



Chemical Spill Response Training

Course Objective

This course is designed to provide employees assigned in responding to hazardous spills with knowledge & skill to protect themselves and limit the potential environmental impact.

Regulation of Chemical

The Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

- Is an internationally agreed-upon standard managed by the [United Nations](#) that was set up to replace the assortment of hazardous material classification and labelling schemes previously used around the world. Core elements of the GHS include standardized hazard testing criteria, universal warning pictograms, and harmonized safety data sheets which provide users of dangerous goods with a host of information. The system acts as a complement to the [UN Numbered](#) system of regulated hazardous material transport. Implementation is managed through the [UN Secretariat](#). Although adoption has taken time, as of 2017, the system has been enacted to significant extents in most major countries of the world. This includes the [European Union](#), which has implemented the United Nations' GHS into EU law as the [CLP Regulation](#), and United States [Occupational Safety and Health Administration](#) standards.

The Responsibilities

- The operators are responsible for:
 - Ensuring spills are reported or cleaned up in a timely manner
 - Cleaning up nuisance spills of materials in their area
 - Knowing the properties of the materials they are working with (MSDS)
 - Taking reasonable steps to prevent spills

The Responsibilities – *contd.*

- Knowing what appropriate work practices are & use them
- Knowing what the worst case scenario is for a spill of the chemicals you use
- Think about how you will react to a spill of the materials you use
- Knowing what appropriate clean-up procedures are for the materials you use

The Responsibilities – *contd.*

- ❑ Hazardous Material Response Team will:
 - Assist operator who are not comfortable cleaning up spills in their areas (even nuisance spills)
 - Clean-up serious (HazMat) spills



Potentially Hazardous Spills

- Chemicals can be radioactive, toxic, corrosive, flammable, explosive or carcinogenic
- The nature of a spill, whether minor or major, is determined by the risk of the chemical spilled, the volume and the location of the spill
- Another common concern over chemical accidents and spills is short term toxicity
- Chronic or long term toxicity such as exposure to carcinogens may result in cancer 10 or 20 years after the time of the spill although exposure does not result in short-term health problems
- The potential for slipping and falling over uncovered spills such as acids which can cause the floor to be very slippery

The Hazards

- Toxic
- Flammable
- Caustic
- Reactive/Explosive
- Others – radioactive, carcinogenic, biological



The Hazards – *contd.*

Toxic Materials

Assessing the risks due to the toxic effects of biological/chemicals

- Route of exposure
- Acute Toxicants
- Corrosive Substances, Irritants and Allergens
- Carcinogens
- Infectious materials

The Hazards – *contd.*

Examples of materials with a High Level of Acute Toxicity

- Acrolein
- Diazomethane
- Hydrogen cyanide
- Hydrogen fluoride
- Biological toxins; Tetrodotoxin
- Osmium tetroxide
- Beta-mercaptoethanol

The Hazards – *contd.*

Flammability Hazards

- Location
- Ignition sources
- Ventilation
- Other fuels in the area
 - Do not place more than 10 gallon flammable liquids outside of flammable liquid storage area



The Hazards – *contd.*

| Chemical | Flash Point |
|---------------|-------------|
| Acetone | -2.2 F |
| Acetonitrile | 42.0 F |
| Methanol | 51.8 F |
| Diethyl Ether | - 54.0 F |
| Gasoline | - 45.0 F |

Flammability Hazards

Flash Point - The lowest temperature at which a liquid has sufficient vapor pressure to form an ignitable mixture with air near the surface of the liquid

The Hazards – *contd.*

Caustic Chemical Hazards

Acids & Bases (organic and inorganic) example:
Hydrochloric Acid (HCl), Sodium Peroxide
(NaOH)

- Skin burns
- Permanent eye damage
- Inhalation hazards

The Hazards – *contd.*

Where to obtain hazard information on the materials you use?

→ The Material Safety Data Sheet (MSDS) / Safety Data Sheet (SDS) of the chemical provided by the manufacturer



Type of Spill Emergencies

1. Incidental Spill (Minor)
2. Emergency Spill (Major)

“The quantity of product spilled does not by itself determine if an incidental spill has occurred. Several variables, including the volume of the spill, must be considered ... Examples of other variables include the type of material spilled and the location of the spill.”

**OSHA interpretation letter
July 31, 1990**

An Incidental Release (Minor)

- Does not pose a significant safety or health hazard to employees in the immediate vicinity or to the employee cleaning it up
- Does not have the potential to become an emergency within a short time
- Is limited in quantity, exposure potential or toxicity



An Emergency Release (Major)

According to an OSHA interpretation letter, for the definition of “emergency response” to be satisfied, the release or situation must pose an emergency.

**OSHA interpretation letter
July 31, 1990**

An Emergency Release (Major)

Examples of Major Emergency include:

- It may cause high levels of exposures to toxic substances
- It is life or injury threatening
- It poses Immediately Dangerous to Life and Health (IDLH) conditions
- It poses a fire and explosion hazard
- It requires immediate attention because of danger
- It represents an oxygen deficient condition
- It requires employees to evacuate the area

Factors to Consider

- The properties of hazardous substances onsite, such as toxicity, volatility, flammability, explosiveness, corrosiveness, etc.
- The particular circumstances of the release itself, such as volume spilled, confined space considerations, ventilation, etc.
- Employees' level of knowledge
- Personal protective equipment (PPE) available

Incidental or Emergency Release?

There is no “one-size-fits all” answer to whether a spill is incidental or an emergency release.

- The answer is facility and spill-specific

Emergency Response Procedures

The overall objective of hazardous materials management is to avoid or, when avoidance is not feasible, minimize uncontrolled releases of hazardous materials or accidents (including explosion and fire) during their production, handling, storage and use.



Emergency Response Procedures – *contd.*

Many regulations require facilities to prepare for the “worst-case scenario” spill.

While this is important; according to the National Response Center, most spills in fixed facilities are less than 10 gallons, making response to incidental spills an important consideration.

Emergency Response Procedures – *contd.*

Employees who are trained to clean up incidental spills have the ability to:

- Safely and efficiently clean up incidental spills
- Keep the workplace cleaner and safer
- Minimize slip and fall incidents
- Quickly recognize spill hazards that are beyond the scope of their training.

Emergency Response Procedures – *contd.*

All employees need to be trained on their specific roles and responsibilities for spills.

- Even if the only action an employee will take is to evacuate the area, response plans need to state this
- Plans should also establish exit routes and list the location that employees should report to after evacuating.

Emergency Response Procedures – *contd.*

Because the type of liquid spilled and its quantity play a role in spill response, facility response plans should provide guidance on what is considered to be “incidental” at your facility, and what defines an “emergency response.”



Emergency Response Procedures – *contd.*

There may be different rules for different types of chemical spills within the facility. Example:

- Clean up a 20-gallon spill
- Sound an alarm and evacuate the facility for any ammonia spill



Steps for Incidental Spill Response

1. Determine the scope

Does the spill meet your facility's definition of "incidental"?

- If it does not, follow your facility's procedures for evacuating the area and notifying trained spill responders
- If you are not sure, ask a supervisor.

Steps for Incidental Spill Response – *contd.*

2. Safety First

Life safety is always the top priority in spill situations

- ❑ If it is not safe for you to remain in the area to clean up a spill, the spill may no longer be “incidental”
- ❑ Do not enter a spill area to help victims.
- ❑ Notify trained responders who will be able to do this safely.

Steps for Incidental Spill Response – *contd.*

3. Inform and barricade/block the area

- Notify your supervisor and co-workers in the area of the spill to help avoid slip and fall or other injuries
- Limit or stop foot, cart, forklift or other traffic through the spill area.



Steps for Incidental Spill Response – *contd.*

4. Protect yourself

Don the proper personal protective equipment (PPE) before cleaning up a spill.

Proper PPE may be:

- What you normally wear
- Specialized clothing or protective gear
- Check Material Safety Data Sheets (MSDS) or the facility response plan to be sure.



Steps for Incidental Spill Response – *contd.*

5. Use appropriate spill response materials

Spill response materials include:

- Personal protection equipment:
 - Chemical-resistant gloves, e.g. nitrile rubber gloves.
 - Chemical splash goggles.
 - Face shield.
 - Protective apron.
 - PVC boots.



Steps for Incidental Spill Response – *contd.*

Spill response materials include:

- Chemical absorbents
- Chemical neutralising materials
- Plastic scoop, dust pan, broom or brush with plastic bristles.
- Reagents for decontamination: calcium carbonate, sodium hydrogen carbonate (for corrosive liquid spills).
- Strong, heavy duty leak-proof waste bags, sealing tapes.
- Hazardous waste labels, warning signs.

Note: Before a spill, learn how to use the spill response materials available at the facility.

Spill Cleanup Procedures

Absorbent Pad Spill Kit



1

Place a barrier around the spill

2

Cover completely with appropriate material

3

Clean up

4

Bag and tag for EH&S waste removal



Steps for Incidental Spill Response – *contd.*

6. Decontaminate

After the spill is cleaned up, decontaminate the floor, tools and any other surfaces that were exposed to the spill.



Steps for Incidental Spill Response – *contd.*

7. Bag or containerize wastes

- Clean up used spill response materials
- Properly label disposal bags or containers for the appropriate actions to be taken.



Steps for Incidental Spill Response – *contd.*

8. Restock

Restock or replace items used during the spill response so that materials will be ready for the next incident.



Steps for Emergency Spills (Major)

- Alert everyone in the area to evacuate
- Attend to the injured or contaminated workers and remove them from the area
- If the chemical is flammable, turn off ignition sources, if you can do so safely
- Evacuate, closing door as you exit
- Report spill to immediate supervisor
- Secure supplies & equipment for cleanup
- Don appropriate PPE for spill cleanup



Preventing the Spills

To prevent the spill from happening, the worksite should be examined to identify measures that can be taken to minimize the risk of a chemical spill occurring.

Chemical spills occur during five types of activities;

1. Storage
2. Transport
3. Transfers
4. Usage and
5. Disposal

Note: Extra precautions shall be taken whenever carryout the 5 activities. Follow company's specific procedures in preventing chemical spill.

Spill Kit

Although OSHA and EPA require facilities to be prepared for spills, neither has a comprehensive list of required spill response materials.

- Spill kits are a convenient way to be prepared for spills and comply with various regulations



Spill Kit – *Contd.*

Because spills and levels of training vary, it is the employer's responsibility to determine which materials and tools will work best for their possible scenarios.

Many responders use a variety of materials and techniques such as:

- Absorbents materials
- Neutralizing agents
- Decontamination
- Appropriate hazardous disposal bag



Spill Kit – *Contd.*

Spill kits traditionally contain some or all of the following items:

- Absorbent socks and mats
- Loose absorbents
- Temporary disposal bags
- Plugs, repair items and tools
- Basic PPE

Spill Kit – *Contd.*

When selecting absorbents, make sure that they will be compatible with the liquids spilled.

In general:

- Cellulose-based absorbents are good for noncorrosive spills
- Polypropylene or other “inert” materials are necessary for corrosive spills
- Absorbents do not neutralize a spill or make it less hazardous

Spill Kit – *Contd.*

Spill response items can be housed in cabinets, placed on shelving, stored in plastic containers or bags or kept in cardboard boxes.

No matter what type of container is used, it is critical for workers to easily find and access the materials in the spill kit when they are needed.

Spill Kit – *Contd.*

Personal Protective Equipment (PPE) is often stored with spill response supplies to help ensure that employees have the proper protection when responding to a spill.

- PPE for incidental spills may be as simple as a pair of goggles and gloves.
- Check Material Safety Data Sheets (MSDS) for guidance.

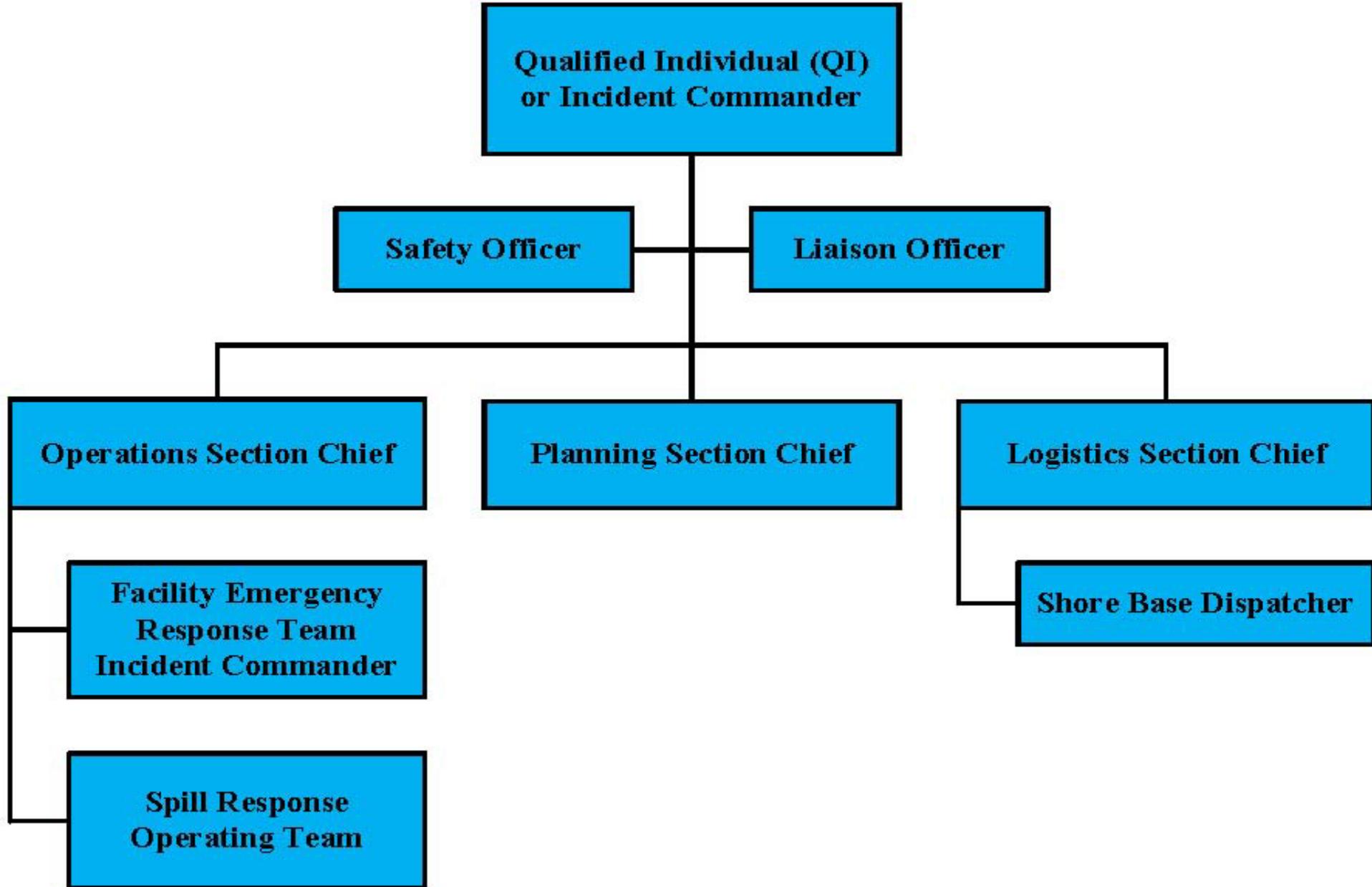


Spill Kit – *Contd.*

Response tools can be stored in or near a spill kit. Common tools include:

- Brooms, dustpans and shovels
- Vacuums
- Drain covers
- Nonabsorbent containment dikes
- Plugs and other patch and repair items
- Wrenches, hammers or other hand tools

Spill Management Team (Example)



Steps for Spill Cleanup at Workplace

DECONTAMINATE - Cleaning a spill means properly cleaning both the clean up crew and their equipment afterwards – involved chemical



Practical

- ER Actions.
- Using correct PPE & Spill Kit
- Cleanup Actions & Handling of hazardous waste disposal