

**United States Environmental Protection Agency**  
**Region IV**  
**POLLUTION REPORT**

**Date:** Thursday, May 4, 2006

**From:** Glenn Adams

**To:** Katrina Jones, EPA - R4

**Subject:** Final PolRep  
Lilburn Mercury Spill  
Lilburn, GA  
Latitude: 33.8619000  
Longitude: -84.1258000

<b>POLREP No.:</b>	2	<b>Site #:</b>	A4KC
<b>Reporting Period:</b>	09/17/2005 to 03/13/2006	<b>D.O. #:</b>	0205-F4-0035
<b>Start Date:</b>	9/17/2005	<b>Response Authority:</b>	CERCLA
<b>Mob Date:</b>	9/17/2005	<b>Response Type:</b>	Emergency
<b>Demob Date:</b>	10/27/2006	<b>NPL Status:</b>	Non NPL
<b>Completion Date:</b>	3/13/2006	<b>Incident Category:</b>	Removal Action
<b>CERCLIS ID #:</b>		<b>Contract #</b>	
<b>RCRIS ID #:</b>			

#### **Site Description**

On Friday, September 16, 2005, a resident in Lilburn, GA, was vacuuming the living room floor when she noticed small droplets of mercury surrounding the base of a weighted pendulum. The pendulum weight was part of an antique clock in the living room. The pendulum had been removed from the clock cabinet approximately one year ago, when the clock mechanism was removed for off-site repair. The remainder of the clock, which included the pendulum weights and the wooden cabinet, remained in the residence. The weights had remained upright and covered with a metal lid in the corner of the living room. When the resident lifted the pendulum weight to investigate the source of the mercury droplets, approximately 1-2 cups of mercury inside the pendulum weight were spilled onto the living room carpet. Concerned about the potential health hazards of mercury to the family, the resident immediately researched mercury hazards on the internet and contacted local, State, and private entities. Due to the volume and complexity of the spill, it was suggested that the resident notify the National Response Center (NRC).

On Saturday, September 17, 2005, the resident and her father attempted to collect the spilled mercury with a metal spoon and a syringe. The collected mercury was placed in a metal bowl outside. Additionally, the resident pulled up a portion of carpet from the corner of the living room. The resident visually observed mercury on the particle board subfloor. Additionally, the resident noticed mercury descending through cracks in the subfloor to the basement. The resident attempted to prevent mercury from reaching the basement floor by placing plastic sheeting on the basement ceiling. Following these efforts, the resident contacted the NRC.

On September 17, the EPA Region 4 Duty On-Scene Coordinator (OSC) dispatched a EPA Region 4 OSC and Weston Solutions, Inc., the START-2 contractor. Weston was tasked to mobilize to the residence and provide EPA with technical assistance, including remediation strategies, documenting site activities, and operating the Lumex® RA-915 Mercury Vapor Analyzer ("Lumex") to monitor the air and personal property for mercury contamination. Additionally, EPA tasked Kemron, an Emergency and Rapid Response Services (ERRS) contractor, to provide cleanup, waste removal, and disposal services.

The residence is a three-level single family home situated on approximately 0.5 acre. The residence is normally occupied by two adults and four children, whose ages range from 14 months to 8 years old. The family had no pets. During emergency response activities, the residents voluntarily lived with a relative off-site.

#### **Current Activities**

At 18:50 on Saturday, September 17, 2005, EPA and START-2 arrived at the residence. EPA and START-2 monitored each room in the house for mercury vapor. The temperature inside the house was at 84°F and

the background outdoor mercury vapor concentration was at 34 ng/m<sup>3</sup>. The initial concentrations ranged from 67,840 ng/m<sup>3</sup> in the dining room to 30,070 ng/m<sup>3</sup> in the basement. Additionally, mercury droplets were visually observed in the living room and basement.

Based on these concentrations and the presence of mercury droplets, EPA planned an emergency response strategy that involved bringing in EPA's ERRS contractor to conduct the cleanup, voluntary relocation of the residents during initial clean-up actions, comprehensive monitoring and sampling, and removal or remediation of contaminated items.

Both chemical and physical removal procedures were employed during clean-up activities. During initial clean-up or wherever mercury droplets were visually observed, a wettable mercury-sorbent powder was dispersed and the mercury-sorbent complex was removed either with a mercury vacuum or a wet rag or mop (mop water was collected and staged in a 55-gallon drum; prior to disposal, a water sample was collected and sent to a laboratory for mercury analysis). The room temperature was then increased to approximately 80-90°F and maintained at this temperature for up to 6 hours while also being ventilated. Following physical and chemical removal actions, selected surfaces known to have been in contact with mercury received further treatment.

All items removed from the residence were placed outside on visqueen for at least 24 hours. Following aeration, the items were placed in plastic bags, and the bags were sealed and subjected to at least a one-hour heating (80-100°F) period. Following heating, the mercury vapor concentration in the headspace was measured with the Lumex. The aeration process was repeated for all items with a mercury vapor concentration greater than 10,000 ng/m<sup>3</sup>. Items below 10,000 ng/m<sup>3</sup> were returned to the resident (staged inside the screened porch).

ATSDR was consulted various times during the response. The consultations were on the phone and on the site of the response. EPA and ATSDR both agreed that the final testing in the house would be conducted under normal living conditions.

On Tuesday, September 27, 2005, the analytical laboratory reported the confirmation sampling results. The data indicated that the mercury vapor concentration was below the action level on the ground floor and upstairs locations. The concentration was at 431 ng/m<sup>3</sup> in the living room, 415 ng/m<sup>3</sup> in the kitchen, 194 ng/m<sup>3</sup> in the upstairs hallway, and 234 ng/m<sup>3</sup> in the playroom. Based on these results, EPA determined that the ground floor and upstairs level of the home were clean and suitable for occupancy. Additionally, no further clean-up activities were planned for these areas. The remainder of the response focused on the basement.

EPA determined that the mercury released in the upstairs living room had entered the basement by passing through the living room carpet and cracks in the wood floor and subfloor. Additionally, as the mercury dropped to the basement, small droplets landed on the basement ceiling joists and the upper surface of the air conditioning ducts. These visible mercury droplets, as well as mercury embedded in the basement floor, were remediated.

On Monday, September 19, 2005, monitoring without ventilation was conducted. The mercury vapor concentration in the unventilated basement was at 104,000 ng/m<sup>3</sup> (detected with a Jerome). EPA determined that the lower mercury vapor concentration detected on the previous day was a result of dilution with the outside air. Further, the elevated mercury concentration more accurately represented conditions in the basement. EPA planned removal strategies in the basement relative to this elevated concentration.

From September 19, 2005 until October 4, 2005 various attempts were made to clean the basement to acceptable levels of mercury vapor, with levels still above the cleanup level of 1,000 ng/m<sup>3</sup>. Based on the unsuccessful attempts and the data, EPA concluded that long-term ventilation with the high-volume fan was the most effective clean-up strategy. The ventilation system required no maintenance and could be operated by the residents. Further, the residents could enter the basement while the fan was running. EPA informed the residents to leave the fan running at all times. Additionally, EPA informed the residents that more monitoring would have to take place to determine the effectiveness of the ventilation clean-up strategy.

On Monday, December 19, 2005, EPA and START-2 returned to the residence. The fan had been continuously running in the basement since the last visit. With ventilation on, the mercury vapor concentration was at 9 ng/m<sup>3</sup> in the breathing zone and was at 242 ng/m<sup>3</sup> above the floor cracks. The ventilation was then terminated and the room was allowed to equilibrate for one hour. The mercury vapor

concentration after this period was 274 ng/m<sup>3</sup> in the breathing zone and was at 496 ng/m<sup>3</sup> near the floor cracks. Based on these data, EPA informed the residents that confirmation monitoring was appropriate and would occur in the following weeks.

On Wednesday, January 18, 2006, EPA and START-2 returned to collect confirmation samples. The basement was heated with electric and gas heaters between 75 and 80°F and ventilation was terminated according to standard operating procedures, as previously described for confirmation sampling. In addition to confirmation sampling, the mercury vapor concentration was measured with the Lumex. During the confirmation sampling period, the mercury vapor concentration was at 539-842 ng/m<sup>3</sup> in the breathing zone. START-2 delivered the confirmation samples and a background sample to A.E.S. Laboratory for total mercury analysis.

The laboratory reported that the mercury concentration in the basement was at 412 ng/m<sup>3</sup>. Based on these results, EPA informed the residents that the basement was clean. No further clean-up action was necessary in the basement. However, EPA recommended to the residents that they should continue ventilating the basement using the high-volume fan.

### Key Issues

It was confirmed during this response that the Lumex is more than adequate to perform clearance monitoring as long as the same time protocols are followed as required by NIOSH 6009 (6 to 8 hours). Also, it was determined that high volume ventilation over a long term period of time (several weeks to months) can significantly reduce mercury vapor levels when conventional cleanup techniques do not attain acceptable mercury vapor concentrations.

### Estimated Costs \*

	Budgeted	Total To Date	Remaining	% Remaining
<b>Extramural Costs</b>				
ERRS - Cleanup Contractor	\$125,000.00	\$28,000.00	\$97,000.00	77.60%
RST/START	\$75,000.00	\$25,000.00	\$50,000.00	66.67%
<b>Intramural Costs</b>				
USEPA - Direct (Region, HQ)	\$50,000.00	\$10,000.00	\$40,000.00	80.00%
<b>Total Site Costs</b>				
	\$250,000.00	\$63,000.00	\$187,000.00	74.80%

\* The above accounting of expenditures is an estimate based on figures known to the OSC at the time this report was written. The OSC does not necessarily receive specific figures on final payments made to any contractor(s). Other financial data which the OSC must rely upon may not be entirely up-to-date. The cost accounting provided in this report does not necessarily represent an exact monetary figure which the government may include in any claim for cost recovery.

### Disposition of Wastes

Solid and liquid wastes that were generated during the clean-up were placed in eleven 55-gallon drums. Composite samples were collected from the drums. Samples were placed in separate 32-ounce glass sample jars. The samples were processed by START-2 and picked up by a representative from A.E.S. Laboratories in Atlanta, Georgia for total mercury and TCLP analyses.

The non-hazardous wastes (9 55-gallon drums) were disposed of at EQISATLANTA, Atlanta, Georgia, while the hazardous waste (4 55-gallon drums) was disposed by EQIS at the Michigan Disposal Waste Treatment Plant, Belleville, Michigan. One 1-gallon bucket contained universal mercury and was suitable for recycling and was taken to Omni Waste, 1501 Omni Way, St. Cloud, FL.

[response.epa.gov/LilburnHgSpill](http://response.epa.gov/LilburnHgSpill)