In-Station Training

TM 23-29 Mercury Spill

Author

Chief Ed Hartin

Purpose

Firefighters and fire officers commonly respond to hazardous materials incidents involving gasoline, diesel fuel, propane, natural gas, and carbon monoxide. When confronted with a hazardous materials incident involving a less familiar material, developing an effective incident action plan is challenging.

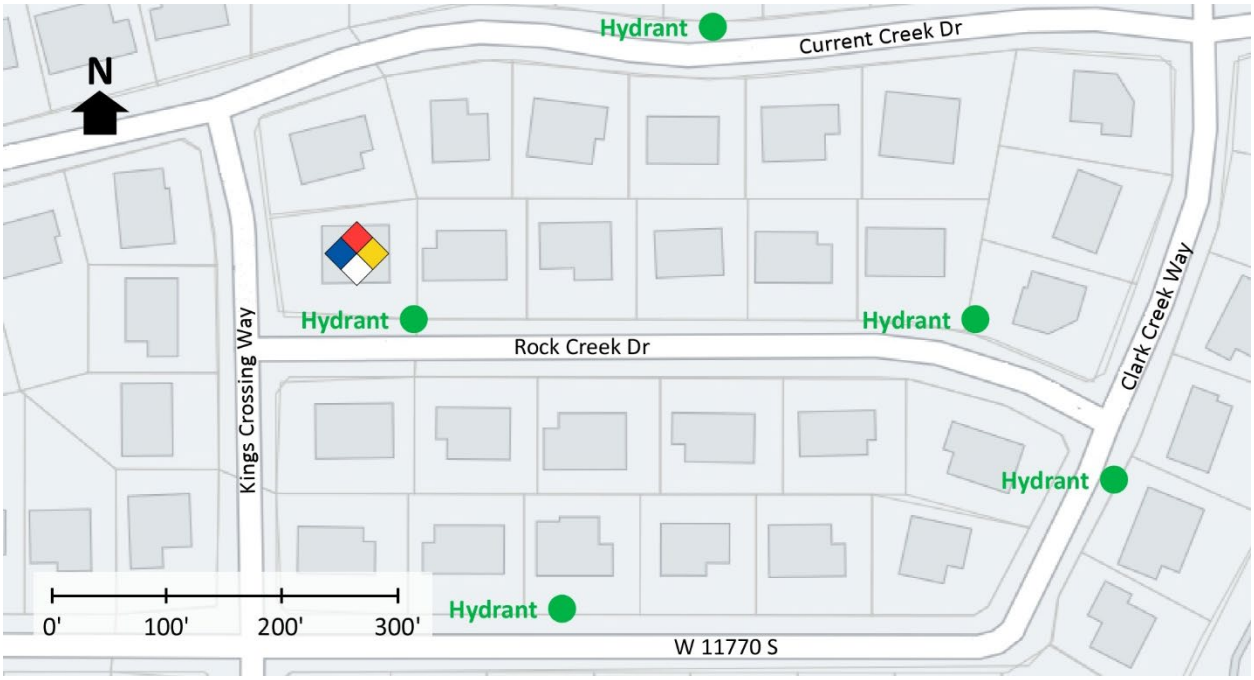
Learning Outcomes

Firefighters and officers perform an effective size-up; select an appropriate strategy, and implement tactics based on the strategic decision-making model when dealing with hazardous materials incidents.

Conducting the Drill

This incident involved a hazmat incident at 2982 Rock Creek Drive, South Jordan, Utah on October 31, 2022, at 17:00 (Porter, 2022; Ellis, 2022; & Graves & Winn, 2022). Review the map and photos (Figures 1-6) to gain an understanding of the area and building involved.

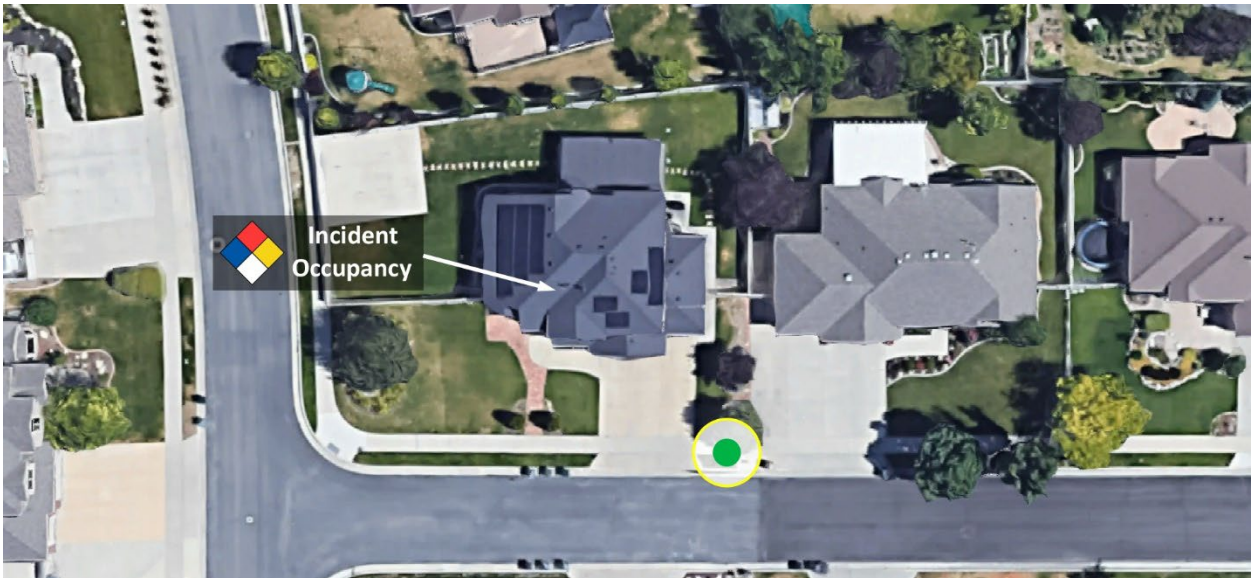
Figure 1. Map of the Incident Area



Note: Adapted from Google. (2023a). [map, 2982 Rock Creek Drive, South Jordan, UT]. https://bit.ly/43cpeyE.

The closest hydrant is located on the Alpha/Delta Corner of the incident occupancy and there are additional hydrants in the area as illustrated in Figures 1 and 2.

Figure 2. Aerial View



Note: Adapted from Google. (2023b). [aerial view, 2982 Rock Creek Drive, South Jordan, UT]. https://bit.ly/3rd7ENO.

The fence on Sides Alpha and Bravo that is visible in Figure 2, was constructed after 2011 and as such is not visible in Figures 3, 4, and 6.

Figure 3. Alpha/Bravo Corner

Note: Adapted from Google. (2011a). [street view, 2982 Rock Creek Drive, South Jordan, UT]. https://bit.ly/44bybtl.

Figure 4. Side Alpha

Note: Adapted from Google. (2011b). [street view, 2982 Rock Creek Drive, South Jordan, UT]. https://bit.ly/3NX8NSE.

Figure 5. Alpha/Delta Corner

Note: Adapted from Google. (2011c). [street view, 2982 Rock Creek Drive, South Jordan, UT]. https://bit.ly/3CV8Bgt.

Figure 6. Bravo/Charlie Corner

Note: Adapted from Google. (2011d). [street view, 2982 Rock Creek Drive, South Jordan, UT]. https://bit.ly/46x3VuF.

You have been dispatched to 2982 Rock Creek Drive for a report of a mercury spill at 17:00. You are the company officer or AIC of the first arriving engine and have your company's typical staffing. The temperature is 63° F with wind from the north at 6 mph (Weather Underground, 2022).

1. What critical factors would you consider when dispatched and during response and what conversations would you have with your crew while responding?

While responding you hear a command officer and another engine with typical staffing for your agency go enroute. Dispatch provides an update reporting a spill of approximately two pounds of mercury inside the home. The second engine will arrive approximately 10 minutes after you, followed by the command officer. With a grided street layout, you have the option of arriving from the south (most direct access) or from the north on Kings Crossing Way.

Use the *2020 Emergency Response Guidebook* (DOT, 2020) and *Pocket Guide to Chemical Hazards* (NIOSH, 2020) to inform your strategic and tactical decision-making.

2. What direction will you approach this incident from and how will you define the initial isolation area (hot zone)?

There is no pre-arrival incident video for this incident. Examine Figure 3 (if arriving from the south) or Figure 6 (if arriving from the north) illustrating conditions on arrival.

3. State your initial radio report (IRR) exactly as you would transmit it to dispatch.

4. What specific actions would you take (as the company officer) immediately upon arrival and exiting the apparatus and what task orders you would give your crew?

The homeowner and her son meet you as you exit the apparatus and advises that her son spilled approximately two pounds of mercury (2.25 fluid oz.) in his bedroom on the second floor while working on a science project examining the reaction between aluminum and mercury[1]. The homeowner says that the mercury spilled on her son's pants and on the desk, chair, and floor in the bedroom.

5. Would you change the action you are taking or modify the assignments given to your crew? If so, what task orders would you provide?

6. State your update report exactly as you would transmit it to dispatch.

7. State the tactical assignment you would give the next arriving engine exactly as you would transmit it.

8. Based on the anticipated effectiveness of your tactical operations, state your conditions, actions, and needs (CAN) report that you would provide to the first arriving command officer as part of command transfer to IC #2?

[1] No information was available about what the mercury was being used for in the incident described in this 10-Minute Training. The scenario provide was developed to create a reasonable context for the incident.

Answer the following questions to examine how you used the resources available to aid in development of the initial incident action plan as well as your choice of strategy and tactics for this incident.

9. What guide number did you reference in the *2020 Emergency Response Guidebook* (ERG) (DOT, 2020)? Was the information useful and how did it inform your decision-making in this incident?

10. Did you locate mercury in the *NIOSH Pocket Guide to Chemical Hazards* (NIOSH, 2020)? What was the difference in naming convention between the ERG (DOT, 2020) and the NOSH Pocket Guide to Chemical Hazards (NIOSH, 2020)? Was the information useful and how did it inform your decision-making in this incident?

11. Did you make entry into the house to perform reconnaissance? Why or why not? If you chose to make entry, what personal protective equipment and atmospheric monitoring devices did you use? Why?

12. What additional resources did you request (if any) and why did you request these specific resources?

Additional Learning: Watch *Looking at Mercury Vapour-Periodic Table of Videos* (Haran, 2015) and *Mercury Vapor Video* (Michigan Department of Public Health, 2014). Then read, *Mercury Spill Information and Cleanup Guidance* (IDEM, 2007).

In the workplace, incidental releases are not covered by the emergency response provisions of *Washington Administrative Code (WAC) 296-824 Emergency Response* (referenced by *WAC 296-305*

Safety Standard for Firefighters). An incidental spill is one that is hazardous, but limited in quantity, exposure potential, and toxicity. Incidental spills have no more than a minor threat to safety and health and have no more than minor effects from the cleanup process. Incidental spills have no potential to become an emergency within a short period of time (Jensen Hughes, 2011 & Clark, 1990). Emergency response to hazardous materials releases is regulated by Washington Administrative Code (WAC) 296-824 (or 29 Code of Federal Regulations (CFR) 1910.120 Hazardous Waste Operations and Emergency Response if in an Occupational Safety and Health Administration (OSHA) state.).

The Washington Department of Labor and Industries (L&I) and federal Occupational Safety and Health Administration (OSHA) regulate the workplace. If a small mercury spill occurred in the workplace and met the definition of an incidental spill, it could be cleaned up by that employer's workers if they were trained to do so. How does this change when they dial 911 and request assistance from a fire and rescue agency? Neither L&I nor OSHA regulate what people do in their homes, but what happened when they called 911 for a fire and rescue agency to respond. Hint, the regulatory provisions for emergency response to hazardous materials incidents apply. How does this impact your initial incident action plan for operations level hazardous materials responders when dealing with a mercury spill (this may be different for gasoline, diesel, propane, or natural gas depending on the training provided to firefighters and officers).

Yet another consideration, what is "mercury"? The term "chlorine" is often used to describe chlorine containing chemicals (such as calcium hypochlorite used in swimming pools) as well as gaseous chlorine. These two substances both present hazards but have considerably different physical and chemical properties. Did you consider the potential for the term mercury to be used for other mercury containing substances such as inorganic or organic mercury compounds? See Methylmercury (Science Direct, 2023) for multiple references on the characteristics and hazards of organic mercury.

References

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