Letter Health Consultation

TRICA – IMMANUEL CHURCH

BOISE, IDAHO

MAY 7, 2008

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.

You May Contact ATSDR TOLL FREE at
1-800-CDC-INFO
or
Visit our Home Page at: http://www.atsdr.cdc.gov

LETTER HEALTH CONSULTATION

TRICA – IMMANUEL CHURCH

BOISE, IDAHO

Prepared By:

Idaho Department of Health and Welfare
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

IDAHO DEPARTMENT OF
HEALTH & WELFARE

C.L. "BUTCH" OTTER– GOVERNOR
RICHARD M. ARMSTRONG – DIRECTOR

ELKE SHAW-TULLOCH – CHIEF
BUREAU OF COMMUNITY & ENVIRONMENTAL HEALTH
450 West State Street, 6th Floor
P.O. Box 83720
Boise, Idaho 83720-0036
PHONE 208-334-5927
FAX 208-334-6573

April 29, 2008

RE: Evaluation of Lead and Methamphetamine Exposure at the former Immanuel Methodist Church

John Swarthout
TriCa
1406 Eastman Street
Boise, ID 83702

Dear Mr. Swarthout,

The Bureau of Community and Environmental Health, ATSDR Cooperative Agreement Program has completed an evaluation of lead and methamphetamine exposure to volunteers and staff working in the former Immanuel Methodist Church. Attached is the final evaluation with our conclusions and recommendations.

Best Regards,

Kai Elgethun PhD MPH
ATSDR Health Assessor
208-334-5682

LETTER HEALTH CONSULTATION
TITLE: Evaluation of Lead and Methamphetamine Exposure to Volunteers and Office Staff Working in the Former Immanuel Methodist Church, Boise, ID

Bureau of Community & Environmental Health
ATSDR Cooperative Agreement Program
Idaho Division of Health

Requested by: Jon Swarthout, Artistic Director and Co-founder, TRiCA
Prepared by: Kai Elgethun PhD MPH, ATSDR Health Assessor,
Jim Vannoy MPH, ATSDR ID Program Manager
Date: March 12, 2008

BACKGROUND

In the summer of 2007 the Bureau of Community and Environmental Health (BCEH) was asked to conduct a walk through of the historic Immanuel Methodist Church, located on the corner of 14th and Eastman Streets in Boise, Idaho. The walk through assessed safety and health issues for volunteers that were working to demolish parts of the building, which is slated to be converted into a children's dance studio and child educational center. The September 13, 2007 walk through found (based on visual inspection and qualitative wipe lead testing using LeadCheck® Swabs) that there were fall hazards, lead-based paint in several locations throughout the building, and possible asbestos containing materials. Subsequently, the building's owner contacted the Idaho Department of Environmental Quality (IDEQ) to inquire about the Brownfields Program and environmental sampling available through that program. The owner worked with IDEQ's Brownfields program to conduct quantitative sampling for lead, asbestos, and methamphetamine. The building was sampled for methamphetamine because it was noted by the current owner that prior to their ownership the Boise Police Department conducted a warranted search of the building in April 1999 and methamphetamine paraphernalia was found. IDEQ contracted with Terragraphics Environmental Engineering, Inc. of Boise to do the sampling.

The analytical results from sampling found lead and methamphetamine present but no asbestos-containing materials. The owners have asked BCEH to quantify potential health effects for: 1) the volunteers who had helped clean up the building before the owners were aware of the potential environmental health hazards at the site; and 2) for staff who work in an office in the building. This document reviews the analytical results, develops exposure scenarios for volunteers and staff, determines what the pre-cleanup health hazards may have existed for the two groups from lead and methamphetamine exposures, and makes recommendations for exposure prevention.

DISCISSION

Environmental Sampling Results

Health assessors use comparison values as screening tools to evaluate environmental data relevant to exposure pathways. Comparison values are concentrations of contaminants

that are considered to be levels of exposure at or below which no adverse health effects can occur. Comparison values used in this document include U.S. Environmental Protection Agency (EPA)/ U.S. Housing and Urban Development (HUD) clearance standard for lead loading; the U.S. Occupational Safety and Health Administration (OSHA) rate for lead loading; and the Cal/EPA draft reference dose for methamphetamine. Comparison values are derived from available health guidelines, such as ATSDR's minimal risk levels or EPA's reference doses. Comparison values are formulated using conservative exposure assumptions, resulting in values that are much lower than exposure concentrations that have been observed to cause adverse health effects. These comparison values are therefore protective all populations in all potential exposure scenarios. Exposures above a comparison value do not imply an immediate or certain health hazard.

Lead

Qualitative wipe lead testing using LeadCheck® Swabs was performed by BCEH in September 2007. BCEH confirmed that lead was present on several deteriorating painted surfaces within the building, in particular on a staircase railing and on windowsills. Three months later, Terragraphics took bulk material lead samples (paint chips). Follow-up wipe sampling was performed by PBS Environmental & Engineering, in coordination with Terragraphics. This was necessary to assess the amount of lead potentially available to people from surfaces. The surfaces wiped for lead contamination (wall, window, floor) were those that were within reach of volunteers and staff. No bulk samples and no wipe samples were taken from the office area so we cannot directly say whether there is a concern for workers in the office due to lead dust. This may have been an oversight by the sampling team. BCEH recommends that wipe sampling be performed in the office as time and resources permit. Where lab results of bulk samples had shown the presence of lead, wipe sampes were completed to quantify lead loadings. Individual wipe samples show that lead loading ranged from 55 to 283 µg/ft^2. Table 1 below shows mean lead loading for the two areas sampled.

Table 1. Lead Loading Levels (Dust)

	Lead
South Apartment: Mean Surface Load (windows, wall)	**130 µg/ft^2**
Basement of Building: Mean Surface Load (floor)	**234 µg/ft^2**

The U.S. Environmental Protection Agency (EPA)/ U.S. Housing and Urban Development (HUD) clearance standard for lead loading in a HUD residence is 40 µg/ft^2 for interior floor surfaces and 250 µg/ft^2 for windowsills (US HUD 1999; US EPA 2001) These cleanup levels were developed to protect young children in residential scenarios who are apt to exhibit hand-mouth activity. Children younger than six years old are the most sensitive to the health effects of lead. The standards were also derived to account for chronic (long-term) exposures that may last from several months to many years. The Occupational Safety and Health Administration (OSHA) has also established an

acceptable lead loading rate of 200 µg/ ft^2 in situations where employees are in direct contact with lead-contaminated surfaces, such as working surfaces or floors in change rooms, storage facilities and lunchroom and eating facilities (Fairfax 2003). Loading on the basement floor exceeded both the HUD floor standard and the OSHA surfaces standard. However, because volunteers were only on the site for a maximum of three days, the potential for adverse health effects among volunteers is felt to be insignificant and not a public health hazard. Due to the lack of data for the office, it cannot be directly determined whether lead is a health concern for staff. If we assume that the office has the same or similar lead loading to the south apartment, office workers would not be exposed over the OSHA threshold for a normal 8-hour workday. Whether this assumption is valid or not, thorough and careful cleaning of any visible dust on painted surfaces is recommended for the office and should contain the majority of available dust.

Methamphetamine

The results of the analysis showed that methamphetamine levels varied by area sampled. Locations that were not easily accessible to volunteers or workers are NOT included in the mean surface residue value because it is unlikely anyone would have contacted them. The mean values represented in Table 2 below are based on wipe samples from surfaces that are in arm's reach. Samples in ductwork and attic areas in particular were not included in the mean presented in Table 2. Note also that there were no wipe samples taken in the auditorium area of the church.

Table 2. Meth Levels

	Meth
Office: Mean Surface Residue	**0.38 µg/100 cm^2**
Basement of Building: Mean Surface Residue	**0.75 µg/100 cm^2**

Carpet was replaced in the Office (north apartment/apartment 2) and no further loading of meth onto carpet surfaces is expected, nor is any transport of meth from the subflooring. No exposure to carpet residues was assumed in any part of the building.

Idaho has a cleanup standard for meth of 0.1 µg/100 cm^2. However, this is not a health-based standard. Since there are no national guidelines for evaluating health effects from exposure to materials in homes or buildings where methamphetamine has been smoked or manufactured, BCEH did a search for peer reviewed documents that could provide guidance on assessing exposure and potential hazards. We found that California EPA (Cal/EPA) has just released documents related to methamphetamine residue exposures and potential health hazards in buildings. In particular, one document entitled "Development of a Reference Dose (RfD) for Methamphetamine" by C. Salocks of Cal/EPA (December 2007) describes the derivation of a comparison value that can be used when evaluating potential health effects for people spending time in buildings where methamphetamine was smoked or cooked. This Cal/EPA document is a review of previous methamphetamine health studies, and it focuses in particular on two individual studies. Although the Cal/EPA draft RfD for methamphetamine of 0.3 µg/kg/day has not

been officially adopted for screening and EPA risk determination purposes, we believe the Cal/EPA document is well-crafted and use the Cal/EPA draft RfD for our comparison value in this report to determine potential health effects.

Public Health Implications

Exposure Scenario Assumptions

The assumptions used to determine methamphetamine exposures in this assessment are similar to assumptions made by Cal/EPA in their draft document "Assessment of Children's Exposure to Surface Methamphetamine Residues in Former Clandestine Methamphetamine Labs, and Identification of a Risk-Based Cleanup Standard for Surface Methamphetamine Contamination" (Salocks, 2007). See Table 3 for a summary of exposure assumptions. The contaminant and pathway assumptions are as follows:

Contaminant assumptions for methamphetamine
-The source concentration is constant; it does not increase or decrease over time.
-Inhalation of airborne methamphetamine residues does not represent a significant exposure pathway.

Pathway exposure assumptions
-Dermal exposure occurs following contact with contaminants on hard surfaces.
-Incidental non-dietary ingestion occurs following hand-to-mouth transfer for young volunteers.

Calculation - Skin absorption

To arrive at the amount of methamphetamine that workers and volunteers might absorb through their skin, the following formula was used.

Potential dermal dose (PDD)
PDD = (ISR * TC * ET) * (AF)

ISR = Indoor surface residue: 0.75 μg/100cm^2 for volunteers and 0.38 μg/cm^2 for office workers
TC = Transfer coefficient (16700 cm^2/hr)
ET = Exposure time (4 hrs per day)
AF = absorption factor (0.7)

The potential dermal dose was then divided by standard body weights for men, women, and children to arrive at a dose of methamphetamine per kilogram of body weight per day (μg/kg/day).

Calculation - Non-dietary ingestion

The formula for Potential Ingestion Dose (PIR) from hand-to-mouth activity is:

PIR = ISR * SA * FQ * ET*AF
ISR = Indoor surface residue: for the basement, the mean is 0.75 μg/100 cm^2
SA = Surface area of child's hands = 623 cm^2

FQ = Frequency of hand-to-mouth events = 9 per hour
ET = Exposure time (4 hrs per day)
AF = 1 (100% of what gets on the hands is assumed to be ingested and absorbed)

The potential dose from non-dietary ingestion was then divided by the standard body weight for children to arrive at a dose of methamphetamine per kilogram of body weight per day (µg/kg/day). To arrive at the total estimated dose for young volunteers, the Potential Dermal Dose for skin absorption and the Potential Ingestion Dose for non-dietary ingestion were added together.

Table 3. Dermal Exposure Assumptions for Meth

	Percent Absorbed	Dermal Transfer Coefficient (TC)	Body Weight	Duration per day*	Number of days (volunteer)	Number of days (employee)
Adults-M	70%	16700 cm^2/hr	72 kg (159 lbs)	4 hr	3	234
Adults-F	70%	16700 cm^2/hr	60 kg (132 lbs)	4 hr	3	234
Children (7-12)	70%	6000 cm^2/hr	35 kg (77 lbs)	4 hr	3	

*The EPA guidance is for 8 hours but that guidance is based on exposure to carpets in residences. Following Cal/EPA, we modified this to 4 hours to make the exposure more appropriate to the site circumstances.

Table 4 summarizes the dose calculations. The draft RfD for methamphetamine derived by Salocks of Cal/EPA is 0.3 µg/kg/day based on a study where the health endpoint was weight loss. The RfD is the amount of a substance that one can be exposed to and be certain to not experience any adverse health effects (in this case, slight weight loss). Note that both volunteers and office staff at the church potentially received doses of methamphetamine above the Cal/EAP draft RfD. However, this is not a cause for alarm since we do not expect the doses shown in Table 4 to result in adverse health effects because of the short exposure duration in the church, because the possible health effect was slight weight loss, not a more severe effect such as insomnia, and because there are uncertainty factors built into the Cal/EAP draft RfD.

Table 4. Dose Summary for Methamphetamine

	Office Worker Male	Office Worker Female
Dose (µg/kg/day)	2.5	3.0
Difference: RfD - Dose	+2.2	+2.7
Number of Times Greater than RfD	8.3X	10X

The Cal/EPA draft RfD for methamphetamine derived by Salocks and based on the study by Chapman (1961) includes a **300-fold uncertainty factor**. Uncertainty factors are used in the derivation of an RfD to assure that more sensitive populations, such as children, are highly protected and to factor in uncertainties in the science. Without the application of this uncertainty factor, the lowest value at which an adverse health effect was observed (or the Lowest Observable Adverse Effect Level [LOAEL]) was 80 µg/kg/day. The observable adverse health effect was **weight loss**. The highest chronic exposure (for female office workers) was 27 times lower than this LOAEL. The highest acute exposure (for volunteer children) was 10 times lower than this LOAEL. None of the potential exposures in the church was as high as the value at which no adverse health effect was observed (the No Observable Adverse Effects Level [NOAEL]). The NOAEL was established by a study of children in which the adverse health effect was insomnia (Young and Turner 1965).

It is true that all exposures were above the Cal/EPA draft RfD (with uncertainty factor included) for all scenarios, by a factor of 8.3 – 28 X higher. For many 'toxic' chemicals we assess, this might be alarming. To put it in perspective for methamphetamine, however, we must look at what 'toxic' endpoint is considered in the RfD calculation. The Cal/EPA draft RfD is derived from a study of weight loss in pregnant women who were given various doses of methamphetamine for 4 months of their pregnancy. This was the *most sensitive endpoint* of all health endpoints studied in clinical studies of methamphetamine. All women who received 80 µg/kg-day (0.08 mg/kg-day) or higher lost some amount of weight over the 4 month period. More extreme adverse effects such as insomnia were not observed in these patients. Furthermore, none of the predicted exposures to church volunteers were higher than those that caused insomnia in children in the study by Young and Turner, suggesting that this effect would not be felt by Office Workers or Volunteers. It is highly unlikely that anyone exposed in the church would feel any effects from exposure and highly unlikely that any adverse health effects would occur. Additionally, there are no studies that suggest any long-term adverse effects or damage from methamphetamine exposure (at the levels present in the church) could persist once the methamphetamine source is gone and exposure ceases.

A concern was raised about potential long-term central nervous system effects to children from acute exposure at the levels found in the church. None of the studies referenced by Salocks (2007) found this to be a concern. The study by Young and Turner (1965) involved children being treated for bedwetting using methamphetamine. As mentioned above, the doses in this study were higher than anything encountered in the church. Insomnia was reported during the dosing regimen, but not after the conclusion of the study. No other health effects were reported by child subjects or their parents. The exposure of great concern for children is second-hand smoke inhalation from being in the presence of an adult smoking meth. Second-hand smoke inhalation represents a potential acute exposure many thousands of times higher than what could be encountered as residue on a surface (Martyny et al. 2004).

It must be noted that the exposure scenarios presented here are *worst-case*. There is no exposure 'discount' given in our calculations for people washing their hands or avoiding

surfaces that are highly-loaded with methamphetamine. Thus real exposures to office workers and volunteers could reasonably be expected to be significantly lower than what is presented here.

Note that the calculated exposures presented refer to a daily dose. The intention for the RfD is that it relates to *sub-chronic* exposure, meaning over a period of several weeks or months. As such, it is applicable to the 'Office Worker' scenario but not directly applicable to the 'Volunteer' scenario. Based on self-reported behavior of volunteers, the frequency (1 day) and duration (approximately 6-8 hours) of exposure to contaminants in the church was brief. This means that we are not as concerned with volunteers exposed at slightly higher levels than the RfD compared to office workers exposed at similar levels because the exposure frequency and duration was much shorter.

CONCLUSION

In conclusion, we do not feel that past exposures to methamphetamine and lead in the Immanuel Methodist Church building pose a significant hazard to office workers who may have had chronic exposure or volunteers who may have had an acute exposure. Therefore, BCEH states that *no apparent public health hazard exists* now or in the past from exposures to volunteers and staff to methamphetamine residues and dust containing lead based on the scenarios presented in this document. However, since the site is to be a children's activity center, it is important that the building is remediated for both methamphetamine and lead as part of good public health practice so that future exposures to the children and staff at the center do not pose chronic adverse health effects.

RECOMMENDATIONS

Possible Further Sampling

If possible, it is advisable to conduct lead wipe sampling in the office area since this has not been done so far. In particular, windowsills and frequently-contacted painted surfaces should be tested.

Exposure Prevention

Until remediation is completed, BCEH makes the following recommendations for TRiCA staff.

1. Get a vacuum that is just for the office, and vacuum regularly (be sure it has a good filter (HEPA quality) and does not kick up dust).
2. Anywhere you see dust, clean it up with a vacuum equipped with a good filter or use a disposable damp rag (wear disposable gloves).
3. Don't use the ceiling fan, kitchen hood, or any other fixture that circulates air that was present before you moved in.
4. Do crack windows and allow for air circulation.
5. Replace any light bulbs that were present from before you moved in. Avoid using lights in the kitchen. Heat from incandescent bulbs may cause release of meth residue into the air. Replace bulbs with compact fluorescent or tube fluorescent bulbs wherever possible since these do not produce heat.

6. Wash hands regularly, especially before eating.
7. Avoid touching hands to face or mouth; avoid eating finger foods; smokers should wash hands before smoking.
8. Stay out of the kitchen area or other areas that tested higher for methamphetamine.
9. Don't track dust from the rest of the building into the office. Have a pair of construction zone shoes and leave them at the door—don't wear them into the office. Do not wear these shoes into your home, and avoid wearing them in your car.
10. Purchase a 'sticky mat' (available at most paint stores) that will remove dust from the bottom of shoes.
11. Don't lean against walls.
12. Remove any absorptive/porous furnishings that may have been in the office when methamphetamine was cooked or smoked (curtains, etc).
13. Clean any remaining plumbing fixtures very well if you intend to use them (wear disposable gloves, use disposable rag).
14. Do not touch or use any kitchen or bathroom fixtures that have visible stains. You may want to replace the toilet seat and/or entire toilet, since methamphetamine ingredients might have been dumped there.

REFERENCES

Chapman, J. D. (1961). Control of weight gain in pregnancy, utilizing methamphetamine. *The Journal of the American Osteopathic Association* 60, 993-997.

Fairfax R. (2003). Clarification of "as free as practicable" and lead contamination under 29 CFR 1926.62. U.S. Occupational Safety and Health Administration (OSHA).

Martyny, J. W., Arbuckle, S. L., McCammon, C. S. and Erb, N. (2004). Methamphetamine contamination on environmental surfaces caused by simulated smoking of methamphetamine. National Jewish Medical and Research Center, Denver, Colorado.

Martyny, J. W., Erb, N., Arbuckle, S. L., and VanDyke, M. V. (2005). A 24-Hour Study to Investigate Chemical Exposures Associated with Clandestine Methamphetamine Laboratories. National Jewish Medical and Research Center, Denver, Colorado.

Salocks C. (2007). Development of a Reference Dose for Methamphetamine. External Peer Review Draft. Office of Environmental Health Hazard Assessment, California EPA.

Salocks C. (2007). Assessment of Children's Exposure to Surface Methamphetamine Residues in Former Clandestine Methamphetamine Labs, and Identification of a Risk-Based Cleanup Standard for Surface Methamphetamine Contamination. External Peer Review Draft. Office of Environmental Health Hazard Assessment, California EPA.

U.S. Department of Housing and Urban Development (HUD), (1999). Requirements for Notification, Evaluation, and Reduction of Lead-Based Paint Hazards in Federally Owned Residential Property and Housing Receiving Federal Assistance; Final Rule. Fed Reg 64(178):50139.

U.S. Environmental Protection Agency (EPA), Office of Pesticide Programs (1997). *DRAFT Standard Operating Procedures (SOPs) for Residential Exposure Assessments*. December 19, 1997.

U.S. Environmental Protection Agency (EPA) (2001). Identification of Dangerous Levels of Lead; Final Rule. 40 CFR 745. Fed Reg 66(4):1206.

U.S. Environmental Protection Agency (EPA), Office of Pesticide Programs, Science Advisory Council for Exposure Policy (2001). *Policy Number 12 Regarding Recommended Revisions to the Standard Operating Procedures (SOPs) for Residential Exposure Assessments*. Revised February 22, 2001.

U.S. Environmental Protection Agency (EPA). (2002) Child-specific exposure factors handbook.National Center for Environmental Assessment, Washington, DC; EPA/600/P-00/002B. Available from: National Information Service, Springfield, VA; PB2003-101678 and <http://www.epa.gov/ncea>.

Young, G. C., and Turner, R. K. (1965). CNS stimulant drugs and conditioning treatment of nocturnal enuresis. *Behaviour Research and Therapy* **3**, 93-101.

CERTIFICATION

The Health Consultation for the Evaluation of Lead and Meth Exposures at the Former Immanuel Methodist Church, Boise, Idaho, was prepared by the Idaho Department of Health and Welfare under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.

Gregory V. Ulirsch
Technical Project Officer, CAT, CAPEB, DHAC
Agency for Toxic Substances and Disease Registry (ATSDR)

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

Alan Yarbrough
Team Leader, CAT, CAPEB, DHAC, ATSDR