

Letter Health Consultation

SOIL ASSESSMENT OF FORMER EAST LAZY
LANE FIRING RANGE

IDAHO FALLS, BONNEVILLE COUNTY, IDAHO

Prepared by
Idaho Department of Health and Welfare

OCTOBER 19, 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

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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October 14, 2016

Dana Swift
Mine Waste Project Coordinator
Idaho Department of Environmental Quality
1410 North Hilton, Boise, ID 83706

RE: Former East Lazy Lane Firing Range site (Lazy 8 Estates subdivision)
Bonneville County, Idaho

Dear Ms. Swift:

Per your request on July 1, 2015, the Bureau of Community and Environmental Health (BCEH) has developed this letter health consultation to assess whether contaminants in the soil at the Former East Lazy Lane Firing Range site pose a health risk to residents who may come in contact with the soil in the Lazy 8 Estates subdivision. After reviewing available data, BCEH concludes that exposure to lead in surface soil from the Lazy 8 Estates subdivision is unlikely to cause harmful health effects in children and adults.

The lead levels in soil have a low probability of producing blood lead levels (BLLs) higher than 5 micrograms per deciliter ($\mu\text{g}/\text{dL}$), the Centers for Disease Control and Prevention's (CDC) reference value for lead in children. This reference value is used by CDC and others to identify children with elevated BLLs who may need clinical and health department follow-up. BCEH concludes this because we estimate that children under 7 years old (the most vulnerable age group) who regularly play in the Lazy 8 subdivision and are exposed to lead in soil have a low probability that their BLL would be higher than the CDC reference level from that exposure. Exposures to adults are also unlikely increase their BLLs over the average level found in the general population in the United States. Additionally, the levels of all other metals in soil do not exceed the health-based, non-cancer comparison values for children or adults so exposures are not expected to result in harmful health effects. However, it very important to note that since there is no safe level of lead in children, steps should be taken to reduce exposures. These steps are discussed below.

The limitations of this report include lack of samples from two properties located on the former firing range where access for soil sampling was denied, using default values of the

U.S. Environmental Protection Agency's (EPA) Integrated Exposure Uptake Biokinetic (IEUBK) model which may over or underestimate the BLLs, and not accounting for the lead in the small fragments of lead bullets in some sampling areas.

Although exposure to lead in surface soil sampled at Lazy 8 Estates subdivision has a low probability of producing BLLs higher than the CDC reference level, BCEH recommends reducing exposure to lead whenever possible. To help reduce lead exposure, the residents of Lazy 8 Estates can do the following:

1. Cover bare soil with vegetation (grass, mulch, etc.) and add a layer of clean soil over existing soil to minimize contact with lead.
2. Create safe play areas for children with appropriate and clean ground covers. Consider sand boxes for children that like to dig.
3. Watch children to identify any hand-to-mouth behavior or excessive intentional dirt eating. If children are eating soil then medical attention is suggested.
4. Create a raised bed and fill with clean soil for gardening to reduce exposures from gardening and digging. Rinse produce well to remove garden soil.
5. Keep children's hands clean by washing periodically, before coming inside, and before eating. Do not eat food, chew gum or smoke when playing or working in the yard.
6. Change and launder any dirty clothes after playing outside.
7. Remove shoes before going in the house.
8. Frequently bathe your pets since they can also track contaminated soil into your home.
9. Regularly use a damp mop or damp duster to clean surfaces. Dry sweeping and dusting can increase the amount of lead-contaminated dust in the air.
10. Private wells should be sampled regularly. BCEH can provide technical assistance on testing your well for lead and other contaminants. More details can be found at: <http://www.healthandwelfare.idaho.gov/Health/EnvironmentalHealth/WellWater/tabid/1128/Default.aspx>

Our program is available to assist with outreach and education activities to avoid exposures to lead in soil.

The remainder of this letter presents background information as well as the evaluation of the data to support the conclusions and recommendations for the Lazy 8 Estates Subdivision.

Background and Statement of Issues

The former firing range is located in the Lazy 8 Estates subdivision, north of E. Lazy Lane, near the intersection with S. Saddle Horn Drive, approximately six miles south of Idaho Falls. According to property owners and historic records, the International Handgun Metallic Silhouette

Association (IHMSA) operated the firing range from 1984 to 1988. They hosted several national championships during the 1980s where recreational shooters shot at metallic silhouettes of farm animals at various ranges up to a maximum extent of 200 meters using a free style standing position and different gun types (air pistol, field pistol, small and big bore firearms) (IHMSA website, 2015).

In November of 2014, a community member from the subdivision requested BCEH evaluate whether residents exposed to lead in the soil of the Lazy 8 Estates subdivision when playing or recreating outside posed a health concern. BCEH contacted the Idaho Department of Environmental Quality (IDEQ) in November to discuss possible options for testing the soil. IDEQ was able to secure funding and contracted TerraGraphics Environmental Engineering, Inc. to conduct a Preliminary Assessment and Site Inspection (PA/SI) of this site. The Quality Assurance Project Plan for soil sampling was completed in July 2015. Soil sampling took place in August 2015, and the analytical results were provided to BCEH in October 2015.

The Lazy 8 Estates subdivision has seven parcels (see Attachment A for map). The firing line and building have been removed from this historic firing range. There are still berms which served as backstops for the bullets on the site. The owners of parcels 2 and 5 did not agree to soil sampling, but the other five property owners allowed sampling. Three houses have been built and are currently occupied, and there are plans to build homes on the other sites. A landowner of one of the unoccupied parcels is planning to build in the near future. Residents of the homes built on the former firing range who recreate outdoors in areas on and adjacent to the former firing range can be exposed by accidentally ingesting contaminated soil or breathing dust.

Results and Discussion

Environmental Data

For this health consultation, BCEH evaluated total lead, chromium, copper, zinc, antimony, and arsenic. This list was based on potential contaminants identified in firing ranges (ITRC, 2003). Environmental sampling was completed by TerraGraphics Environmental Engineering, Inc. in August 2015 (IDEQ & TerraGraphics, 2015). Soil samples were collected from the upper-most layer of soil (0–2 inches) where people are most likely to be exposed. The sampling design consisted of a multi-incremental sampling approach, consistent with the ITRC's Incremental Sampling Methodology (ISM) guidance document (ITRC, 2012). The site was divided into 20 decision units (see attachment A). In each decision unit, one ISM sample was collected. Each ISM sample was made up of 30 individual subsamples from residential, non-residential areas, firing range line, firing range floor and/or berms (IDEQ & TerraGraphics, 2015). For quality assurance purposes, each sample had one field blank, one lab blank, one field replicate, one lab matrix/spike duplicate (IDEQ & TerraGraphics, 2015). Samples collected as part of this investigation were submitted for analysis to SVL Analytical, Inc. in Kellogg, Idaho. Groundwater sampling was not collected as part of IDEQ efforts, so the drinking water pathway was not evaluated (see the next section for details).

Pathway Analysis and Public Health Implications

BCEH considered two exposure pathways: soil and groundwater. Soil contamination currently exists in areas with public access (i.e., empty lots) where sporadic recreational activities such as playing with sand and riding ATVs take place. Children who play outdoors

may be exposed by accidental ingestion of contaminated soils and breathing dust. Teenagers and adults may be exposed by accidentally inhaling dust from uncovered areas. Thus, the soil exposure pathway is complete. Private water wells supply drinking water to the residents of Lazy 8 subdivision. Recent water quality data from these private wells are not available. Thus, BCEH cannot evaluate the groundwater pathway.

Evaluation Process

The Agency for Toxic Substances and Disease Registry (ATSDR) has developed comparison values (CVs) to help determine if levels of chemicals of potential health concern warrant further evaluation. These CVs include environmental media evaluation guides (EMEGs) and reference dose media guides (RMEGs) for non-cancerous health effects (ATSDR, 2005). The Environmental Protection Agency has residential soil screening (RSL) values for non-cancerous health effects (EPA-RSL). If a contaminant concentration exceeds the CV or RSL, it is selected for further evaluation. Contaminant concentrations below CVs and RSLs are unlikely to cause harm and are not evaluated further. Concentrations above the available CVs or RSLs 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.

The IEUBK model (Version 1.1, Build 11) (EPA, 2015) was used to assist in understanding if the lead levels represent a health hazard for children. BCEH used site-specific soil lead levels provided by IDEQ shown in Attachment B (Table 2) to estimate lead blood levels in children aged six months to seven years taking into consideration several default parameters such as: outdoor air lead concentration, indoor air lead concentration, dietary lead intake, time spent outdoors, and lead in drinking water. These default values in the IEUBK model are conservative in that the model assumes many routes of exposure are complete. Completed lead exposure routes include soil, house dust, air, water and food. Also, since the model makes the assumption that the level of lead in indoor dust is 70 percent or more of that found in outdoor soil, the soil ingestion rates used are slightly higher than those found in EPA's Exposure Facture Handbook. Similarly the assumption that children spend up to four hours a day outdoors throughout the year, overestimates the time spent outdoors during winter months. Thus, the model makes conservative estimates of lead exposure.

Metals in Soil

Surface soil samples were analyzed for six metals (lead, chromium, copper, zinc, antimony, and arsenic). The levels of all metals tested in surface soils were below the ATSDR chronic CVs for children and adults (See Attachment B Table 1). While metals in general are poorly absorbed through the skin, a small fraction of some metals, such as arsenic, can be absorbed through the skin. The levels of arsenic detected at this site are not high enough to be a dermal exposure concern. Thus, the dermal route of exposure to metals was not considered in the analysis. All the lead concentrations detected at Lazy 8 Estate subdivision were below the current EPA RSL for lead in residential soil (400 mg/kg). However, to further investigate if children living in the subdivision might be exposed to lead levels in soil that would likely cause their BLLs to be 5 µg/dL or greater (CDC, 2012). BCEH used the IEUBK model to estimate BLLs. The EPA's Adult Lead Model was used to estimate adult BLLs.

Estimated Lead Blood Levels

Table 3 in Attachment B shows the predicted results of the BLLs for children (0.5 to 7 years) at the different locations sampled at Lazy 8 Estate subdivision. All the predicted BLL in all the locations sampled were below the level of 5 µg/dL, the level at which the CDC recommends public health action be taken.

Adult exposures were estimated using the EPA's Adult Lead Model (EPA-Adult Lead Model). Table 4 shows the estimate of adults BLLs. The model using the highest lead value in the sampling dataset predicts BLLs would be only slightly above the geometric mean of adult BLLs in the United States (CDC 2015), a level still below the 5 µg/dL used to identify a more vulnerable population. In fact, the estimate is that adults exposed to the highest level of lead in the soil would have a BLL of 1.3 µg/dL.

Uncertainties

One of the unique challenges of sampling at a former firing range site is the presence of bullet fragments. Sieving of soils using #60 (0.25 mm) mesh would have eliminated the larger lead fragments, but children could still be exposed to them. Therefore, there may be an exposure to fragments that is not considered when only using sieved soils. Using the IEUBK model with the default values derived from national averages does not necessarily represent values from the Lazy 8 Estates subdivision. Some parameters such as time spent outdoors and soil intake levels in indoor and outdoor environments may not be representative of Lazy 8 Estates subdivision where snow covers the ground for approximately four months of the year. In addition, other environmental factors such as wind speed, rain, type of soil could increase or decrease the exposures. Thus, the model's outputs are good estimates, but real values may be lower or higher than what is presented in this letter. A more rigorous soil sampling, including those two parcels where access was denied for soil sampling, may have produced average soil concentrations different from those currently available.

Public Health Action Plan

1. BCEH will coordinate with IDEQ to communicate the findings of this health consultation to the community members of the Lazy 8 Estates subdivision.
2. BCEH will provide health education materials to the residents of Lazy 8 Estates subdivision to prevent exposures.

I hope this information is useful. If you have further questions, please do not hesitate to contact me at 208-334-4964 or vannoyj@dhw.idaho.gov.

Sincerely,

Jim Vannoy
Environmental Health Program Manager

References

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REPORT PREPARATION

This Health Consultation for Former East Lazy Lane Firing Range site was prepared by the Bureau of Community and Environmental Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with the approved agency methods, policies, procedures existing at the date of publication. Editorial review was completed by the cooperative agreement partner. ATSDR has reviewed this document and concurs with its findings based on the information presented.

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Attachment A.
Map and sampling locations



Residential sampling locations: L8A-DUR, L8B-DUR, L8D-DUR and L8E-DUR
Parcel sampling locations: L8A-DU1, L8A-DU2, L8B-DU1, L8B-DU2, L8B-DU3, L8C-DU1, L8C-DU2, L8C-DU3, L8D-DU1, L8D-DU2, L8E-DU1
Target area sampling locations: 50M-DU, 100M-DU, 150M-DU, 200M-DU
Shooting platform sampling location: SP-DU

Attachment B.

Table 1. Analytical results of metals in surface soil from Lazy 8 Estates Subdivision and health comparison values

| Metal | Range of Analytical Results (mg/kg) | Child Health Comparison Value (mg/kg) | Adult Health Comparison Value (mg/kg) |
|---------------|--|--|--|
| Lead | 4.6 - 135 | 400 ¹ | NA |
| Chromium (VI) | BRL – 0.08 | 51 ² | 720 ² |
| Copper | 4.7 – 13.4 | 570 ³ | 8000 ³ |
| Zinc | 21.5 – 42.1 | 17,000 ² | 240,000 ² |
| Antimony | BRL – 7.0 | 23 ⁴ | 320 ⁴ |
| Arsenic | 2.5 – 3.1 | 17 ² | 240 ² |

mg/kg = milligram per kilogram

NA = Not Applicable

BRL = below reporting limit

¹ = EPA Residential Soil Screening Value

² = ATSDR Chronic EMEG

³ = ATSDR Intermediate EMEG

⁴ = ATSDR Chronic RMEG

Table 2. Surface soil lead levels at different locations at the Lazy 8 Estates Subdivision

| Sampling Locations¹ | Number of composite samples | Range of lead concentrations mg/kg | Average Lead concentration in mg/kg |
|---------------------------------------|------------------------------------|---|--|
| Residential ² | 4 | 6.5-13.5 | 8.6 |
| Parcels | 11 | 4.6-81.9 | 19.7 |
| 50 meter target area | 2 | 5.5-5.8 | 5.7 |
| 100 meter target area ³ | 1 | 12.1 | 12.1 |
| 150 meter target area | 3 | 5.6-6.1 | 5.8 |
| 200 meter target area | 3 | 118-135 | 121.7 |
| Shooting platform ³ | 1 | 6.0 | 6.0 |

Lead data source: IDEQ & TerraGraphics 2015. Preliminary Assessment and Site Inspection Report for a Former Gun Range, Bonneville County

mg/kg = milligrams of lead per kilogram of soil

¹ see attachment A for details of sampling areas

² residential sampling was confined to areas immediately around homes or future home sites

³ Single composite sample

Table 3. Integrated Exposure Uptake Biokinetic Model¹ estimated blood lead levels in µg/dL by age of children who live at Lazy 8 Estates Subdivision

| Age (years) | Residential | Parcels | 50 meter target area | 100 meter target area | 150 meter target area | 200 meter target area | Shooting platform |
|-------------|-------------|---------|----------------------|-----------------------|-----------------------|-----------------------|-------------------|
| 0.5-1 | 1.0 | 1.1 | 1.1 | 1.1 | 1.1 | 2.2 | 1.1 |
| 1-2 | 1.0 | 1.2 | 1.1 | 1.1 | 1.1 | 2.5 | 1.1 |
| 2-3 | 1.0 | 1.1 | 0.9 | 1.0 | 0.9 | 2.3 | 0.9 |
| 3-4 | 0.9 | 1.1 | 0.9 | 1.0 | 0.9 | 2.2 | 0.9 |
| 4-5 | 0.8 | 0.9 | 0.8 | 0.9 | 0.8 | 1.8 | 0.8 |
| 5-6 | 0.8 | 0.9 | 0.8 | 0.8 | 0.8 | 1.6 | 0.8 |
| 6-7 | 0.8 | 0.8 | 0.7 | 0.8 | 0.7 | 1.4 | 0.7 |
| | | | | | | | |

µg/dL = micrograms of lead per deciliter of blood

¹The EPA’s IEUBK model was used to estimate children’s blood lead levels. Default assumptions were used for all inputs except for lead in soil. The average soil concentration from each sampling location was used in the model.

Table 4. Estimated adult blood lead levels using EPA’s Adult Lead Model

| Soil Lead Concentration (ppm) | Predicted blood lead level (µg/dL) | Geometric mean blood lead level ¹ (µg/dL) |
|-------------------------------|------------------------------------|--|
| 135 ² | 1.3 | 1.23 |

¹Source: CDC Fourth National Report on Human Exposure to Environmental Chemicals, February 2015. This number is for adults 20 years of age and older and represents data from survey years 2009-2010, the most recent available.

²This is the highest lead concentration from data set