



## **APPENDIX V**

# **GASOLINE AND ETHANOL SPILL RESPONSE**



## GENERAL

Gasoline is the highest volume petroleum product transported into Maine ports. Ethanol is also commonly transported by barge or tanker to Maine's marine terminals. Ethanol is added to gasoline at the loading rack to produce various blends of gasoline. The nature of a gasoline and/or ethanol spill response differs in significant ways from a response to a spill of oil. A discharge of gasoline or ethanol will present responders with different challenges and response options than a response to other types of product. This Appendix will outline considerations that must be addressed for all gasoline and/or ethanol releases.

In the case of a gasoline or ethanol spill the foremost priority will be the safety of the public and responders due to the flammability of these products. The second priority is the protection of the environment. A gasoline or ethanol spill can be very dangerous and both responders and the general public need to be aware of how hazardous a situation this may be. Maine has many areas that are environmentally sensitive. During a spill, protection of these areas needs to be considered, but only after life and safety considerations have been addressed.

## SAFETY OF LIFE AND HEALTH

A Site Safety Officer (SSO) must be established prior to any response operations involving gasoline or ethanol spills. The SSO is responsible for ensuring the safety of the public as well as the responders. In accordance with the Incident Command System (ICS) structure, the SSO reports to the On-Scene Coordinator (OSC, if assigned) or Incident Commander (IC).

## RESPONSE CONSIDERATIONS

Responders will utilize the same notification protocols and response management structure outlined in the main body of this Marine Oil Spill Contingency Plan, including use of the Incident Command System (Section 3). Roles and responsibilities and response operations will likewise follow protocols outlined in the main plan with further considerations as outlined below.

Public safety will have priority over environmental protection in the strategic response and deployment of resources. Local fire and police representatives will play a leading role as Incident Commander or within a unified command while significant fire or public safety hazards are addressed. The spill area must be isolated. Ignition sources must be removed, secured, or protected.

A decision must be made to either evacuate the public or to have them shelter in place. Roads will be closed by municipal resources and bridges by USCG 1st District. Local emergency personnel would conduct public evacuation. The Captain of the Port will establish safety zones in navigable waters and/or will close the port.



Air monitoring (area and personal) will be performed prior to site entry as well as periodically during the incident, to ensure site personnel are not over-exposed to hazardous substances. Instruments that may be utilized include combustible gas indicators (CGIs), portable gas chromatographs (GCs), photoionization detectors (PIDs), detector tubes, organic vapor monitors (OVMs), personal air sampling pumps, personal air monitoring badges and tubes, and radiation detectors.

A hazard analysis shall include but not be limited to: ppm levels, lower explosive limits (LEL), benzene levels (for gasoline), and fire/explosion hazards. The exposure route may include: inhalation, absorption, ingestion, and/or eye contact. While gasoline will float on water and quickly evaporate, ethanol is completely miscible in water and presents the possibility of acute toxicity to aquatic organisms, especially in relatively calm or sheltered waters such as coves or marshes.

Personnel should attempt to stay up wind and keep out of low areas. Cold weather will slow the rate of evaporation.

Gasoline:        Class IB Flammable Liquid  
                      LEL - 1.4 % (evacuate at 10% of the LEL)  
                      UEL - or 7.6 %  
                      OSHA PEL - none

Benzene, a component of gasoline, is a clear, colorless, highly flammable liquid with an odor threshold between 1.5 and 119 ppm. Inhalation exposure can cause acute symptoms such as fatigue, dizziness, dryness of the mouth, headache, nausea, stagger and shortness of breath, and irritation to eyes, nose, and throat.

Odor description:	Aromatic sweet odor
Ionization potential:	9.24 eV
Action level:	0.5 ppm
OSHA PEL/TWA:	1 ppm
OSHA STEL:	5 ppm
OSHA IDLH limit:	500 ppm

Ethanol:        Class IB Flammable Liquid  
                      LEL - 3.3% (evacuate at 10% of the LEL)  
                      UEL – 19%  
                      OSHA PEL / NIOSH REL – 1000 ppm

Most SDSs for gasoline or ethanol recommend the following PPE:

- Splash proof or dust resistant goggles
- Impervious gloves



- Respiratory protection would be determined by air monitoring
- Coveralls or other protective clothing (i.e., exposure suits in winter etc.)

The exact PPE shall be determined by considering the following:

- Is there splash potential?
- Is the concentration in air above the action level?
- Is there potential for high levels of vapor in certain work areas or performing certain tasks?
- Is there potential for falls from heights or into a body of water?

PPE shall be re-evaluated when the degree of hazard or tasks change, whenever additional hazards are identified, or when symptoms occur from inhaling gasoline vapors.

## POLLUTION RESPONSE

The evolution of action during a gasoline and/or ethanol spill incident response should follow five basic steps. The steps are Discovery and Notification, Preliminary Assessment, Development of Incident Objectives, Containment and Control, and Conclusion. These steps have been assigned to separate sections for this document. Each of these steps needs to be addressed and each step will need to be tailored to the specific incident.

Discovery and Notification- This step involves identification, the associated hazards, and the degree of hazard. The reporting agency or person will normally conduct this initial step. **THIS STEP DOES NOT INCLUDE RECONNAISSANCE.** Recognition should be general in nature and include the nature of the incident (e.g., damaged barge or overturned rail car in a river) and what material is involved (e.g., placard UN# 1203 for gasoline, or UN# 1170 for ethanol). Once on-scene, the OSC/IC shall identify what hazards may exist (e.g., physical hazard of the tank, chemical hazards, need to evacuate). The OSC / IC shall establish a "Hot Zone", ensure all required agencies (e.g., USCG, NOAA Scientific Support Coordinator) and persons are notified, and designate the personnel or agency to make the initial site reconnaissance and the level of PPE for those responders.

Preliminary Assessment, or Evaluation - This step includes assessing the risks that the situation poses to the public, response personnel, and the environment. This is the step in which initial entry or approach to the site occurs. Response personnel will use analytical techniques to determine the level of contamination and identify the existence of any hazards. The Site Safety Officer will use the information gathered by on-site personnel to identify the level of risk to the public, responders, and the environment. The On-Scene Coordinator, if assigned, will re-evaluate the evacuation policy and set PPE limits for all responders.



Reconnaissance of the spill shall include: identifying the source of the spill, the extent of the area affected by the spill, and the amount spilled. Personnel tasked with reconnaissance shall be provided the proper air monitoring equipment and shall have been properly trained to utilize the equipment.

Development of Incident Objectives and/or an Incident Action Plan– This step includes identifying methods to reduce or eliminate the hazard. This step will be conducted by the Incident Commander or the On-Scene Coordinator as described in Section 5.3 of this Marine Oil Spill Contingency plan.

Containment and Control, or Remediation - In reality, this step and the Evaluation step could happen simultaneously or in reverse order. This step is the physical work of shoring, diking, berming, absorption of material, stabilization of physical hazards, preventive hazing of wildlife, etc. Public safety will have priority over environmental protection in the strategic response and deployment of resources.

Remediation is the long term clean up of a site and may involve such activities as soil removal, dredging, and ground water clean up or other long-term projects. The OSC will ensure the site has been properly cleaned up and taken over by a remediation agency or contractor.

The DEP's policy is to not implement containment booming of a gasoline discharge. (An exception would be the containment booming of debris associated with the spill - degraded Styrofoam from floating docks, etc.) Containment booming will increase the concentration of vapors and increase the probability of creating an explosive atmosphere. The solubility of ethanol renders booming for containment ineffective. The use of diversion boom may be considered in some circumstances.

In open water, allow product to spread out and explosive vapors to evaporate. Booming shall be limited to preventing product from drifting under piers, protecting water intakes and diversion from the public and sensitive areas.

Strategies most commonly implemented include:

- Continuous air monitoring.
- Evacuation/access restriction - A decision must be made to either evacuate the public, or to have them shelter in place.
- Isolation - People and ignition sources must be kept away from the spill.
- Dispersing - using water from fire hoses to push gasoline away from the shore.
- Aeration – In relatively contained areas (coves, lakes), aeration of the water may help to avoid toxicity to fish and other aquatic organisms from ethanol dissolved into the water.



- Suppression – applying aqueous film forming foam (AFFF) on to gasoline to suppress the vapors. Gasoline blends (e.g. E-10, E-15, E-85, etc.) or ethanol will require alcohol resistant AFFF (AR-AFFF).
- Exclusion/protection booming – For protection of water intakes, diversion from ignition sources, to prevent of gasoline from drifting under docks and to implement geographic response plans that protect environmentally sensitive areas.
- Evaporation - Allowing product to evaporate so explosive vapors dissipate and the slick naturally disperses and degrades.
- Containment booming - not the policy of the DEP, however, it may be considered in some circumstances as determined by the OSC.
- Monitoring of the harbor for slicks.
- Monitoring of wharf areas to locate areas of pooling.
- Staying in advance of spill - evacuate/remove equipment/protect (as determined) possible down wind hazard areas

In cold weather ice conditions, where product is trapped beneath or on ice, possible methods:

- Collect contaminated ice for proper handling and disposal.
- Break up ice and allow evaporation.

Conclusion - Once the On-Scene Coordinator or Incident Commander has decided that the site is as clean as reasonably possible, that a hazard no longer exists, or that a proper remediation is under way, they will conclude the incident, ensure the proper funding and legal documentation is completed, and debrief the responders.

## FURTHER RESOURCES

Section 8000 of the [Maine and New Hampshire Area Contingency Plan](#) contains a complete Marine Firefighting Plan.

The Massachusetts Department of Environmental Protection has published an extensive document containing information on emergency response techniques for large volume ethanol spills: <https://www.mass.gov/doc/large-volume-ethanol-spills-environmental-impacts-response-options/download>