

# **Health Consultation**

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**EVALUATION OF ORGANIC CONTAMINANTS IN THE PRIVATE WELLS  
LOCATED OFF THE FORT HALL INDIAN RESERVATION SITE**

**BANNOCK COUNTY, IDAHO  
EPA FACILITY ID: ID0000127753**

**APRIL 4, 2005**

**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:

Idaho Department of Health and Welfare  
Division of Health  
Bureau of Community and Environmental Health  
Under Cooperative Agreement with the  
U.S. Department of Health and Human Services  
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# **HEALTH CONSULTATION**

## **Evaluation of Organic Contaminants in the Private Wells Located off the Fort Hall Indian Reservation Site**

**Bannock County, Idaho**

**CERCLIS NO. ID0000127753**

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## Summary

As part of a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR), the Bureau of Community and Environmental Health (BCEH), Division of Health, Idaho Department of Health and Welfare, prepared this health consultation to evaluate the potential health effects from exposure to the organic contaminants in wells located off the Fort Hall Indian Reservation in southeast Idaho.

In the 1990s, ethylene dibromide (EDB) contamination was found in wells located on the Reservation and the surrounding area (off the Reservation). In 1997, ATSDR completed a health consultation to evaluate the health implications from exposure to EDB in the groundwater on the Reservation (ATSDR 1997). In that health consultation (ATSDR 1997), ATSDR concluded that the levels of EDB detected (concentrations greater than the maximum contaminant level of 0.05 ppb) in private well water samples did not pose non-cancerous health effects in children or adults; however, these levels did pose an unacceptable cancer risk. Since then, the Shoshone-Bannock Tribes and the Idaho Department of Environmental Quality (IDEQ) have been monitoring EDB contaminated private wells located on and off the Reservation, respectively.

On July 29, 2004, the U.S. Environmental Protection Agency (EPA), after reevaluating the cancer risk of EDB, reduced EDB's oral cancer slope factor from 85 to 2 (mg/kg/day)<sup>-1</sup>. This means the cancer risk from drinking EDB contaminated water decreased 43 times. In July and August of 2004, IDEQ sampled the EDB contaminated private wells located off the Reservation. BCEH agreed to conduct this health consultation for off the Reservation exposures using current groundwater data collected by IDEQ and the updated cancer slope factor from EPA. A separate health consultation will be prepared by BCEH for the Tribes when current EDB monitoring data becomes available on the Reservation.

Based on IDEQ's new monitoring data and EPA's new oral cancer slope factor, BCEH has drawn the following conclusions and recommendations for wells tested off the Reservation:

### *Conclusions:*

- Using ATSDR's public health hazard categories (Appendix B, Table B-1) and available data, BCEH considers the levels of EDB and other contaminants in the private or community wells off the Fort Hall Indian Reservation to be of *no apparent public health hazard*.
- EDB and other contaminants measured in the private and community wells off the Reservation are unlikely to cause any adverse non-carcinogenic public health effects or an appreciable increased risk of cancer in the exposed population.

### *Recommendations:*

- As a part of prudent public health practice, IDEQ should continue to monitor EDB levels in groundwater to evaluate potential trends and extent of EDB contamination.
- Since private wells are not regulated by the state of Idaho, efforts should be made by BCEH and IDEQ to provide information to the community members who use well water. Specifically, BCEH and IDEQ should provide information on the availability and use of common faucet and shower head filters that significantly reduce the amount of EDB in water to the community through community meetings and fact sheets.

## **Purpose**

The Bureau of Community and Environmental Health (BCEH), Division of Health, Idaho Department of Health and Welfare (IDHW) has a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR) to conduct public health assessments and consultations for hazardous waste sites in Idaho.

In 1997, ATSDR addressed the health implications from exposure to ethylene dibromide (EDB) in the groundwater at the Fort Hall Indian Reservation (the Reservation) in southeast Idaho in a health consultation (ATSDR 1997). Since then, the Shoshone-Bannock Tribes and the Idaho Department of Environmental Quality (IDEQ) have been monitoring the EDB contaminated private wells located on and off the Reservation, respectively. On July 29, 2004, after reevaluating the cancer risk of EDB, the U.S. Environmental Protection Agency (EPA) lowered EDB's cancer slope factor from 85 to 2 (mg/kg/day)<sup>-1</sup> (<http://toxnet.nlm.nih.gov/cgi-bin/sis/search/f?./temp/~FcXwVQ:1>). This means the cancer risk from drinking the EDB contaminated water decreased 43 times. In this health consultation, BCEH evaluates the potential health risk of EDB and other organic contaminants in the private wells located off the Reservation based on IDEQ's recent monitoring data and EPA's updated cancer slope factor. When the current EDB monitoring data from the Shoshone-Bannock Tribes are available, BCEH will evaluate the current health risk of EDB contamination in the private wells located on the Fort Hall Indian Reservation in a separate health consultation.

BCEH conducted this health consultation to evaluate the health effects of the EDB and other organic contaminants in the private wells off the Reservation only.

## **Background and Statement of Issue**

The Fort Hall Indian Reservation is located on one-half million acres in southeast Idaho. In 1990, the U.S. Geological Service (USGS) measured EDB at 0.202 parts per billion (ppb) in a private well water sample on the Reservation. On March 4, 1994, EPA Region 10 issued an emergency order concerning EDB in the private well since EPA's maximum contaminant level (MCL) for EDB is 0.05 ppb.

Based on subsequent private well water sampling and monitoring in 1993 and 1994, it was found that 63 square miles of the Reservation's groundwater was contaminated with EDB (DeJongh 1996). In 1993, IDEQ found elevated EDB levels (0.22 ppb) in one community well off the Reservation. The well was shut down. Later on, more off-site private wells were found to be contaminated with EDB. The EDB-contaminated groundwater on and off the Reservation forming the EDB plume is depicted in Appendix A, Figure A-1.

On August 6, 1997, ATSDR released a health consultation (ATSDR 1997) that evaluated whether the EDB-contaminated well water posed a public health threat. In that health consultation, ATSDR concluded that the levels of EDB detected (concentrations greater than 0.05 ppb) in private well water samples did not pose non-cancerous health effects in children or adults; however, these levels did pose an unacceptable cancer risk.

On July 29, 2004, after reevaluating the cancer risk of EDB, EPA lowered EDB's oral cancer slope factor from 85 to 2 (mg/kg/day)<sup>-1</sup> (<http://toxnet.nlm.nih.gov/cgi-bin/sis/search/f?./temp/~FcXwVQ:1>). In July and August of 2004, IDEQ sampled the EDB contaminated private wells located off the Reservation, and analyzed EDB and other organic contaminants in the water.

EDB is a colorless liquid with a mild, sweet odor. It evaporates easily and can dissolve in water. EDB stays in groundwater and in soil for a long time but breaks down quickly in the air (ATSDR 1992). Historically, EDB has been used as a pesticide and as an additive in leaded gasoline. It is mostly man-made, but it may occur naturally in the ocean in very small amounts. In the 1970s and early 1980s, it was used in soil to kill insects and worms that get on fruits, vegetables, and grain crops. It was also used in soil to protect grass, such as on golf courses. Another use was to kill fruit flies on citrus fruits, mangoes, and papayas after they were picked. EPA stopped most of these uses in 1984 (ATSDR 1992). The source of the EDB in the private well water on and off the Reservation is unknown (DeJongh 1996).

## Discussion

### Assessment Methodology

BCEH followed a two-step methodology to evaluate public health issues related to water contamination. First, BCEH obtained representative water quality data for the site of concern and compiled a comprehensive list of site-related contaminants. Second, BCEH used health-based comparison values (CVs) to screen out those contaminants that do not have a realistic possibility of causing adverse health effects. For the remaining contaminants, BCEH reviewed recent scientific studies to determine whether the level of environmental contamination and exposure indicated a public health hazard.

Using CVs provides a way to screen and prioritize the contaminants at a site for further evaluation. CVs are derived for each of the various media and reflect an estimated contaminant concentration that is *not expected* to cause adverse health effects for a given chemical, assuming a standard daily contact rate (e.g., an amount of water or soil consumed or an amount of air breathed) and body weight.

*CVs are not thresholds for adverse health effects.* ATSDR CVs establish contaminant concentrations many times lower than levels at which no effects were observed in experimental animals or in human epidemiologic studies. CVs are also deemed conservative or cautious because they include safety or protective factors that account for more sensitive populations, such as young children.

If contaminant concentrations are above CVs, BCEH 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.

## Environmental Contamination in the Wells

Land developers, who were required to test new wells for compliance with standards for safe drinking water, and IDEQ sampled private and community wells off the Reservation. In 1993, the EDB was measured at 0.22 ppb in one of three community wells in the Lacey Vista housing development (ATSDR 1997). In 1996, IDEQ sampled 18 off-reservation private wells. Among those 18 wells, 12 wells were found to be contaminated with EDB. The highest measured concentration of EDB was 0.23 ppb (Personal communication: Lisa Safford, Professional Geologist, Intern, IDEQ, email, Feb. 9, 2005) (Table 1). In 1997, IDEQ sampled 8 private wells off the Reservation, among which 4 wells were found to be contaminated with EDB. The highest measured concentration of EDB was 0.086 ppb (Personal communication: Lisa Safford, Professional Geologist, intern, IDEQ, email, Feb. 9, 2005) (Table 1).

In July and August of 2004, IDEQ sampled 53 private wells off the Reservation. EDB, 1,2-dibromo-3-chloropropane (DBCP), and 1,2,3-trichloropropane were analyzed in these water samples. Figure A-2 (Appendix A) shows IDEQ's sampling locations of EDB contaminated wells (Personal communication: Lisa Safford, Professional Geologist, intern, IDEQ, email, Feb. 9, 2005). Among the 53 wells, 22 wells were found to be contaminated with EDB, 6 wells were found to be contaminated with DBCP, and 4 wells were found to be contaminated with 1,2,3-trichloropropane. The highest measured concentrations of EDB, DBCP, and 1,2,3-trichloropropane were 0.202, 0.030, and 0.020 ppb respectively (Personal communication: Michelle Byrd, Source Water Analyst, IDEQ, email, Nov. 23, 2004) (Table 1).

**Table 1. Drinking Water Comparison Values and Contaminants Levels Found in the Private Well Water**

Contaminant	Year	Concentration Range in parts per billion (ppb)	Frequency of Detection / Total	Conservative Comparison Value (CV) in ppb	CV Source
Ethylene dibromide (EDB)	1996	ND-0.230	12/18	0.02	CREG
	1997	ND-0.086	4/8	90	RMEG-Child
	2004	ND-0.202	22/53	300	RMEG-Adult
1,2-Dibromo-3-chloropropane (DBCP)	2004	ND-0.030	6/53	20	I-EMEG-Child
				70	I-EMEG-Adult
1,2,3-Trichloropropane	2004	ND-0.020	4/53	600	I-EMEG-Child
				2000	I-EMEG-Adult
				60	RMEG-Child
				200	RMEG-Adult

CREG = cancer risk evaluation guide for  $1 \times 10^{-6}$  excess cancer risk.

I-EMEG-Child = intermediate environmental media evaluation guide for children.

I-EMEG-Adult = intermediate environmental media evaluation guide for adults.

ND = non-detectable (the detection limits of EDB, DBCP, and 1,2,3-trichloropropane are all 0.003 ppb).

RMEG-Child = reference dose media evaluation guide for children.

RMEG-Adult = reference dose media evaluation guide for adults.

## **Contaminants of Concern**

In general, comparison values are derived for substances for which adequate toxicity data exist for the exposure route of interest. Where possible, CVs are generally available for three specified exposure periods: acute (14 days or less), intermediate (15 to 365 days), and chronic (more than 365 days). Typically, BCEH selects the lowest environmental guideline consistent with the conditions at or near the site for screening purpose.

Here, concentrations of chemicals in the private wells were compared to health-based drinking water comparison values to decide whether any of the chemicals need further evaluation. For non-cancer toxicity, BCEH uses environmental media evaluation guides (EMEGs) and reference dose media evaluation guides (RMEGs). EMEGs are estimated contaminant concentrations that are not expected to result in adverse non-carcinogenic health effects based on ATSDR's evaluation. EMEGs are based on ATSDR's minimal risk levels (MRLs) and conservative assumptions about exposure, such as intake rate, exposure frequency and duration, and body weight. ATSDR derives RMEGs from EPA's oral reference doses, which are developed based on EPA evaluations. RMEGs represent the concentration in water or soil at which daily human exposure is unlikely to result in adverse non-carcinogenic effects. For cancer risk, BCEH uses cancer risk evaluation guides (CREGs), which are estimated contaminant concentrations that would be expected to cause no more than one excess cancer in a million ( $10^{-6}$ ) people exposed during their lifetime (70 years).

If the concentration of a chemical is less than its CV, it is unlikely that exposure would result in adverse health effects, and further evaluation of exposures to that chemical is not warranted. If the concentration of a chemical exceeds a CV, adverse health effects from exposure are not necessarily expected, but potential exposures to that chemical from the site should be evaluated.

For 1,2-dibromo-3-chloropropane (DBCP) and 1,2,3-trichloropropane, their measured highest concentrations were all far less than their respective CVs. Therefore, they are unlikely to result in any adverse public health effects and do not need further evaluation.

For ethylene dibromide (EDB), the highest concentration of EDB (0.23 ppb) in the wells was more than 390 times lower than the RMEGs for both children (90 ppb) and adults (300 ppb). Since RMEGs represent the concentration in water at which daily human exposure is unlikely to result in adverse non-carcinogenic effects, EDB in the groundwater is unlikely to result in any adverse non-carcinogenic health effects. However, EDB is also considered to be a likely human carcinogen, and the highest EDB concentration in groundwater was higher than the CREG (0.02 ppb). Therefore, only the cancer risk of EDB contamination in the private wells will be further evaluated in the following section.

## **Exposure Pathways**

To determine whether people are exposed to EDB, the environmental and human components that lead to human exposure were evaluated. This exposure pathway analysis considers five elements: the source of contamination; the movement of the contaminants in soil, air or water; the point at which people can come in contact with the contaminants; the routes of exposure

(such as drinking contaminated water); and the population that can potentially be exposed. All five elements must be present for an exposure pathway to be complete.

Exposure pathways are classified as a completed pathway, a potential pathway, or an eliminated pathway. If a pathway is complete, exposure is reasonably likely to have occurred in the past, is currently occurring, or is likely to occur in the future. If a potential pathway exists, exposure might have occurred, may be occurring, or may yet occur. A pathway is eliminated from further analysis when one of the five elements is missing and will never be present, or when no contaminant of concern can be identified.

Based on the exposure pathway analysis and environmental data, people are likely exposed to EDB through ingestion, inhalation, and dermal absorption of water from the contaminated private wells. This constitutes a completed exposure pathway.

### Public Health Implications

As discussed above, EDB in the groundwater is unlikely to result in any adverse non-carcinogenic health effects, but it is still above the CREG. Therefore, this section will only evaluate the cancer risk of EDB in the groundwater.

The U.S. Department of Health and Human Services, the International Agency for Research on Cancer, and EPA have determined that EDB is a likely human carcinogen. This is based on strong evidence of carcinogenicity in animals and inconclusive evidence of carcinogenicity in an exposed human population. Based on the consistent findings of several studies reporting increased incidences of a variety of tumors in rats and mice of both sexes by different routes of administration at both the site of application and at distant sites, it can be concluded that there is strong evidence of the carcinogenicity of EDB in animals. The available evidence further supports a conclusion that EDB is a genotoxic carcinogen based on evidence from a variety of *in vitro* and *in vivo* test systems (<http://toxnet.nlm.nih.gov/cgi-bin/sis/search/f?./temp/~H0kSZA:1>).

Cancer risk estimates do not provide definitive answers about whether or not a person will get cancer; rather, they are measures of chance (probability). Cancer is a common illness, with many different forms that result from a variety of causes; not all are fatal. Approximately one in two people living in the United States will develop cancer at some point in their lives. Since EDB evaporates easily from water through cooking, showering, laundering, and dish washing, BCEH used the following equation to estimate the cancer risk of EDB in the water from the contaminated private wells. The equation was adapted from EPA Region 9 to calculate the cancer risk from both ingestion and inhalation of EDB in water (<http://www.epa.gov/region09/waste/sfund/prg/files/04usersguide.pdf>).

$$Risk = \frac{Conc \times EF_r \times [(IFW_{adj} \times CSF_o) + (VF_w \times InhF_{adj} \times CSF_i)]}{AT_c \times 1000}$$

Where,

- Risk = estimated excess cancer risk over a lifetime (unitless)
- Conc. = concentration (ppb)
- EF<sub>r</sub> = exposure frequency – residential (350 day/year)

IFW<sub>adj</sub> = ingestion factor – water (1.1 L-yr/kg-d)  
CSF<sub>o</sub> = cancer slope factor oral (mg/kg/day)<sup>-1</sup>  
VF<sub>w</sub> = volatilization factor for water (0.5 L/m<sup>3</sup>)  
InhF<sub>adj</sub> = inhalation factor-air (11 m<sup>3</sup>-yr/kg-d)  
CSF<sub>i</sub> = cancer slope factor inhaled (mg/kg/day)<sup>-1</sup>  
AT<sub>c</sub> = average time – carcinogens (25550 days)

BCEH used the standard default values from EPA Region 9 (<http://www.epa.gov/region09/waste/sfund/prg/files/04usersguide.pdf>). The oral cancer slope factor for EDB of 2 (mg/kg/day)<sup>-1</sup> was updated by EPA on July 29, 2004 (<http://toxnet.nlm.nih.gov/cgi-bin/sis/search/f?./temp/~FcXwVQ:1>). The inhaled cancer slope factor for EDB of 2 (mg/kg/day)<sup>-1</sup> came from EPA Region 9 PRG Table (<http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf>).

Based on the highest concentration of EDB (0.23 ppb) in the wells (Table 1), the estimated cancer risk is about 4 excess cancer cases for every 100,000 people exposed over a lifetime (70 years). Therefore, EDB concentrations in the private wells located off the Fort Hall Indian Reservation are unlikely to result in an appreciable increased risk of cancer in the exposed population.

### **ATSDR Child Health Concerns**

Children differ from adults in their physiology (e.g., respiratory rates relative to body weight), pharmacokinetics (i.e., distribution, absorption, metabolism, and excretion of chemicals), and pharmacodynamics (i.e., susceptibility of an organ to the exposure). Therefore, it is always important to address chemical exposures of these sensitive populations. Infants and children are more vulnerable to the toxic effects of chemicals for the following reasons:

- 1) children are more likely to play outdoors and bring food into contaminated areas;
- 2) children are closer to the ground (shorter), resulting in a greater likelihood to breathe dust, soil, and heavy vapors laying on the ground;
- 3) children weigh less, resulting in higher doses of chemical exposure per body weight; and
- 4) children's developing body systems can sustain permanent damage if toxic exposures occur during critical growth stages.

As discussed earlier, exposure to EDB levels in the wells off the Reservation is unlikely to result in any adverse non-carcinogenic public health effects to children or adults. The main concern is an increased risk of cancer in the exposed population. However, since cancer risk is based on a lifetime exposure, risk is the same for both adults and children. The levels found are considered to represent a low increased risk of cancer.

### **Conclusions**

- Using ATSDR's public health hazard categories (Appendix B, Table B-1) and available data, BCEH considers EDB and other contaminants levels in the private or community wells off the Fort Hall Indian Reservation be *no apparent public health hazard*.

- EDB and other contaminants concentrations measured in the private and community wells off the Reservation are unlikely to cause any adverse non-carcinogenic public health effects or an appreciable increased risk of cancer in the exposed population.

## **Recommendations**

- As a part of prudent public health practice, IDEQ should continue to monitor EDB levels in groundwater to evaluate potential trends and extent of EDB contamination.
- Since private wells are not regulated by the state of Idaho, efforts should be made by BCEH and IDEQ to provide information to the community members who use well water. Specifically, BCEH and IDEQ should provide information on the availability and use of common faucet and shower head filters that significantly reduce the amount of EDB in water to the community through community meetings and fact sheets.

## **Public Health Action Plan**

BCEH will evaluate the EDB contamination in the private or community wells located on the Fort Hall Indian Reservation when the new EDB monitoring data become available.

## References

- [ATSDR] Agency for Toxic Substances and Disease Registry. 1992. Toxicological profile for 1,2-dibromoethane. Atlanta: US Department of Health and Human Services. Available at URL: <http://www.atsdr.cdc.gov/toxprofiles/tp37.html>.
- [ATSDR] Agency for Toxic Substances and Disease Registry. 1997. Health Consultation: Fort Hall Site, Fort Hall, Bannock County, Idaho. Atlanta: US Department of Health and Human Services.
- DeJongh L. 1996. Observations of ethylene dibromide occurrence on the Fort Hall Indian Reservation, Idaho.

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## **Certification**

This Health Consultation was prepared by the Idaho Bureau of Community and Environmental Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodologies and procedures existing at the time the health consultation was initiated. Editorial review was completed by the Cooperative Agreement partner.

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Technical Project Officer, CAT, SPAB, DHAC

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

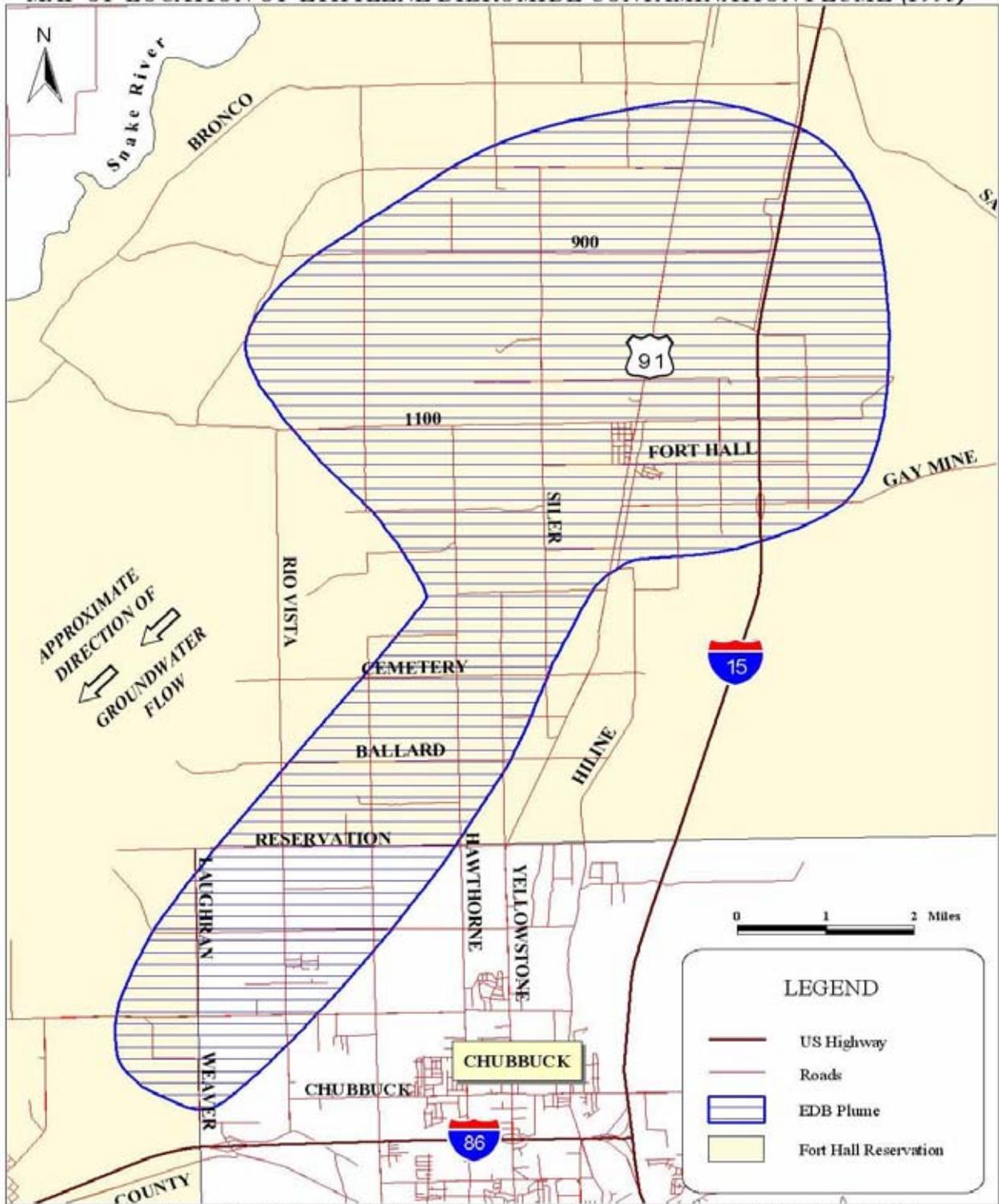
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Team Lead, CAT, SPAB, DHAC, ATSDR

## **Appendix A**

### **Map of Ethylene Dibromide Contamination Plume and Sampling Locations**

MAP OF LOCATION OF ETHYLENE DIBROMIDE CONTAMINATION PLUME (1995)



\*INFORMATION OBTAINED FROM: OBSERVATIONS OF ETHYLENE DIBROMIDE OCCURRENCE ON THE FORT HALL INDIAN RESERVATION FORT HALL, IDAHO, 1996

Figure A-1. Map of Ethylene Dibromide Contamination Plume

Figure 6. Ethylene Dibromide Sampling Locations with Address Density Data

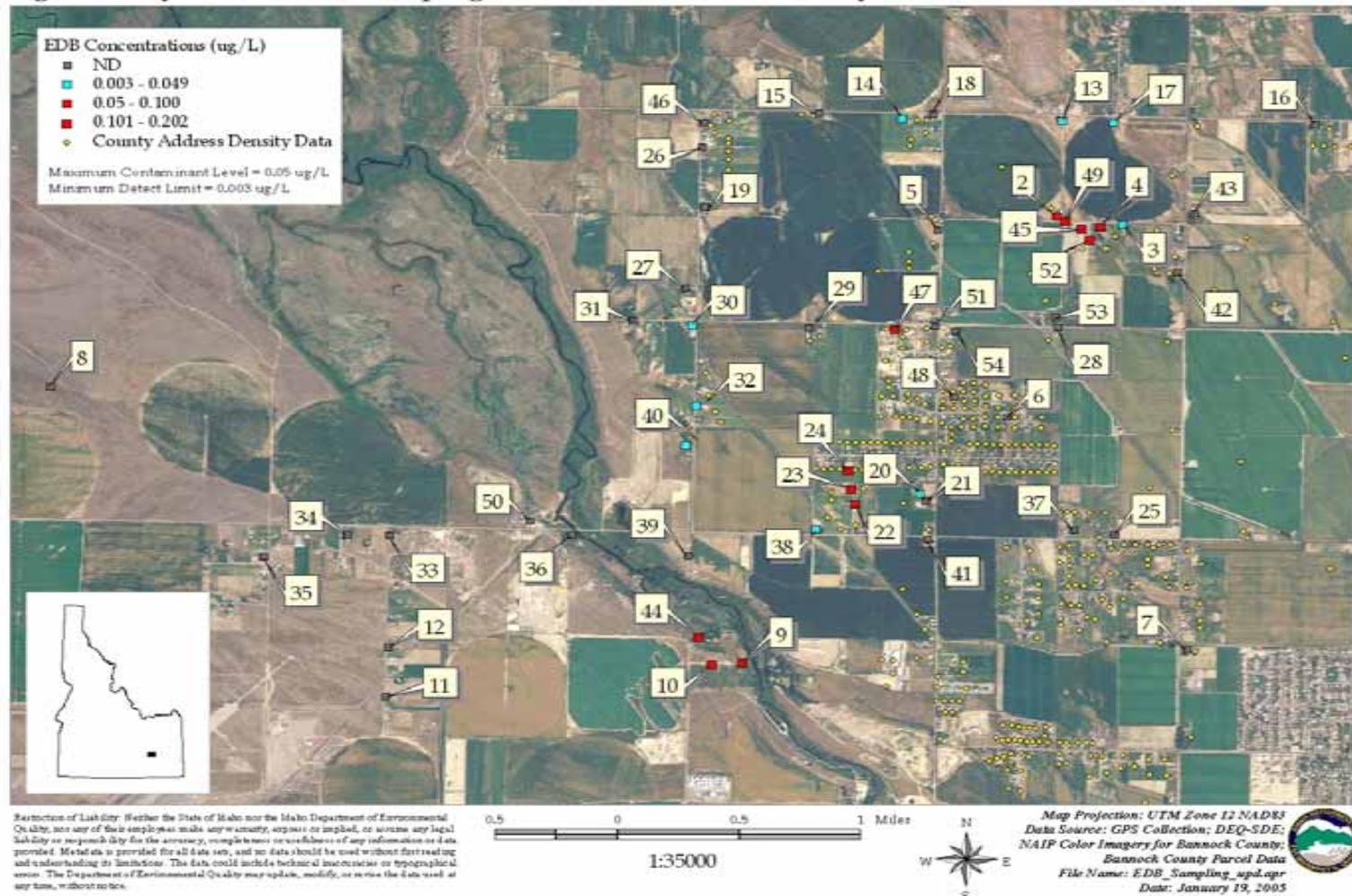


Figure A-2. Ethylene Dibromide Sampling Locations of the Idaho Department of Environmental Quality

## **Appendix B**

### **ATSDR Interim Public Health Hazard Categories**

**Table B-1. Interim Public Health Hazard Categories**

CATEGORY/DEFINITION	DATA SUFFICIENCY	CRITERIA
<p><b>Urgent Public Health Hazard</b></p> <p>This category is used for sites where short-term exposures (&lt;1year) to hazardous substances or conditions could result in adverse health effects that require rapid intervention.</p>	<p>This determination represents a professional judgment that is based on critical data, which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.</p>	<p>Evaluation of available relevant information* indicated that site-specific conditions or likely exposures have had, are having, or are likely to have in the future, an adverse effect on human health that requires immediate action or intervention. Such site-specific conditions or exposures may include the pre of serious physical or safety hazards.</p>
<p><b>Public Health Hazard</b></p> <p>This category is used for sites that pose a public health hazard due to the existence of long-term exposure (&gt;1year) to hazardous substance or conditions that could result in adverse health effects.</p>	<p>This determination represents a professional judgment that is based on critical data, which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.</p>	<p>Evaluation of available relevant information* suggests that, under site-specific conditions of exposure, long-term exposures to site-specific contaminants (including radionuclide) have had, are having, or are likely to have in the future, an adverse effect on human health that requires one of more public health interventions. Such site-specific exposures may include the presence of serious physical or safety hazards.</p>
<p><b>Indeterminate Public Health Hazard</b></p> <p>This category is used for sites in which “critical” data are insufficient with regard to extent of exposure and/or toxicological properties at estimated exposure levels.</p>	<p>This determination represents a professional judgment that critical data are missing and ATSDR has judged the data are insufficient to support a decision. This does not necessarily imply all data are incomplete; but that some additional data are required to support a decision.</p>	<p>The health assessor must determine, using professional judgment, the “criticality” of such data and the likelihood that the data can be obtained and will be obtained in a timely manner. Where some data are available, even limited data, the health assessor is encouraged to the extent possible to select other hazard categories and to support their decision with clear narrative that explains the limits of the data and the rationale for the decision.</p>
<p><b>No Apparent Public Health Hazard</b></p> <p>This category is used for sites where human exposure to contaminated media may be occurring, may have occurred in the past, and/or may occur in the future, but the exposure is not expected to cause any adverse health effects.</p>	<p>This determination represents a professional judgment that is based on critical data, which ATSDR considers sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.</p>	<p>Evaluation of available relevant information* indicates that, under site-specific conditions of exposure, exposures, exposure to site-specific contaminants in the past, present, or future are not likely to result in any adverse impact on human health.</p>
<p><b>No Public Health Hazard</b></p> <p>This category is used for sites that, because of the absence of exposure, do NOT pose a public health hazard.</p>	<p>Sufficient evidence indicates that no human exposures to contaminated media have occurred, none are now occurring, and none are likely to occur in the future.</p>	

\* Such as environmental and demographic data; health outcome data; community health concerns information; toxicological, medical, and epidemiological data; monitoring and management plan