



ANN ARBOR FIRE DEPARTMENT

Standard Operating Procedures – 6.05 Hazardous Materials Response



HAZARDOUS MATERIALS RESPONSE

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 Approved: Fire Chief Mike Kennedy

I. PURPOSE

This procedure provides a basic philosophy and strategic plan for hazardous materials situations. Hazardous materials incidents encompass a wide variety of situations including fires, spills, transportation accidents, chemical reactions, explosions, and similar events. Hazards involved may include toxicity, flammability, radioactivity, corrosives, explosives, health hazards, chemical reactions, and combinations of factors. This plan provides a general framework for handling a hazardous materials incident but does not address the specific tactics or control measures for particular incidents.

Every incident presents the potential for exposure to hazardous materials and the products of combustion of an ordinary fire may present severe hazards to personnel safety.

Adequate situation evaluation is critical. If the wrong decision is made, personnel can easily become part of the problem instead of part of the solution. Any emergency response effort must favorably change or influence the outcome. If the outcome cannot be favorably changed, personnel must withdraw, evacuate endangered civilians, and protect exposures if possible.

This procedure is specifically applicable to known hazardous materials incidents, but it does not reduce the need for appropriate safety precautions at every incident. The use of full protective clothing and SCBA whenever appropriate and the utilization of all SOPs on a continuing basis is the starting point for this plan.

II. WASHTENAW COUNTY HAZARDOUS MATERIALS RESPONSE TEAM

For any significant hazardous materials incident, the Washtenaw County Hazardous Materials Response Team may be requested to respond. It is better to call early and not need the Washtenaw County Hazardous Materials Response Team than to delay their activation.

For incidents where the Incident Commander needs technical assistance or guidance on incident mitigation, a consultation may be solely requested. The consultation will start with a phone call from the director or other team leadership. When the Washtenaw County Hazardous Materials Response Team is called, the AAFD Incident Commander shall retain overall control of the incident. Additionally, AAFD shall remain on-scene and provide whatever support may be necessary to the Washtenaw County Hazardous Materials Response Team.

III. FIRST ARRIVING UNIT

The first arriving officer will establish incident command and begin a size-up. The first unit must consciously avoid committing itself to a dangerous situation. When approaching, slow down or stop to assess any visible activity taking place. Evaluate effects of wind, topography, and location of the situation.



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Command will establish Level II staging for other responding units. Staged companies must be in a safe location, taking into account wind, spill flow, explosion potential, and similar factors in any situation. The DOT guidebook and WISER application may be used to identify staging locations. Units must stage in a safe location taking into account wind, spill flow, explosion potential, and similar factors in any situation.

IV. SIZE-UP

Command must make a careful size-up before deciding on a commitment. It may be necessary to take immediate action to make a rescue or evacuate an area, but this should be done with an awareness of the risk to fire department personnel and taking advantage of available protective equipment.

The objective of the size-up is to identify the nature and severity of the immediate problem and gather sufficient information to formulate a valid action plan. A hazardous materials incident requires a cautious and deliberate size-up.

Command must avoid premature commitment of companies and personnel to potentially hazardous locations. Proceed with caution in evaluating risks before formulating a plan and keep uncommitted companies at a safe distance. Command must identify a hazardous area based on potential danger, taking into account materials involved, time of day, wind and weather conditions, location of the incident, and degree of risk to unprotected personnel. Take immediate action to evacuate and/or rescue persons in critical danger if possible, providing for the safety of rescuers first.

The major problem in most cases is to identify the type of materials involved in a situation and the hazards presented before formulating a plan of action. Look for labels, markers, DOT identification numbers, NFPA diamond, and shipping papers, refer to pre-fire plans and ask personnel at the scene, e.g., plant management, responsible party, truck drivers.

V. ACTION PLAN

Based on the initial size-up and any information available, Command will formulate an action plan to deal with the situation. Most hazardous materials are intended to be maintained in a safe condition for handling and use through confinement in a container or protective system. The emergency is usually related to the material escaping from the protective container or system and creating a hazard on the exterior. The strategic plan must include a method to control the flow or release, get the hazardous material back into a safe container, neutralize it, allow it to dissipate safely, or coordinate proper disposal.

The specific action plan must identify the method of hazard control and identify the resources available and/or required to accomplish this goal. It may be necessary to select one method over another due to the unavailability of a particular resource or to adopt a "holding action" to wait for needed expertise, equipment, or supplies.

At all incidents involving hazardous materials, a safety officer will be established. The safety officer will monitor all activities to ensure that procedures are conducted in a safe manner. The safety officer will intervene and stop any operation that is being performed in an unsafe manner. Upon intervening into any operation, the safety officer will advise Command of the situation.



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The action plan must provide for:

- Safety officer.
- Safety of citizens.
- Safety of firefighters.
- Evacuation of endangered area if necessary or sheltering in place if practical.
- Control of situation.
- Stabilization of hazardous materials, and or disposal or removal of hazardous material.
- Avoid committing personnel and equipment prematurely or "experimenting" with techniques and tactics. Many times it is necessary to evacuate and wait for special equipment or specialty help.

VI. CONDITIONS FOR RESCUE OPERATIONS

The below information based off of information found in "[Risk Assessment of Using Firefighter Protective Ensemble \(FFPE\) with Self-Contained Breathing Apparatus \(SCBA\) for Rescue Operations During a Terrorist Chemical Agent Incident](#)," U.S. Army Soldier and Biological Chemical Command Homeland Defense, Business Unit, Improved Response Program, August 2003.

FFPE (turnout gear) is not a substitute for certified chemical protective clothing, however, in certain emergency response situations the Incident Commander may find himself / herself on the scene, faced with a casualty rescue mission, without certified chemical protective clothing. If a rescue operation with the protective equipment that is readily available (FFPE and SCBA) is performed, SBCCOM's study indicates that the operation should be minimized and should not exceed the constraints outlined in the Incident Commander's Operational Considerations (see below).

The Incident Commanders must be aware that there is a higher degree of risk to firefighters using FFPE and SCBA than there is to firefighters using certified CBRN protective clothing.

VII. OPERATIONAL CONSIDERATIONS

In many instances, firefighters may arrive on the scene of an incident where numerous victims exhibit varying degrees of injury and illness. It may not be immediately recognizable that a chemical agent is the cause of the victim's distress. As such, firefighters possibly will enter a potentially hazardous environment in order to perform rescue of living victims wearing only their basic firefighter protective ensemble (structural turnout gear and SCBA).

Based on the testing performed by the SBCCOM IRP, Incident Commanders have some basic knowledge of the operational limitations of performing quick rescue operations in a chemical weapon environment with FFPE and SCBA. The following basic operational considerations summarize the contents of the report.

- A. The presence of LIVING victims inside the potential hazard area provides the basic indicator for firefighters to assess the level of nerve agent contamination.



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- B. Rescue entry occurs after vapor concentration has peaked (assumed approximately ten minutes after the release of agent).
- C. Firefighters using standard turnout gear and SCBA to perform rescue of KNOWN LIVE VICTIMS can operate in a nerve agent vapor hazard for up to 30 minutes with minimal risks associated with nerve agent exposure.
- D. The risks associated with these 30-minute operations are that 50% of firefighters MAY experience increased sweating and muscle weakness 1-18 hours after exposure.
- E. Firefighters entering a nerve agent environment WITHOUT KNOWN LIVE VICTIMS using standard turnout gear and SCBA should limit their potential exposure to three minutes.
- F. Firefighters searching an enclosed area for victims should immediately exit the area and undergo decontamination if they encounter evidence of chemical contamination and cannot identify any living victims.
- G. If firefighters encounter oily liquid contamination (puddles/drops) and victims report signs of mustard agent (i.e. garlic odor), firefighters and victims should immediately exit the area and undergo decontamination.

VIII. CONTROL OF HAZARDOUS AREA

A hazardous materials incident has three zones associated with the scene. There is the Hot Zone, Warm Zone, and the Cold Zone.

Hot Zone

The Hot Zone is the area in which personnel are potentially in immediate danger from the hazardous condition. This is established by the Incident Commander and controlled by the fire department. Access to this area will be rigidly controlled and only personnel with proper protective equipment and an assigned activity will enter. All companies will remain intact in designated staging areas until assigned. Personnel will be assigned to monitor entry and exit of all personnel from the Hot Zone. The Hot Zone should be geographically described to all responding units and identified with hazard tape, if possible.

Responsibility for control of personnel in this zone includes not only Fire Department personnel, but any others who may wish to enter the Hot Zone (police, press, employees, tow truck drivers, EMS personnel, etc.). Command is responsible for everyone's safety.

Warm Zone

The Warm Zone is the larger area surrounding the Hot Zone in which a lesser degree of risk to personnel exists. All civilians would be removed from this area. The area to be evacuated depends on the nature and amount of the material and type of risk it presents to unprotected personnel, e.g., toxic, explosive. In the Warm Zone certain activities may take place, such as contamination reduction, site survey, etc. All personnel in the Warm Zone will wear appropriate level of personal protective equipment for the hazards present. In some cases, it is necessary to completely evacuate a radius around a site for a certain distance.

In other cases, it may be advisable to evacuate a path downwind where toxic or flammable vapors may be carried (and control ignition sources in case of flammable vapors).



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When toxic or irritant vapors are being carried downwind, it may be most effective to keep everyone indoors with windows and doors closed (sheltering in place) to prevent contact with the material instead of evacuating the area. In these cases, companies would be assigned to patrol the area assisting citizens in shutting down ventilation systems and evacuating persons with susceptibility to respiratory problems.

Cold Zone

The Cold Zone is the area outside of the limits of the Warm Zone. All other incident activities, including Command, should be located in the Cold Zone. All non-essential personnel, staged companies, and the public should be in the Cold Zone.

IX. GENERAL FACTORS TO CONSIDER

Using turnout gear and SCBA, while rescuing known live, viable victims in a chemical agent environment, does not justify performing hazardous material operations, such as agent detection, identification, or mitigation procedures, in other than the appropriate level of Occupational Safety and Health Administration (OSHA) Personal Protective Equipment (PPE) for the estimated hazard.

Due to the wide variety of situations fire department personnel may encounter in dealing with hazardous materials, these considerations will not attempt to provide specific guidelines on any one individual chemical or situation and are not listed in any priority. It is imperative that the first arriving fire department unit determine what hazardous material(s) is involved and how much prior to taking action to stabilize the incident. Call for additional resources.

Entering the scene to make positive identification may be a considerable risk. The danger of explosions, leaking gas, and poisoning may be great. Action taken prior to determining the product involved may be totally wrong and may severely compound the problem.

Transportation emergencies are often more difficult than those at fixed locations. The materials involved may be unknown, warning signs may not be visible, or obscured by smoke and debris, the driver may be killed or missing. Department of Transportation hazardous materials marking systems are inadequate because some hazardous materials in quantities up to 1,000 lbs. do not require a placard. There may be combinations of different hazard classifications involved with only a "dangerous" placard showing. The DOT placarding system only identifies a primary hazard classification for most hazardous materials. All hazardous materials have secondary hazards which are generally not indicated by placards.

At the termination of an incident, ensure that all of the necessary information is collected for use during a debrief of the incident. As soon as practical, a debrief of every hazardous materials incident will be scheduled and conducted in accordance with federal OSHA regulation 29 CFR 1910.120.

Call for additional resources when their need is anticipated. The actions taken by the fire ground Incident Commander in the first few minutes of an incident affects the outcome more than any other single factor.



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X. MERCURY

Mercury is a heavy, silver metal that is liquid at room temperature, which can slowly change from a liquid to a gas at room temperature. Mercury is a potential hazard to people who are exposed to it, especially pregnant women, infants and young children. The most common way that people are exposed to mercury in their home is by breaking a thermometer that contains mercury.

Anyone contacting the fire department for information regarding the disposal of mercury i.e. thermometers shall be referred to the Washtenaw County Environmental Health Division at (734)222-3800.

AAFD does not possess equipment to monitor mercury vapors or mitigate mercury spills. AAFD personnel shall not clean-up or dispose of mercury. If dispatched for a reported mercury spill, personnel shall use the following procedures.

- A. Dispatched unit will respond normal traffic to any reported mercury spill.
- B. Close off the area immediately to people and animals.
- C. Contact the Washtenaw County Hazardous Materials Team for consultation. This is not a full team activation.
- D. Turn down the temperature or lower the thermostat. Temperature should be maintained below 65° Fahrenheit.
- E. Open windows and ventilate the area.

For small spills, e.g., thermometer, the occupant may be able to clean-up by themselves using information that is available online from the Michigan Department of Community Health. If it is a large spill or the occupant is not comfortable cleaning up the spill, a professional clean-up contractor is recommended.

A mercury spill that equals or exceeds one pound (>2 Tablespoons) is considered a “large” spill. For a release to the environment of one pound or more, it is mandatory under federal regulations to call the numbers listed below:

National Response Center (NRC) (800)424-8802
DEQ’s Pollution Emergency Alerting System (PEAS) (800)292-4706
Washtenaw County Environmental Health Division at (734)222-3800