Best Practices for Spill Planning, Reporting, and Response

Scope

The scope of this best practice consists of guidelines that a facility could use to develop their own detailed and specific emergency action plan, procedure, or checklist for effective planning, reporting, and response to chemical and oil spills originating from a chemical facility. It is intended for employees discovering the spill, the response units, and personnel who make agency notifications. This activity is regulated by several OSHA and EPA regulations and the reader must be thoroughly familiar with these or the corresponding regulations for their country. See the section, "Regulatory References in the United States" at the end of this document.

Key Points

- Perform an incident investigation of all spills and releases, regardless of size. Focusing on the small spills will ultimately prevent the larger spills.
- Establish metrics to track and reduce the number of spills.
- Establish a spill table to include all on-site chemicals that have listed reportable quantities. Indicate the reportable quantity for each to facilitate agency notifications when necessary.
- Establish spill kits in strategic locations with booms, absorbents, and other tools needed for spill response.
- If using off-site spill responders, ensure that they are familiar with the site, its hazards, and potential emergencies before a spill occurs.
- Establish metrics to track progress on minimizing spills of all sizes. Consider the Center for Chemical Process Safety (CCPS) guidelines.

Definitions

Spill/release - Any unwanted release of a chemical or oil. These include a liquid release ranging from a drip or greater, a gas release ranging from a "wisp" or greater, and a spill of solids of any quantity. It also includes spills/releases into secondary containment. Best practice is to document and investigate all spills/releases.

Incidental Release - An incidental release is a release of a hazardous substance which does not pose a significant safety or health hazard to employees in the immediate vicinity or to the employee cleaning it up, nor does it have the potential to become an emergency within a short time frame. Incidental releases are limited in quantity, exposure potential, or toxicity and present minor safety or health hazards to employees in the immediate work area or those assigned to clean them up. An incidental spill may be safely cleaned up by employees who are familiar with the hazards of the chemicals with which they are working.

Emergency Release - Some spills will clearly require emergency response by personnel who are trained to don appropriate respiratory protection and other advanced personnel protective equipment. Examples of emergency response spills include high levels of toxic substances,

situations where the permissible exposure limit or limit for immediately dangerous to life and health (IDLH) is exceeded, and fire or explosion hazards, or if the spill is uncontained.

Oil Spill – Oil that is spilled in navigable waters and adjoining shorelines resulting in a sheen, discoloration, sludge or emulsion. Note that EPA broadly defines the term "oil," and it applies to both petroleum and non-petroleum oils (e.g., vegetable oil and tall oil fatty acid).

Training

When responding to an incidental release, some employees will be trained so that they can respond only in a defensive fashion. That is, they can close valves, place absorbent booms, etc., as long as their exposure does not exceed established permissible exposure limits (PEL) for the spilled chemical. For many raw materials and products, there are no established PEL's. A good rule of thumb is simply to avoid exposure to the vapor or liquid that exceeds levels experienced in normal handling. Training in the U.S. includes Hazard Communication and proper use of personal protective equipment.

When responding to an emergency release and defensive response isn't sufficient, "offensive" training is defined in the Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) 29 CFR 1910.120 in the U.S. These personnel could be an on-site team or from an external source such as a local fire department. If using an off-site resource, best practice is to routinely conduct tours and familiarize these responders with the hazards and potential emergency situations well in advance of an actual response.

Notifications and Response

Notifications and response to spills vary according to the quantity and hazards presented. Best practice is for a facility to classify spills indicating the required notifications for each. Most spills are easily handled by personnel on-site and routine notifications. However, some chemicals may be defined as a SARA extremely hazardous or CERCLA hazardous listed chemical. Spilling/releasing more than the reportable quantity (RQ) of any chemical to the environment (directly to the air, soil, river, or marsh) requires immediate reporting to the National Response Center (NRC). For example, a simplified spill classification may look like this:

Table 1 – Sample Notifications for Personnel Discovering a Spill

Spill Classification	Description	Notifications	Typical Actions
Minor/Incidental	<1 gallon*, non-hazardous (e.g. no RQ) on-site	-Record on shift log	-Respond defensively
Moderate	>1 gallon* non-hazardous or any quantity of hazardous material on-site	-Record on shift log -Notify immediate supervision	-Respond defensively. -Invoke HAZWOPER response if needed.
Major/Emergency	Any release off-site to the environment	-Record on shift log -Notify immediate supervision -Notify Environmental Personnel -Notify NRC	-HAZWOPER response. -Oil spill response if an oil is released to a waterway.

*Volume specified is determined by each facility and could be different for each chemical.

As regards chemicals which have a SARA/CERCLA Reportable Quantity (RQ) best practice is to establish a facility-specific table for on-site chemicals that have such RQ's and to list the RQ of each. This list shall be readily available to all facility personnel. Note that if a chemical mixture has a component which is SARA/CERCLA listed, include the quantity of the mixture that would trigger the RQ. RQ's are typically listed in pounds. If it is easier for operators to estimate volumes instead, list the RQ by weight and by volume. If using the Center for Chemical Process Safety (CCPS) classification for types of spills, also include the DOT Packing Group for these chemicals, which is useful in determining whether the spill is a Tier 1, 2, or 3 process safety incident. For more information on CCPS metrics, click on the following link on the American Institute of Chemical Engineers website:
https://www.aiche.org/sites/default/files/docs/pages/ccps_process_safety_metrics_-_v3.2.pdf

Table 2 - Sample Spill Table
SARA Extremely Hazardous and CERCLA Hazardous Chemicals

Hazardous Chemical	**RQ (Per Day), lb.**	**RQ (Per Day). gal.**	**DOT Packing Group**
All chemicals not listed below	None	None	See SDS
Therminol VP-1 (contains 26.5% biphenyl)	370 lb.	42 gal.	III
High/low pH material (pH ≤ 2 or pH ≥ 12.5)	100 lb.	12 gal. @ SG=1	See SDS
Chemical X	5,000 lb.	757 gal.	II
Chemical X containing product, 30%	16,700 lb.	2,350 gal.	II
Chemical X containing product, 45%	11,100 lb.	1,620 gal.	II
Oils (includes fuel oil, tall oil and fatty acids, heat transfer fluids)	NA	1,000 gal. or sheen on river or marsh	See SDS
Potassium hydroxide, 45%	2,220 lb.	183 gal.	II
Sodium hydroxide, 50%	2,000 lb.	158 gal.	II
Sulfuric acid	1,000 lb.	67 gal.	II

Spill Response Outline

Preplan Potential Spill Scenarios:

- Develop scenarios for emergency responders to analyze:
  - Tabletop drills to access hypothetical situations.
  - Hands-on exercises to familiarize emergency responders with spill conditions
  - Surprise drills to access readiness for response.
  - Train responders on calculating volume of liquid materials by using pre-measured containers of water poured on the ground to demonstrate dispersion on ground.
- Include offsite/third-party emergency responders where available to familiarize them with materials used within your facility.
- Critique drills and exercises to identify opportunities for improvement before a spill occurs.
- Develop Chemical Fact Sheets and general spill response templates for materials stored onsite to expedite access to information needed by emergency responders.

Discovery and Initial Assessment of the Situation:

- Determine if there are injuries.
- Identify the spilled material and its hazards.
- Estimate the quantity of material released.
- Determine if the spill is ongoing or stopped.
- Determine if the spill is going "off-site" to the environment (air, waterways, soil, storm drain, etc.).
- Determine if there is danger to equipment.
- Determine what's needed to stabilize the situation. Record spill on shift log.

Notifications

- Contact medical responders if an injury has occurred.
- Contact HAZMAT Team if emergency response is needed.
- Contact immediate supervision as specified by the size and severity of spill.
- In each case above, notify them of:
    - The nature of the spill - what, how much, injuries, etc.
    - The location of the spill or any other pertinent details.
    - Indicate if the spill exceeded the SARA/CERCLA RQ (Reportable Quantity) to the environment.
    - State if assistance is needed stopping the spill.
- Call internal security if actions are needed on their part.
- If RQ is exceeded, the designated individual to call the NRC (National Response Center) within 15 minutes of discovery of the spill. Also contact state and local agencies, depending upon the requirements of your location.
- If oil is spilled to a waterway causing a sheen or any greater quantity, contact the Oil Spill Response Organization (OSRO) in addition to the NRC to start a spill response on the waterway.

Response

- Respond "defensively" if possible. Exposure to the chemical cannot exceed the PEL (Permissible Exposure Limit):
    - turn off valves, deploy absorbent booms, etc.
    - Eliminate sources of ignition, if necessary.
    - Prevent spread of spill to drains, sewers, soil, and off-site locations. Divert spill to spill containment, if this is an option.
    - Contact Waste Treatment Plant personnel to alert them of spills that reach them.
    - Remain available (in person or by radio) to assist Incident Commander.
- Initiate Hazmat response, if defensive response is insufficient.
- Invoke the Facility Response Plan, which is specific to oil spills, if needed.
- Consult with internal environmental personnel on the proper way to clean the spill.
- Properly label and store any containers of spilled material.

Closure

- Classify spill tier level.
- Perform incident investigation.
- Determine disposition of the recovered material.
- Perform post incident review of the response team.
- Re-stock spill response supplies.

Regulatory References in the United States

OSHA: Hazardous Waste Operations and Emergency Response (HAZWOPER) training is covered under OSHA standard 29 CFR Part 1910.120. HAZWOPER standard applies to five groups of employers and their employees and specifically includes any employees who are exposed to hazardous substances and who are engaged in several operations including clean-up, treatment, storage and disposal of hazardous waste. In addition, workers involved in an emergency response operation dealing with hazardous waste and workers who have to perform duties at a waste site where hazardous contamination are equally expected to be fully trained and protected.

EPA (Chemical Spills): The Emergency Planning and Community Right-to-Know Act (EPCRA), also known as Title III of the Superfund Amendments and Reauthorization Act (SARA), requires states and local governments to establish local chemical emergency preparedness programs for their communities. The implementing regulations for EPCRA are found in 40 CFR Parts 300.215, 355, 370, and 372. In addition, the CERCLA release reporting regulations at 40 CFR Part 302 identifies CERCLA hazardous substances and their reportable quantities, referenced in the Part 355 regulations. The consolidated List of Lists can be found at this link: https://www.epa.gov/epcra/consolidated-list-lists-under-epcracerclacaa-ss112r-june-2019-version

EPA (Oil Spills): To prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil, the regulation requires these facilities to develop and implement Spill Prevention, Control, and Countermeasure (SPCC) Plans and establishes procedures, methods, and equipment requirements 40 CFR part 112, Oil Pollution Prevention regulation. In some cases, a separate Facility Response Plan is required under this regulation. Also, 40 CFR part 110, Discharge of Oil regulation, provides the framework for determining whether an oil discharge to inland and coastal waters or adjoining shorelines should be reported to the National Response Center.