

# Letter Health Consultation

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Wipe Sample Data Evaluation

WAUSEON FIREWORKS SEIZURE

WAUSEON, FULTON COUNTY, OHIO

**Prepared by the  
Ohio Department of Health**

MARCH 24, 2010

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

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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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LETTER HEALTH CONSULTATION

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WAUSEON, FULTON COUNTY, OHIO

Prepared by:

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

Ms. Kim Cupp  
Environmental Health Director  
Fulton County Health Department  
606 South Shoop Avenue  
Wauseon, OH 43567

Dear Ms. Cupp:

This letter is in response to your request to review and comment on wipe sampling results from a Wauseon, Ohio home where there was a seizure of materials used in making fireworks. The Ohio Department of Health's Health Assessment Section (HAS) evaluated the U.S. EPA data for this site in order to make a public health assessment and a recommendation.

Included below is the information that ODH reviewed in order to evaluate this site:

1. Laboratory results of five wipe samples for metals
2. List of compounds recently delivered to the address
3. Photos of the basement and sampling areas

### **Background and Statement of Issues**

The site is a home in Wauseon, Fulton County, Ohio, where the State Fire Marshall and AFT performed a seizure of materials used in illegal fireworks manufacturing. It was implied that there was material "caked" over the walls, inside the furnace, etc. and that the house would not be released to the homeowner until it was cleaned. The Fulton County Health Department requested assistance from the Ohio EPA, who in turn contacted the U.S. EPA. The U.S. EPA was permitted access to the house to assess the area and found settled dust left behind. The photo images of the basement work area show a light dusting of material on book shelves, toys, and PVC piping. The U.S. EPA collected four wipe samples in the basement and one sample from the register in the living area of the house. All sample areas were as close to 10 cm by 10 cm as possible. However, the U.S. EPA could not conduct air sampling, which would have been preferred (Wolfe 2009).

The U.S. EPA analyzed the wipe samples for 23 metals, as metals make up the majority of the components that were present. There were no bulk materials to analyze for other contaminants, such as accelerant or explosive material for fireworks.

### **Discussion**

It is difficult to evaluate the wipe sample results from the Fulton County fireworks case. Few metals have surface action levels established by regulatory agencies. In the U.S., lead and beryllium have surface dust loading limits, e.g., lead sampling in homes has EPA national standards, which were adopted by and implemented in Ohio. Wipe sampling also has some

application in detecting methamphetamine residues in illegal drug labs, but there are no national consensus standards. Wipe sampling is addressed in the EPA laboratory methods manual but is limited to laboratory safety concerns regarding dioxins and furans. The EPA does not recommend that the procedure be extended to other analytes or other situations.

The laboratory gives the results of 23 metals from the wipe samples in micrograms, using EPA method SW6020A/ SW3050B. If we assume that the area per sample was 100 cm<sup>2</sup>, the results can be converted to a sample loading, expressed in mass per unit area. Otherwise, one cannot compare the mass results, except to say that one wipe picked up more material than another. The efficiency of the wiping process would also be affected by the type of surface (smooth vs. rough), so the results need to be interpreted with caution.

### ***Sample Results for Lead***

Of the metals detected in the samples, lead is the only metal that has health-based standards for surfaces (Beryllium was not detected). Lead clearance levels are 40 micrograms per square foot (µg/ft<sup>2</sup>) for a floor, 250 µg/ft<sup>2</sup> for a window sill, and 400 µg/ft<sup>2</sup> for a window trough. Ohio has a health standard of 40 µg/ft<sup>2</sup> for other horizontal surfaces (OAC 2009). If the area was 100 cm<sup>2</sup> or 0.1076 ft<sup>2</sup>, then the results for lead can be converted to a surface loading, expressed in micrograms per square foot, listed in the table below:

<i>Sample #</i>	<i>Sample Location</i>	<i>Lead Result µg</i>	<i>Loading µg/ft<sup>2</sup></i>	<i>Standard µg/ft<sup>2</sup></i>
Wipe 1	Shelf in basement	300	2,800	40
Wipe 2	Model car in basement	58 J	540	40
Wipe 3	Shelf in basement	100 J	930	40
Wipe 4	Exterior of PVC pipe in basement	170	1,580	40
Wipe 5	Exterior of register in living area	ND (100)	ND (930)	40

Source: U.S. EPA 2009

µg/ft<sup>2</sup> – micrograms per square foot

ND – Not detected (Reporting Limit)

J – Detected below quantitation limits

All lead levels in the basement appear to be above health-based limits; however, these calculated values may not be suitable to make a proper health determination. Two of the results are qualified because lead was detected below the laboratory's reporting detection limit. In addition, the laboratory's detection limit is too high in comparison to the standard (930 µg/ft<sup>2</sup> versus 40 µg/ft<sup>2</sup>). The low limit of detection may be due, in part, to the sample area being too small for adequate detection of lead on surfaces. In addition, the analytical method used may not be sensitive enough for the determination of lead.

### ***Other Metals***

Based on the invoices provided to us, the metals that would be expected to be present are primarily aluminum, magnesium, potassium, sulfur, barium, and chromium. Chromium was not detected (DL=1,000 µg) in any of the samples. Magnesium was not detected (DL = 30,000

micrograms) in any of the samples. Potassium was detected in one out of five samples. Sulfur is not one of the analytes on the target analyte list (TAL). Aluminum was detected at levels from 330 (living area) to 13,000 µg (sample 1), and may be residue from the aluminum (flake) source material. The presence of barium in the basement dust samples may be due to barium sulfate, one of the compounds also delivered to the address.

### ***Exposure Pathways***

The exposure pathway investigated here was the ingestion of metals from surfaces particles that may be potentially transferred to hands to mouth, especially by children.

### ***Public Health Implications***

A public health concern can be raised because children could be potentially exposed at this location. Children can be at a greater risk of developing illness due to exposure to hazardous chemicals because of their smaller stature and developing body systems.

Lead is a heavy, low melting, bluish-gray metal that occurs naturally in the Earth's crust but is rarely found naturally as a metal. Because of their behavior and physiology, children are more affected by exposure to lead than are adults and absorb more ingested lead than do adults. Children generally ingest lead-contaminated soil and house dust at higher rates than adults because of mouthing and hand-to-mouth behaviors. The major adverse health effect from exposures to excessive amounts of lead is damage to the nervous system, potentially resulting in lower intelligence and behavioral effects that persist into adulthood (ATSDR 2007a). The amount of lead in the dust on shelves and toys at the Wauseon home is above dust standards for lead. However, the results are questionable and may not be reliable enough to be certain that a hazard exists. As a precaution, all dusty surfaces, such as shelves and model cars in the basement where the fireworks were made, should be carefully cleaned.

Aluminum powder and dust can be a hazard in the industrial environment. Aluminum is not generally regarded as an industrial poison. However, inhalation of finely divided powder has been reported to cause pulmonary fibrosis. It is a reactive metal and the greatest industrial hazards are with chemical reactions. As with other metals, the powder and dust are the most dangerous forms. Aluminum dust is moderately flammable/explosive by heat, flame, or chemical reaction with powerful oxidizers (Lewis 1993). Aluminum is found naturally in the environment but never as the free element. Aluminum is the most abundant metal in the earth's crust. Its concentration in soils varies widely, ranging from about 7,000 to over 100,000 micrograms per gram (µg/g). An aluminum concentration of 25,948 µg/g was reported in house dust from residences in Ottawa, Canada. Exposure to aluminum is usually not harmful, as aluminum occurs naturally in many foods (ATSDR 2008).

The levels of aluminum found in the home are low and are not suspected to be hazardous. Magnesium and chromium, two other metals that would be expected based on the fireworks invoice materials, were not detected. Other metals detected, including copper, potassium, barium, calcium, iron and manganese, were found at very low levels. These elements are not generally harmful and most are essential nutrients needed by the body. Barium compounds that

do not dissolve well, such as barium sulfate (the likely source of barium in this case) are not generally harmful (2007b).

## **Conclusions**

ODH concludes that touching, breathing, or incidentally eating the metals found in the settled dust in the home is not expected to harm people's health. The reason for this is that the amounts of metals in the surface dust, in general, are not significant and many of the metals occur naturally in the environment and/or are essential nutrients. The exception in this case is lead. The presence of lead dust poses a public health concern and is especially harmful to children under 6 years of age. However, surface lead levels, calculated using non-uniform sample areas, may not be sufficient and accurate enough for a reliable health assessment.

## **Recommendations**

ODH recommends that the owner clean up all visible dust on shelves and other surfaces with settled dust, including toys, with an all-purpose cleaner and water. Another option is to use a vacuum with a HEPA filter or a combination of both HEPA vacuuming and wet cleaning. In the meantime, as a precaution, it would be advisable to keep the children out of the basement area where the fireworks were made or stored.

Sincerely,

John Kollman, MS, RS, CIH  
Environmental Specialist

## References

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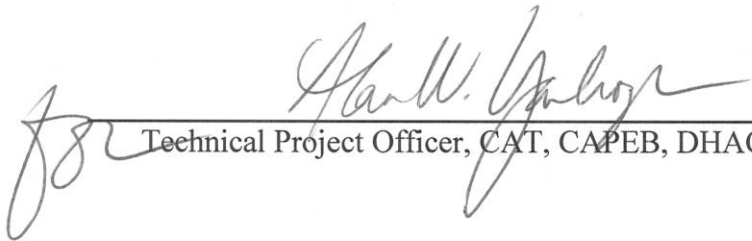
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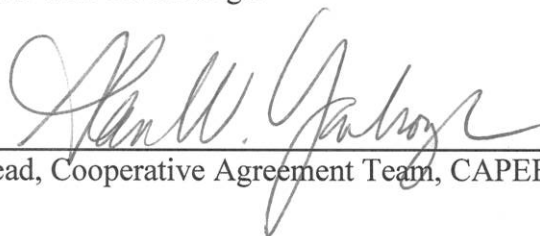


## Certification

The Wauseon Fireworks Site Letter Health Consultation was prepared by the Ohio Department of Health 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 begun. Editorial review was completed by the Cooperative Agreement Partner.

  
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Technical Project Officer, CAT, CAPEB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

  
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Team Lead, Cooperative Agreement Team, CAPEB, DHAC, ATSDR