling included: benzene, ethylbenzene, toluene, and total xylenes (BTEX) are presented in Table 1.

All the benzene, ethylbenzene, toluene and total xylenes sampling results from the living room and family room were below known chronic and intermediate comparison values; however, benzene values detected in the living room and family room were six times higher than the ATSDR Cancer Risk Evaluation Guides CREG comparison value (Table 1). Benzene evaporates into air very quickly and dissolves slightly in water (ATSDR, 2007). Benzene is present in crude oil and gasoline, cigarette smoke, and also used in the manufacturing of some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides (ATSDR, 2007).

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Table 1: Indoor Air Data and Comparison Values for Benzene, Ethylbenzene, Toluene, and Xylenes (BTEX) in housing unit

Indoor Air Contaminant	Concentrations Measured in µg/m^3		ATSDR Comparison Values in µg/m^3		
	Living room	Family room	Intermediate EMEG	Chronic EMEG	CREG
Benzene	0.8	0.8	19	9.6	0.13
Ethylbenzene	1.1	1.0	8,700	260	NA
Toluene	36	30	NA	300	NA
Total Xylenes	3	3	2,600	220	NA

µg/m^3 = micrograms per cubic meter
ATSDR = Agency for Toxic Substances and Disease Registry
EMEG = Environmental Media Evaluation Guide
CREG = Cancer Risk Evaluation Guides
NA= Not Available

The Department of Health and Human Services has determined that benzene is a known carcinogen (can cause cancer). Both the International Agency for Cancer Research and the EPA have determined that benzene is carcinogenic to humans (ATSDR, 2007). This means that exposure to this compound could increase a person's risk for developing cancer over the course of a lifetime. BCEH estimated the additional life time cancer risk to benzene to be low. The risk would be three additional cancers per one million people exposed. We would interpret these risks as posing no apparent increased risk for developing cancer over the course of a lifetime. The actual additional life time cancer risk will be lower because, unless new sources are brought into the housing unit, benzene is highly volatile over time. In addition, the levels of benzene are within the average background indoor air concentration of < 0.05–4.7 µg/m^3 (EPA, 2011) and several orders of magnitude below the no observed adverse effect level (NOAEL) of 0.55 ppm or 1,757 µg/m^3 for a 14-year occupational exposure calculated for abnormal hematological values and below the lowest-observed-adverse-effect level (LOAEL) of 29 ppm or 92,646 µg/m^3 for a three to 19-year occupational exposure linked to leukemia (ATSDR, 2007). Furthermore, the benzene values measured inside the housing unit are also below the EPA screening level of 3.1 µg/m^3 for benzene found for residential indoor air (EPA, 2013). Thus, BCEH does not expect exposure to benzene at IDFG housing unit in Hagerman, Idaho to result in increases in the risk of developing cancer above what is normally seen in U.S. populations.

Conclusion

BCEH does not expect that breathing the air inside the IDFG housing unit in Hagerman, Idaho to result in harm to either children or adults residents or visitors. BCEH concludes this because the levels of air pollutants found in indoor air are below to the levels known to cause harmful health effects. The cancer risk associated with these chemicals is below a level considered a health threat.

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Recommendations

- If diesel odor persists and any symptoms appear, it would be advisable to contact your primary physician and consider the option to move out from the housing unit, particularly if small children and/or elderly visit the housing unit.
- The levels of BTEX, which are part of a large group of contaminants called volatile organic compounds (VOCs) in indoor environments, depends upon several factors such as humidity, temperature, and air flow. To minimize exposures to these air pollutants it would advisable to: 1) include a routine maintenance of Heating, Ventilation and Air-Conditioning (HVAC) systems (e.g., periodic cleaning or replacement of filters); 2) vent contaminant source emissions to the outdoors; 3) store and use paints, adhesives, solvents, and pesticides in well ventilated areas; 4) do not dispense or handle gasoline in your home or garage, and; 5) purchase and use low-VOC materials or allow time for building materials in new or remodeled areas to off-gas pollutants before occupancy.

If you have any questions, please do not hesitate to contact me at 208-334-5682 or padenn@dhw.idaho.gov

Sincerely,
Norka E. Paden, Ph.D.
Toxicologist/Public Health Assessor

cc: Jim Vannoy

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