Practical Application of Safety and Health Principles at Chemical Removal Sites with Residential Exposures

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ABSTRACT

Local, state and federal hazardous materials incident responders are often faced with unique technical questions for which the established support structures do not provide a ready basis for a consensus decision on which way to proceed. In the two situations discussed in this paper examples of these types of technical concerns are provided based on real examples and the actions taken are described. Many of these problem areas arise due to the lack of consensus standards for short-term public exposures to recognized industrial chemical hazards. Other problem areas identified include lack of access to necessary public support agencies and deficiencies in communication with exposed residential occupants.

INTRODUCTION

The author is an On-Scene Coordinator (OSC) for the U.S. Environmental Protection Agency in Kansas City, Kansas, and as such has the responsibility to provide technical assistance and hazardous materials response mitigation funding for state and local responders in the states of Iowa, Kansas, Missouri, and Nebraska under the provisions of the Oil Pollution Act and the Comprehensive Environmental Response, Compensation and Liability Act. This paper provides a discussion of the procedures and actions followed at two such recent responses where public exposures were a consideration.

Handy Street Site, Sikeston, Missouri

The local law enforcement agency in Sikeston was contacted by 911 by a local resident to respond to a vandalism call at an abandoned pole barn-type storage structure in a lower middle class neighborhood. The responding officer investigated the sheet metal covered wooden structure and discovered that a quantity of deteriorated cardboard boxes labeled "Poison B, Calcium Arsenate" were stored in a loft in the structure. Some of these boxes had been broken into and the fine pinkish white powdered material was spread around a portion of the structure. The former owner of this site was incarcerated at a Federal penitentiary in Marion, Illinois, and disclaimed any knowledge of the presence of the calcium arsenate. The original manufacturer of the material, FMC Corporation, declined to provide any technical or financial assistance with this effort. The local public safety agency secured the site with banner cord and requested additional assistance from the state and federal support agencies. The local agencies were aware of the training and equipment requirements for hazardous materials response but had made a conscious decision they could not afford the time and financial investment required to develop and maintain a hazardous materials team. This incident was the first hazardous materials situation, other than vehicular fuel, in their jurisdiction in a three year period. A Unified Incident Command system consisting of local, state and federal responders was

established with the local senior public safety officer serving as the Incident Commander. The local public agency also provided the public information officer and logistical support functions.

The plan of action which was developed called for the calcium arsenate materials to be immediately overpacked in steel drums and taken off-site for temporary storage at the local fire station pending disposal. This was performed by a contractor with state emergency funds. Overview of the contractor in the hot zone area was provided by the federal OSC. Disposal was to be arranged and disposal costs borne by federal Superfund monies. The concerns raised during the development of the action plan included:

1. Lack of real-time monitoring capabilities for arsenate salts.
2. Lack of short-term exposure guidelines for arsenates for residential neighbors, including several small children.
3. Lack of a local management structure for temporary evacuation of nearby residents and support for the evacuees until returned to their residences.

The contractor employed portable high efficiency particulate air movers to minimize the risk of spreading the arsenate salt throughout the neighborhood during the overpacking. All handling actions were conducted with the building sealed as well as possible. Personal monitoring pumps with appropriate filter pads were used both in the structure and outside to determine if exposures had actually occurred. Exposures inside the structure during the overpacking were as high as 10 mg/m^3 for arsenic while outside monitors were nondetect at 0.005 mg/m^3 for arsenic. Overpacked materials were moved by city vehicles to storage pending disposal arrangements.

The assistance and coordination of the local officials in the Incident Management system were essential for the smooth functioning of this removal action. The Incident Commander's positive support in contacting local elected officials and area residents to indicate his assurances that the plan of action would not cause exposures of local residents and subsequent dissemination of the exposure data were a major contributing factor to the public acceptance of the actions taken.

Davenport Mercury Site, Davenport, Iowa

At about 10:00 a.m. on a Friday the Davenport Fire Department responded to a call from a local citizen about a mercury spill. The situation they found was that several pre-teen children living in a four-unit apartment complex had obtained an estimated 12 to 15 pounds of metallic mercury in a two-liter soda bottle. They had played with the material at several locations in the yard of the apartment complex and had spilled quantities of the material on sidewalks, grassed areas, used tires and wheels, and hubcaps. When discovered by one of the parents, they poured the remainder of the material in a commercial trash dumpster at the rear of the apartment. Initial advice from the fire service hazardous materials team was to wash the children thoroughly and package their clothes and shoes in plastic bags until additional information could be obtained. The fire service hazmat team also donned impermeable garments and crawled the perimeter of the spill areas until they visually identified the boundaries of the release. This area was cordoned off with banner guard and the fire service stayed on the site until assistance was obtained. Because of the anticipated cost of the clean-up the local fire department requested assistance from EPA through the state of Iowa emergency response coordinator. The OSC mobilized contractor resources and arrived at the site at 4:00 p.m. on the same afternoon. Initial efforts included repeated applications of Mercury Sorb™ to all visible areas of liquid mercury to reduce volatilization and seepage into soil areas. The plan of action called for manual excavation of contaminated soil areas and containerization of the excavated soils for off-site disposal. Soil was excavated to a depth of about three inches starting from the

exterior of the areas identified by the Fire Department to the center of each contaminated area. The entire contents of the trash dumpster were also containerized. Worker exposure and residential contamination were evaluated with a gold-film mercury vapor monitor. This monitoring disclosed several interior areas of contamination in excess of three times the Permissible Exposure Level (PEL). The children's clothes were also found to be contaminated. Some of the immediate problems were:

1. The primary language of the residents appeared to be Spanish. Their response to any and all inquiries to where the material was obtained was "*No Habla Englais.*" Neither the OSC nor the responding Davenport Fire Department Hazmat staff were conversant in Spanish.

2. The residents declined to give up the children's clothes and contaminated bath rugs for disposal when they were found to have levels of mercury above the PEL. Neither the fire department nor the OSC has authority to seize private property. The Incident Command team discussed the option of having the local Social Services provide assistance but no prior arrangements had been made to obtain these services on a holiday weekend and the fire department representatives declined to contact Social Services.

3. Analysis of samples from excavated areas taken to document that the removal met the cleanup levels specified by the Agency for Toxic Substances and Disease Registry (ATSDR) required 72 hours after delivery to a laboratory over a hundred miles away. The OSC was faced with a decision of whether to hold the excavated areas open for 72 hours and retain a contractor crew on site on overtime for restoration or restore immediately and face the potential of having to return to the site at a later date and reclean the contaminated areas. Involved in this dilemma were also considerations of temporary evacuation of the residents until the job was completed.

The Davenport Fire Department representatives stayed on site for the duration of the cleanup to participate in command decisions and to serve as Public Information Officer. The excavated areas were backfilled immediately after excavation and sampling and resodded to original appearance. Those contaminated clothes which were voluntarily given up were containerized with excavated soil, interior mercury vacuum wastes, used protective clothing for cleanup workers, and the contents of the trash dumpster for a total of 15 drums of waste. The sealed waste containers were stored, pending disposal, in a secure area by the Davenport Fire Department. The cleanup efforts were completed at 2:30 p.m. on the following day and the OSC and contractor crews returned to their stations.

CONCLUSIONS

Each emergency scene has some unique aspects to it caused either by the location, materials, or participants. Some of these problems seem to recur with some frequency. Problems which occur with some frequency include:

1. Lack of real-time monitoring capability to measure responder and general public exposures.

2. Lack of firm short-term exposure guidelines for the general public which would provide for a clear decision matrix for both the cleanup and evacuation decisions.

3. Lack of timely analytical services for cleanup verification.

There is a need for response organizations to make an effort to document these problems and the solutions developed on scene to prevent unnecessary repetition of the delays and additional costs incurred when these problems arise during a chemical response.

KEY WORDS

Hazardous Materials
Calcium Arsenate
Mercury
Public exposure
Real-time monitoring

Elements of Exercise Programming

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