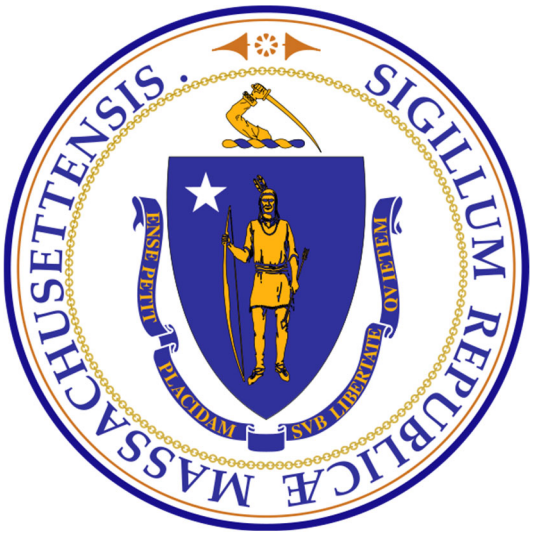
COMMONWEALTH OF MASSACHUSETTS



Large Volume/High Concentration Ethanol Incident Response Plan

August 2025

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

1. INTRODUCTION

This Plan establishes a coordinated framework to support incident/unified commanders responding to large volume and/or high concentration ethanol rail or barge incident occurring within the Commonwealth of Massachusetts. It identifies notification, roles and responsibilities, and resource allocation activities within that support framework. Large volumes of ethanol are commonly shipped by unit trains of up to 3.2 million gallons, and large barges which can transport up to 2.5 million gallons. In Massachusetts, at least two to three ethanol unit trains currently travel through the state per week, as well as one ethanol barge per week. The number of trains and barges transporting denatured ethanol (95%-98% ethanol) through the state are anticipated to increase in the future.

a. Purpose

The purpose of the Massachusetts Large Volume/High Concentration (LV/HC) Ethanol Incident Response Plan is to promote situational awareness and outline the operational activities surrounding a state response to large scale emergency involving ethanol, such as the response to an incident involving railroad tank cars or a barge containing ethanol, within the Commonwealth of Massachusetts.

Note: In this Plan, "ethanol" refers to ethanol made undrinkable by adding 3%–7% gasoline or other denaturants.

The activities conducted by the Commonwealth are intended to support local responders as directed by the Massachusetts Comprehensive Emergency Management Plan (CEMP) and may include activation of Emergency Support Function (ESF) 10 – Environmental Protection and Hazardous Materials, ESF-4 – Firefighting, and other Emergency Support Functions. This Plan intends to provide the information required to refine the plans and procedures documented in the CEMP to address the challenges involved with an LV/HC ethanol incident.

This Plan does not provide in-depth guidance for dealing with related or coinciding activities such as shelter-in-place, public warning, or evacuation operations. Those response elements are covered in the CEMP and supporting annexes. In addition, intentional releases impacting homeland security require a separate response structure than that described in this Plan and close involvement with law enforcement, the Massachusetts State Police (MSP), and the Federal Bureau of Investigation (FBI).

To assist the local on-scene Incident Commander (IC) at an LV/HC ethanol incident the following attachments are provided:

- **Attachment 1** A list of acronyms and abbreviations
- **Attachment 2** Selected References
- **Attachment 3** Information about the general conditions and properties of ethanol and basic information on firefighting and spill response for an LV/HC ethanol spill
- **Attachment 4** Common LV/HC ethanol transportation routes
- **Attachment 5** Contact information for LV/HC ethanol carriers
- **Attachment 6** Information about railroad tank cars
- **Attachment 7** A list of current foam caches
- **Attachment 8** A "Quick Reference" card with key response information

For a more detailed guide to local emergency management and incident command response to LV/HC ethanol incidents, see the Large Volume / High Concentration Ethanol Incident Response Planning Guidance (MEMA, 2025).

b. Scope

This Plan outlines the actions the state intends to take in support of an LV/HC ethanol incident, including mobilizing and providing personnel, equipment, supplies, and other resources as required. The Massachusetts Contingency Plan (MCP: 310 Code of Massachusetts Regulations: Massachusetts Department of Environmental Protection 40.0000 Massachusetts Contingency Plan Subpart C: Notification of Releases and Threats of Release of Oil and Hazardous Material; Identification and Listing of Oil and Hazardous Material and Subpart D: Preliminary Response Actions and Risk Reduction Measures [310 CMR 40.0300 and 40.0400]) governs state participation in the response and recovery process, including long-term monitoring and remediation.

The primary objective for an LV/HC ethanol incident is life safety; secondary objectives are incident stabilization and the protection of property and the environment. To achieve these objectives, the primary response activities include fire control and spill control. **Figure 1** illustrates the progression of a "typical" LV/HC ethanol train derailment involving multiple tank cars where at one tank car was breached in the accident. In nine of eleven recent accidents of this type where tank cars were breached, the ethanol caught fire.

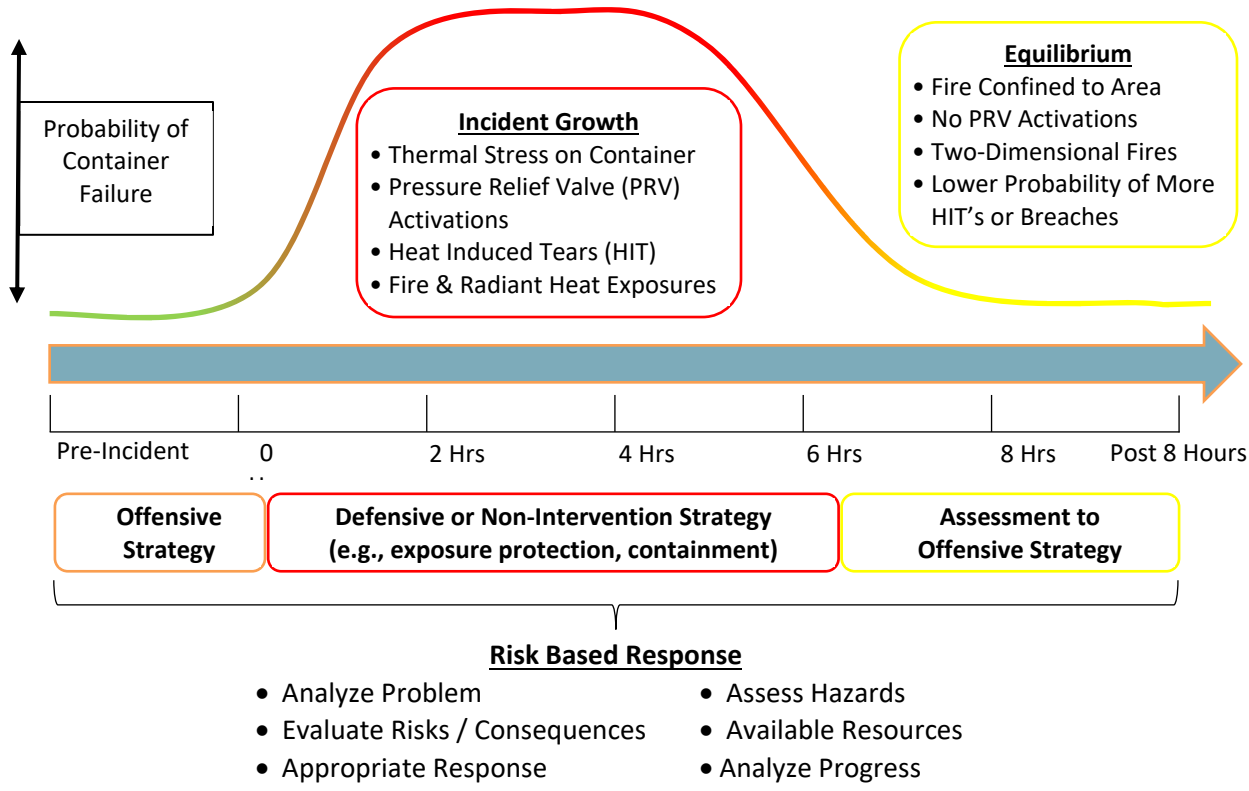


Figure 1 – Response Timeline for Typical Railroad Incident

This Plan addresses actions surrounding an initial response, mitigation activities, and the recovery process for a railroad incident, including the interfacing with the appropriate authority having jurisdiction (local Fire Department [FD], United States Environmental Protection Agency [USEPA], United States Coast Guard [USCG], and/or Massachusetts Department of Environmental Protection [MassDEP]). Additionally, this Plan briefly addresses incidents that may occur offshore or in navigable waters under USCG jurisdiction.

c. Policies

This Plan follows the policies and regulations identified in the CEMP. As an incident requires, and at the direction of the Massachusetts Emergency Management Agency (MEMA) Director or State Emergency Operations Center (SEOC) Director, this Plan will be implemented to support activities related to LV/HC ethanol incidents in the Commonwealth. MEMA will provide overall support and situational awareness to the on-scene IC and/or Unified Command (UC) regarding coordination of the state response to impacted areas of the Commonwealth in the event of an emergency or disaster.

The ESF agencies and organizations detailed in this plan will work collaboratively to support the Annex in accordance with following:

- This Plan supersedes the 2018 Large Volume/High Concentration Ethanol Annex.
- This Plan does not supersede existing local ethanol response plans but rather is designed to supplement and support them. This Plan builds upon established capabilities at the local level.
- The ESF agencies and organizations assigned responsibilities within this Annex will develop and maintain the necessary plans, standard operating procedures, and mutual aid agreements to successfully accomplish assigned tasks.
- MEMA is responsible for overall coordination of this Plan and for coordinating with responsible ESFs to access any additional resources necessary to support LV/HC ethanol incident response efforts across the Commonwealth, such as the response to an incident involving railroad tank cars or a barge containing ethanol.

2. SITUATION AND ASSUMPTIONS

a. Situation

The basic statements listed below describe the situation related to ethanol transport and potential for ethanol transport related incidents throughout the Commonwealth of Massachusetts. These statements lend context to planning for an LV/HC ethanol release.

i. Current Methods for Ethanol Transport

Carriers of LV/HC ethanol typically include railroads and marine vessels, such as tank barges (See **Attachment 4** for common LV/HC ethanol transportation routes). Although on-road tanker transports (i.e., tractor trailer tanker trucks) and tank ships (i.e., tankers – marine vessels for bulk liquids) may be used to transport LV/HC ethanol, these modes are not specifically addressed in the Plan; however, the information provided for rail tank cars and barges, respectively, is generally applicable to these other modes of transport. **Attachment 5** provides contact information for carriers of LV/HC ethanol.

1. Railroad Transport

The most common mode of transporting LV/HC ethanol in Massachusetts is via rail. Commonly referred to as a "virtual pipeline," a single-unit train (typically 80 to 100 tank cars in a unit train) may contain upwards of 3 million gallons of ethanol. In addition, railroads may have one or more tank cars with ethanol on a general consist (i.e., a train hauling mixed freight cars). Railroad tank cars typically have capacities of approximately 24,000 to 32,000 gallons. The most common type of tank car used to transport ethanol since 2015 is the DOT 111, but CJC 1232 tank cars (jacketed and non-jacketed) are also used. Newer, safer DOT 117 tank cars are being phased in for general use for transporting ethanol. Additional information about railroad tank cars that may be used is presented in **Attachment 6**.

2. Marine/Navigable Waterway Transport

On the navigable waterways of Massachusetts, such as along the coast and in Boston Harbor, ethanol is generally shipped in tank barges. Tank barges are non-self-propelled vessels that use tugs to push or tow them through the waters. They have minimal or no crew accommodations onboard and are typically used for inland and coastwise trade. Tank barges used to ship ethanol usually have cargo capacities of 10,000 to 15,000 barrels (420,000 to 630,000 gallons). Additional information about barges that may be used is presented in **Attachment 6**.

ii. Locations Where Ethanol is Transported

Railroad lines that may be used for transporting ethanol pass through densely populated (urban) and less densely populated (rural) areas (see **Attachment 4**). Barges that may be used for transporting ethanol travel through near shore marine (i.e., saltwater) environments. Key factors to be considered for accidents in these different locations are described in the following sections.

1. Urban

Urban environments are characterized by large populations and number of critical facilities that may be impacted by an accident involving LV/HC ethanol. Key factors to be considered for accidents in urban areas include, but are not limited to, the following:

- Fire or the potential for a fire
  - defensive tactics (control and containment),
  - offensive tactics, and/or
  - non-intervention tactics;
- Evacuation
  - hospitals and medical centers,
  - long-term care facilities (nursing homes, rest homes, assisted living),
  - schools and daycare,
  - colleges and universities, and/or
  - residences and businesses; and
- Highway or road closures

- commuter transit (bus, rail).

- Release Containment:
  - flow into storm drains or sewers, and/or
  - flow down streets or natural drainages.
  - into water bodies or waterways,
  - into environmentally sensitive areas

2. Rural

Rural environments are generally sparsely populated areas with fewer facilities that may be impacted by an accident involving LV/HC ethanol. In addition, railroad lines may be in relatively remote locations that are not close to established roads, which may make getting needed resources close to the accident scene difficult. Key factors to be considered for accidents in rural areas include, but are not limited to, the following:

- Fire or the potential for a fire
  - access to incident,
  - allow fire to burn;

- Evacuation
  - hospitals and medical centers,
  - long-term care facilities (nursing homes, rest homes, assisted living),
  - schools and daycare,
  - colleges and universities, and/or
  - residences and businesses;

- Highway or road closures;

- Release Containment:
  - flow into natural drainages,
  - into water bodies or waterways,
  - into environmentally sensitive areas.

3. Marine/Navigable Waterways

Barges that may be used for transporting ethanol generally come through the Cape Cod Canal and into Boston Harbor. Along these navigable waterways, there are generally few or no populations or facilities that may be impacted by an accident involving LV/HC ethanol; however, commercial and recreational vessel traffic, as well as adjacent infrastructure (e.g., bridges, dock/piers) may be affected. Key factors to be considered for accidents in marine environments include, but are not limited to, the following:

- Fire or the potential for a fire
  - allow fire to burn,
  - move vessel to safe location;

- Evacuation

- distance from shore,
- residences and businesses,
- commercial and recreational vessel traffic;

- Bridge or road closures;

- Release Containment:
  - not practicable on water.

iii. Potential Water Contamination

1. Contamination of surface water (drinking or process water intakes)

   A release that enters surface waters may impact drinking water supplies, as well as process water, aquaculture, or cooling water. Specifically, a release may directly enter (e.g., from an adjacent rail line) or flow into a reservoir, lake, stream, river, or other surface water body in the vicinity or upstream of water intakes.

   In water, the ethanol component will readily mix with water and the denaturant will separate and float on the water surface. Therefore, the water users who will be potentially impacted will need to be informed of the incident, so they can determine if their intake(s) needs to be shut down and for how long.

   In addition, impacts from ethanol entering a surface water body may cause significant fish kills. This may be due to direct contact with ethanol or because the natural degradation of ethanol will deplete the oxygen in the water. Furthermore, an ethanol release into a surface water body may impact the recreational uses of the water body.

2. Contamination of groundwater

   Ethanol may also infiltrate into the groundwater and potentially impact groundwater. This may impact public and private water sources for drinking and other uses, so the users will need to be notified. In addition, biodegradation of ethanol in groundwater may release large quantities of methane, so potential long-term impacts, such as methane build-ups in confined spaces (e.g., cellars, basements, under concrete slabs), need to be monitored.

iv. Ethanol Incidents

The Massachusetts Contingency Plan (MCP) and federal regulations (Title 40 of the Code of Federal Regulations Part 110 [40 CFR 110] and 49 CFR 130) require that the responsible party for a denatured ethanol spill (i.e., carrier or facility where the spill occurs) report the spill to MassDEP, the National Response Center (NRC), and other appropriate persons and agencies. The NRC will provide the required notifications to federal agencies, such as USEPA, USCG, FBI, the Federal Railroad Administration (FRA), and National Transportation Safety Board (NTSB) as needed, depending on the location and conditions of the spill.

b. Planning Assumptions

Below is a list of assumptions used when constructing this Plan:

1. LV/HC ethanol incidents may occur at any time with little or no warning.

2. The local on-scene Incident Commander will typically be the chief of the local fire department or her/his designee for a land-based (i.e., railroad) incident.
3. The UC will be established as early as practicable for LV/HC ethanol incidents that involve several jurisdictions and/or several agencies from the same jurisdiction.
4. The initial UC should include fire, law enforcement, emergency medical services, and a representative for the Responsible Party (RP).
5. The carrier is the RP for a release and will provide technical and tactical response resources to mitigate the release and is financially responsible for the response, clean-up, remediation, and recovery.
6. Any response resources can utilize the Association of American Railroads "AskRail" application to access commodity information in immediate time, https://www.aar.org/issue/askrail-app/
7. Local responders have some familiarity with responding to ethanol releases.
8. LV/HC ethanol incidents may overwhelm local and regional responders.
9. It is usually better to control and contain an LV/HC ethanol fire and let it burn out; only attempt fire suppression for life safety (i.e., rescue), if an offensive strategy can be implemented safely.
10. Most fire departments and fire districts will not have sufficient Alcohol-Resistant Aqueous Film-Forming Foam (AR-AFFF) foam concentrate in inventory to deal with an LV/HC ethanol release and fire, such as from a High Hazard Flammable Train (HHFT – for example an ethanol train) derailment or a fire on a barge transporting ethanol.
11. The local on-scene Incident Commander will request mutual aid and Commonwealth of Massachusetts resources, as needed, and representatives of the state agencies may form or enter the UC with the local on-scene Incident Commander.
12. Agencies of the Commonwealth may be requested to provide assistance or response support.
13. Along with resources specifically tailored to HAZMAT response, Commonwealth agencies have additional assets that may be useful when mitigating an ethanol release.
14. At the time of an aid request, state resources may be committed to other emergency response efforts, potentially including coinciding releases.
15. The Commonwealth will prioritize its operational needs and deploy or redeploy assets based on need and availability.
16. The Commonwealth will call upon intra- or interstate mutual aid resources, and the federal government as needed.
17. Proper implementation of local plans reduces or prevents releases and related harmful exposures to the public and to the environment.
18. Use of local and outside resources requires careful coordination.
19. Protective actions for the general population may include in-place sheltering or evacuation.
20. DFS has internal rehabilitation assets that will be automatically deployed for long-term events through their SOG.
21. Newer PFAS free foams require 1.5 to 3 times the amount of foam to reach the same effectiveness

3. CONCEPT OF OPERATIONS

a. General

This section details the concept of response operations, including notifications, activation, response operations, and recovery actions. In **Attachment 8** is a one-page "quick reference" guide for LV/HC ethanol incidents that summarizes the key points of the concepts of operations for local FDs. A checklist for summarizing critical information about an ethanol incident is also presented in **Attachment 8**.

b. Activation

MEMA and other state agencies, such as MassDEP, will start monitoring an LV/HC ethanol incident when they learn of it, such as when a Spill Notification is made to the MassDEP spill hotline that is staffed by the MEMA Communications Center, even if MEMA and/or the state agencies are not formally contacted for assistance. However, the lead response agency (typically the local FD) should specifically notify MEMA of an LV/HC ethanol incident, even if state resources are not initially needed. When the MEMA Communications Center starts monitoring an ethanol incident, MEMA will place the activation of this plan on stand-by status and full activation will depend on how the incident progresses.

The initial notification to MEMA by the lead response agency should include as much of the information shown on the checklist in **Attachment 8** as is available when MEMA is notified; however, the notification to MEMA should not be delayed while obtaining this information.

Once it is determined that the incident will require state support and resources, there are two different paths to activate this plan: through MEMA or through the Fire District Control Point.

i. Activation through MEMA

This plan may be activated by the MEMA Director or SEOC Director upon notification of MEMA of an actual or potential LV/HC ethanol incident. Upon plan activation, if the SEOC is activated, the SEOC will act in a support role for the IC/UC to determine whether additional state resources are required. Massachusetts Department of Environmental Protection will be the lead agency to support ongoing hazmat response. When the need for additional assistance is determined, a resource request will be sent to the SEOC Resource Unit, which will contact the lead state agency for the appropriate agency/ESF to fill the request. Other agencies/ESFs will be activated as needed. Note that calls to the MassDEP Spill Reporting Line are routed through the MEMA Communications Center, which will start monitoring the incident and assessing the need for plan activation.

ii. Activation through Fire District Control Point

Upon the Fire District Control Point receiving notification of an actual or potential LV/HC ethanol emergency, the Fire District Control Point may stand by to activate the Statewide Massachusetts Fire and EMS Mobilization Plan. The Fire District Control Point may then activate the Fire and EMS Mobilization Plan when the local FD requests more resources than can be provided from the mutual aid FDs within the local FD's fire district.

The Fire District Control Point should also provide the information that MEMA requires to determine the need to activate this plan to provide support to the IC/UC in handling the incident.

c. Notification

Although separate reporting requirements under the MCP (MCP: 310 Code of Massachusetts Regulations: Massachusetts Department of Environmental Protection 40.0000 Massachusetts Contingency Plan Subpart C: Notification of Releases and Threats of Release of Oil and Hazardous Material; Identification and Listing of Oil and Hazardous Material and Subpart D: Preliminary Response Actions and Risk Reduction Measures [310 CMR 40.0300 and 40.0400]) and various federal regulations require the responsible party to report to MassDEP and the NRC, emergency responders need only escalate notifications in the event that additional resources may be needed. However, MEMA should be notified directly or through Fire District Control Point of any LV/HC incident. The chain of notification is discussed in the following section.

i. Local Agencies

1. Initial Discovery – A carrier/facility operator, first responder, or member of the general public will likely discover the ethanol release. Note that for a marine incident, the carrier is required to notify the USCG and the public may notify the Massachusetts Environmental Police (MEP), who will in turn notify MassDEP, and other federal and state agencies in accordance with their procedures.
2. Local Notification – Calls from the discovering party to 9-1-1, the appropriate Fire District Control Point, or communication via public safety radio will be the most likely avenue for local FD notification. Note that for an incident on land (e.g., railroads incident) the Fire Chief for the local FD, or her/his designee, likely will be the IC until the UC is established; for a barge incident on a navigable waterway, the USCG will likely be the IC until the UC is established.
3. Regional – Local FD may call for support from adjacent municipalities (i.e., mutual aid), from the Fire District, or directly to MassDEP and/or the regional Hazardous Material Response Team (HMRT) in accordance with local plans and procedures.

ii. State Agencies

1. MEMA – In the event of an LV/HC ethanol incident, MEMA personnel will be notified, as appropriate, via its Communications Center.
2. ESF-10 Primary and Supporting Agencies – The ESF-10 primary agency is MassDEP.
3. Supporting agencies include the Executive Office and Energy and Environmental Affairs (EOEEA), the Department of Fire Services (DFS),the State HAZMAT Team, and Department of Public Health (DPH). These agencies will be notified by MEMA if the activation of ESF-10 is required and will act in coordination with other ESFs so that the various aspects of a response are supported, and specifically ESF-10 coordinates closely with ESF-4. Through MEMA, ESF-10 is the conduit through which state resources are channeled into a HazMat incident response.
4. State Agencies – MEMA will notify state agencies with direct and support roles, as needed, when it is determined that state action is or may become necessary.

5. Executive Branch – MEMA Director/Designee will escalate notification into the executive branch through the Executive Office of Public Safety (EOPPS) Secretary in parallel with the established ESF partner communications processes.
6. Alternate Notification – Due to MCP reporting requirements for the responsible party or requests for assistance from the Fire District, MassDEP may be notified of a release before MEMA is formally notified. Therefore, MassDEP should contact MEMA to confirm it was notified, if MassDEP receives information concerning an LV/HC ethanol incident.

   Note: When there is an ethanol release, the MCP requires the carrier/facility operator call MassDEP Emergency Response after calling 9-1-1. Also, a member of the general public may also contact MassDEP Emergency Response. Furthermore, the carrier may also call the NRC regarding an ethanol release, in accordance with federal regulatory requirements.

iii. Federal Agencies

Federal Assistance – If the carrier calls the NRC to report the ethanol incident, relevant federal agencies (e.g., USEPA, USCG, FRA, NTSB) will be notified by the NRC in accordance with federal regulations.

MEMA may request federal assistance for a major LV/HC ethanol incident through the Regional Response Team (RRT) via ESF-10. Requests will be coordinated in accordance with the National Incident Management System (NIMS) and the National Response Framework (NRF).

iv. Carrier

If the carrier does not make the initial notification, it is likely due to the carrier's crew being incapacitated by the incident. Therefore, the IC/UC or their designee should confirm that the carrier has been notified about the incident and that the carrier acknowledges the notification. If this plan is activated, the IC/UC may request that the MEMA confirm that the carrier was notified and acknowledged the notification. Contact information for LV/HC ethanol carriers is provided in **Attachment 5**.

In addition, the carrier will have specialized knowledge and experience that will be critical for the response effort, and will also provide resources for the response, including personnel, equipment, and contractors with applicable expertise and experience.

Note: Association of American Railroads "AskRail" can provide commodity information in immediate time at https://www.aar.org/issue/askrail-app/

v. Public Information and Warning

1. Notification of critical / vulnerable facilities within the area of concern will be made at the request of the Incident Commander. These notifications will be made by local authorities or MEMA through the Emergency Alert and Warning Plan.
2. Public notification will be made at the request of the UC and coordinated in accordance with the Emergency Alert and Warning Plan.

d. Response Activities

i. Primary Activities

1. Firefighting

It is usually better to control and contain an LV/HC ethanol fire and let it burn out. Fire suppression should only be attempted for life safety (i.e., rescue), and only if an offensive strategy can be implemented safely. As **Figure 1** illustrates, the Incident Commander has up to approximately two hours to implement an effective offensive firefighting strategy; however, the offensive strategy should not be implemented if there are not adequate water, AR-AFFF concentrate, and trained firefighters available for the estimated size and needs of a given incident. Note that due to the potential environmental impacts of an ethanol release and since ethanol is relatively clean burning, allowing ethanol to burn off is often preferred if it catches fire.

After one or more tank cars become involved in a fire, a defensive or non-intervention strategy (i.e., control and contain) is recommended. In addition, the defensive strategy should include spill control, as discussed in the following section.

Based on previous incidents, after approximately six to twelve hours, most or all the ethanol will have burned, infiltrated into the ground, and/or become sufficiently diluted with water. At this point it may be appropriate to implement offensive tactics to extinguish any remaining fire. However, the purer the ethanol burns the cleaner or less visible the flame, so thermal imaging devices or other means (such as straw brooms held above suspected areas) should be used to detect areas that may still be burning.

As noted above, due to the potential environmental impacts of an ethanol release and since ethanol is relatively clean burning, allowing ethanol to burn off is often preferred if it catches fire. Furthermore, conducting an *in situ* burn of ethanol to dispose of it, after a fire has been extinguished, requires numerous agency approvals and may not be feasible before environmental damage is done.

Although the available amounts of AR-AFFF foam and other resources may not be sufficient to put out an LV/HC ethanol fire, this foam may can be used in other ways to control an incident. For example, if ethanol enters a storm drain or sewer, AR-AFFF foam can be used to suppress vapors in the lines and minimize the potential for igniting the vapors and causing additional damage.

2. Spill Control

Spill control at an LV/HC ethanol incident consists of stopping leaks, preventing new leaks from forming, and containing and collecting ethanol that was released. For an LV/HC ethanol incident, state agencies and spill response contractors will be instrumental in controlling spills. Specifically, the HMRT are trained and equipped to stop leaks and MassDEP technicians are trained and equipped for spill containment and collection, so both agencies will be needed for an incident. In addition, MassDEP will provide technical and scientific support and sensitive receptors information to the UC at an LV/HC ethanol incident.

Additionally, the carrier responsible for the incident is required by federal regulations to provide spill response contractors who are trained and equipped to contain and collect the released ethanol. If the carrier is unable to hire an appropriate contractor or respond in a timely manner, MassDEP may hire one of its on-call spill response contractors to conduct response actions. Spill response contractors also typically provide monitoring equipment, temporary storage tanks and containers, and other support equipment. These contractors may also arrange to properly dispose of the collected ethanol, impacted soil and water, and used absorbents and personal protection equipment (PPE) under direction of the MassDEP.

ii. Secondary Activities

1. Security

Security includes establishing and maintaining a perimeter, crowd control, and traffic control. Security operations are primarily a law-enforcement activity and will be coordinated through the on-scene ICS elements and by ESF 13 (Public Safety and Security) at the state level. Depending on the size and nature of the incident, additional security resources may be needed from the Massachusetts National Guard and can be requested through ESF 16 (Military Support). Security at HazMat releases will often include keeping and patrolling a perimeter, establishing crowd control, and maintaining the flow of traffic around the incident, as described below:

Perimeter - Security perimeters should be large enough to account for sudden changes in wind direction or the sudden release of a pressurized vessel. While monitoring devices may be used to establish the direction and size of a chemical plume, the perimeter established for human occupancy should extend beyond this zone. While some law enforcement officers are equipped with PPE including gas masks and chemical-resistant clothing, the security perimeter should be established far enough away from the incident that this equipment is not needed.

Crowd Control - Crowd control can be an essential part of a successful HazMat operation, especially if large numbers of contaminated people need decontamination. For proper decontamination to occur, crowds must remain calm and orderly while waiting their turn. This may be especially true at hospitals where large numbers of self-presenting patients may be requesting treatment or decontamination while higher-priority patients arrive from the scene. This scenario may require the deployment of law enforcement personnel to the receiving hospitals.

Traffic Control - Traffic control is usually an issue whenever a perimeter is established. Law enforcement officers trained in traffic management will most likely be required to keep traffic away from the affected area. This will become even more critical during an evacuation when large numbers of people are fleeing an area. In these cases, officers must keep the flow of traffic steadily moving to avoid a gridlock situation.

2. Public Information

Public information for an LV/HC ethanol incident, including warnings and on-going service announcements and/or information sharing, will be coordinated through either

the on-scene PIO or the SEOC, in accordance with MEMA's public information plan. In addition, the UC must approve information disseminated regarding the specific incident. During certain complex events, PIOs from the state level may be requested to be on-scene. If PIOs are requested, these requests will be coordinated through the SEOC.

All public information concerning state assets or responses must be coordinated through either the on-scene Public Information Officer (PIO) or the SEOC and ESF-15 (Public Information and External Affairs) in accordance with MEMA's public information plan. In addition, the Incident Commander must approve all the information disseminated regarding that specific incident. During certain complex events, PIOs from the state level may be requested on scene. If PIOs are requested, requests will be coordinated through the SEOC or ESF-15 as necessary in accordance with ESF-15 and the Joint Information Procedures.

3. Evacuation/Shelter-in-Place

When a HazMat release impacts or could impact the nearby population, a shelter-in-place or evacuation decision must be made. While these two activities are simple in theory, they can be immensely complicated in practice. The Commonwealth's Evacuation Coordination Plan and Critical Transportation Needs (CTN) Evacuation Coordination Plan can be utilized to support these operations and local decisions. These plans have robust concepts and guidelines to support an evacuation and/or shelter in place scenarios. Local and regional responders and officials should also have adequate plans and resources for either scenario. Shelter-in-place and evacuation decisions are made by the on-scene Incident Commander but may require significant state resources. These options are briefly discussed below:

Shelter-in-Place – Sheltering in place within homes or businesses may be less complicated and quicker than an evacuation; however, time becomes a factor as the HazMat plume may slowly begin permeating buildings and people become increasingly uncomfortable without air conditioning or heat. Nonetheless, sheltering in place may be the safest option while a coordinated evacuation plan is developed, and access and functional needs (AFN) populations can be assisted.

Evacuation – In incidents involving a limited number of people, evacuating the area can be quick and efficient. An evacuation ensures that the public will have no contact with the release and gives the Incident Commander time to more thoroughly assess the situation before making entry decisions. Additionally, when an incident involves a transportation accident or a facility equipped with a siren or communications system, self-evacuations may already have occurred. Depending on the size of the impacted area and the inclusion of AFN and other special populations (such as hospitals, prisons, and schools), evacuations may become extremely long or arduous and an evacuation may prompt people to leave their homes or businesses and become immediately exposed to the released chemical. Additionally, buses may be needed to support an evacuation, especially if evacuating populations do not have access to vehicles and need support leaving the area. Guidance and plans for Critical Transportation Needs

considerations are contained within the CTN Evacuation Coordination Plan. In these instances, sheltering in place may be a more effective solution.

4. Clean-up, remediation, and recovery

Once the response phase of an LV/HC ethanol release is complete, recovery actions and remediation activities will begin. Depending on the incident, the recovery action process is usually overseen by MassDEP.

Remediation activities often continue for months or years. Depending on the incident, the recovery action process is usually overseen by Mass DEP in conjunction with the EPA and other agencies as warranted. These actions are outlined in the MCP.

To transition from the response phase to the recovery phase, the Incident Commander, in conjunction with the Safety Officer and HazMat Branch Director, must be reasonably certain that no immediate threat to health and safety, personal property, or the environment remains. This standard applies to immediate hazards and does not include elevated risks from exposure to long-term pollution or contamination, which fall under the MCP.

e. Personnel, Equipment, and Resources

When this plan is activated, the IC/UC will typically request additional personnel, equipment, and resources by submitting mission tasks to the SEOC. Prior to the activation of this plan, additional personnel, equipment, and resources may be requested via the Fire District Control Point or directly from MassDEP or the carrier.

i. Personnel

Additional personnel that may be needed for the initial response will typically come from implementing mutual aid agreements and the Fire Mobilization Plan. In addition, the carrier and their spill response contractors, as well as MassDEP spill response contractors if mobilized, will provide properly trained and equipped personnel with needed expertise and experience in spill control to support the response effort.

ii. Foam Caches

Massachusetts has established foam caches with AR-AFFF attack foam trailers at multiple locations around the Commonwealth. The list of current foam caches is presented in **Attachment 7**. A local FD will access foam cache(s) through their Fire District Control Point.

Each cache will respond with trained personnel for the foam application. Additional amounts AR-AFFF concentrate in portable containers (5-gallon pails, drums, and totes or trailers) may also be available from other sources (vendors and industries) in Massachusetts.

Furthermore, the Massachusetts Port Authority Fire-Rescue Department (Massport FD) has vehicles equipped with AR-AFFF concentrate and trained personnel at the Fire-Rescue Headquarters at Boston Logan International Airport, Hanscom Air Force Base, and Worcester Airport. The Massport resources are included in **Attachment 7**. The Massport FD resources would be provided by requesting an AR Foam Task Force from Massport Fire-Rescue through the Metro Fire (District 13) Control Point.

iii. Spill Response Resources

Equipment and supplies for spill containment and collection are available from MassDEP and federal agencies and from spill response contractors. The MassDEP and their contractor will be able to provide equipment and resources for an LV/HC ethanol incident response. Additional resources, including trained personnel, may also be available from MassDEP, as well as from the USEPA and USCG, and from the spill response consultants and contractors with whom these agencies have established service agreements.

Other spill response personnel and resources will be available from the carriers and their spill response contractors and consultants. Many of the carriers' spill response contractors are recognized by the USCG as "oil spill response organizations (OSROs)" for various scenarios and discharge volumes. The contractors that are classified as OSROs means that the USCG confirms that these contractors have the required minimum numbers of personnel and quantities of equipment available within specified time frames, based on specific scenario(s) identified in the USCG classifications. Note that barge companies that transport ethanol are required by the USCG to have contractual agreements with OSROs that meet specified minimum response requirements within USCG-designated time frames.

Some spill response contractors also have specialty equipment that may be needed for an LV/HC ethanol incident response, such as the different specialty valves attachments that are needed for transloading from railroad tank cars made by different manufacturers. These spill response contractors also have the required hoses and pumps needed for transloading, as well as tank trucks and/or frac tanks for receiving and removing the ethanol as it is pumped out of rail cars.

iv. Specialized Equipment

With their own resources or through their contractors, carriers can provide specialized equipment that may be needed for the LV/HC ethanol response effort. Railroads have locomotives and crews to remove uninvolved cars, and their contractors have heavy lift equipment needed to roll and/or lift derailed tank cars and rerail and/or remove the tank cars involved in an incident. Railroad specialists are trained to identify risks associated with rerailing or moving loaded or partially loaded railcars. Note that transloading products may not be necessary for rerailing and may complicate the incident mitigation and/or cleanup and restoration of rail service.

Barge companies have access to tow boats and the equipment needed to move a barge to a safer location, as needed. The barge companies also have contractors who may be able to stop and/or patch leaks to stop the flow of ethanol.

f. Demobilization/Recovery

For a land-based incident (i.e., one involving a railroad or railroad equipment), the IC/UC will demobilize the response effort and enter the recovery phase as immediate hazards to the public and environment cease or are no longer considered to be significant. The RP and their contractors will provide technical expertise to the joint decision-making of the IC/UC, specifically with regards to the need for continued and/or scaling back response efforts at the incident scene, such as required assistance during up-righting and/or removal of damaged railcars and

security at the scene as the response effort is reduced. Note that the MassDEP MCP governs state participation in the recovery process, including long-term monitoring and remediation.

4. ROLES AND RESPONSIBILITIES

During a significant HazMat response, a coordinated response is essential. The following describes the systems and concepts to ensure this occurs.

a. Incident Command System – The incident will be managed on scene using the Incident Command System (ICS). ICS is a standardized incident and command response structure for the command, control, and coordination of emergencies involving multiple agencies. This system allows responders from multiple agencies and jurisdictions to operate in a coordinated manner with common objectives, communication, and organization.

b. Unified Command – A unified command structure is used when incidents involve several jurisdictions or several agencies from the same political jurisdiction. A unified command structure allows all agencies with responsibilities for an incident, either geographical or functional, to establish a common set of incident objectives and strategies to which all can subscribe. Upon request or arrival, state agencies may form a unified command with the local on-scene Incident Commander.

c. State Emergency Operations Center – The SEOC provides full-time monitoring and coordination of emergency events. Depending on the size and complexity of the incident, the SEOC will:

- Work with federal, state, and local agencies to identify potential emergencies, mitigate risks, and support response and remediation efforts if necessary.
- Act as a coordinating center between state agencies up to and including full activation of all applicable emergency support functions in accordance with the CEMP.
- Provide coordination surrounding Public Information.

The SEOC will provide a supportive and coordinative role in LV/HC incident responses as needed. This will include logistics and resource support, situational awareness management and dissemination, Incident tracking and documentation, and communications coordination. These roles are defined further in the CEMP.

MEMA SEOC will coordinate with the Incident Command Post through the relevant Regional Emergency Operations Center (when appropriate).

d. Massachusetts Department of Environmental Protection (MassDEP) – MassDEP is the Primary Agency for the coordination of ESF 10 – Hazardous Materials and Environmental Protection. ESF 10 is closely supported by the Executive Office of Energy and Environmental Affairs, DFS, and DPH. These core agencies act in coordination with other ESFs to ensure all aspects of a response are supported. DEP/ESF 10 coordinates closely with DFS/ESF 4 – Firefighting. Through MEMA, DEP/ESF 10 is the conduit through which state resources are channeled into a HazMat incident response.

e. Adjacent State and Federal Aid – In addition to DEP/ESF 10, SEOC can also request adjacent state and federal mutual aid resources. With limited exception, all requests for these resources should be made to the SEOC through the local emergency management agency (EMA) (if activated)

or an on-scene MEMA representative if available. In certain cases, municipalities in proximity to other states may have local mutual aid agreements with other local governments in adjoining states. In these cases, mutual aid can be requested at the local level. All requests for mutual aid must be approved by the Incident Commander. MEMA will request federal HazMat response assistance through the federal Regional Response Team (RRT).

f. On-scene Command and General Staff

i. Fire Department

The Fire Chief of the local FD or her/his designee will typically be the initial IC; however, the senior firefighter may have the role of Incident Commander (IC) until properly relieved by the Fire Chief or her/his designee. The IC will establish the UC and an ICP at the scene of the incident as early in the incident as practicable. Note that for a barge incident, the USCG will be the IC until the UC is established, and the USCG will set up the ICP.

A "Quick Reference" card for responding to an LV /HC ethanol incident is provided in **Attachment 8** for use by the IC/UC.

ii. Local and Massachusetts State Police will:

- Provide support for security coverage and access to the incident site if needed
- Facilitate transportation of required assets to and from the incident site and/or staging areas
- Field and support requests for Bomb Squad resources
- As directed, establish and maintain traffic control and staging area discipline

iii. Massachusetts National Guard <u>may</u> provide:

- Civil Support Teams (CST) chemical response team to augment HazMat personnel and provide chemical support
- Basic needs equipment/supplies (e.g. food, water, tents, etc.)
- Decontamination capability
- Engineer units
- Helicopters
- Scene security
- Water purification

iv. Massachusetts Department of Environmental Protection (Mass DEP)

MassDEP works in conjunction with the Executive Office of Environmental Affairs to coordinate efforts of ESF 10 and MassDEP technicians are trained and equipped for spill response. In addition, MassDEP's on-call spill response contractors may be activated to conduct response actions, if the carrier is unable to hire an appropriate contractor or respond in a timely manner.

The Massachusetts Department of Environmental Protection (Mass DEP) will:

- Direct, coordinate, and integrate the overall state hazardous materials response in the affected area(s)

- Provide coordinative bridge between the On Scene Coordinator, the district HMRT, and overall response activities
- Ensure a successful transition from response to recovery guidance under the MCP
- Provide technical, scientific, and equipment support
- Coordinate efforts of ESF 10 agencies
- Ensure a successful transition to response and recovery guidance under the MCP
- Provide technical and scientific support
- Provide limited HazMat response PPE and equipment as available

v. Department of Fire Services Regional HAZMAT Response Teams (HMRT)

The Commonwealth of Massachusetts has five HazMat response districts (illustrated in Figure 2 below), and each district has an HMRT. District five merged with District four on July 1, 2025. These teams have resources staged at various locations throughout their districts to reduce initial response time. HMRTs can be requested directly by the on-scene Incident Commander as needed. HMRTs are an asset of the Department of Fire Services but upon being dispatched to a HazMat incident, HMRTs are included in the on-scene ICS structure, and deploy as part of a Tiered System. DFS HMRT ranks hazmat incidents from Tier 1 to Tier 5. As the tiers escalate, the amount of personnel and equipment also expands proportionately. This allows for a sufficient response as the type of Hazmat Incident expands in scope, complexity, or danger. See Appendix B for additional details on the Tiered Hazmat Response System utilized by the DFS HMRT.

1. <u>Department of Fire Services Regional HAZMAT Response Team</u>
    - Perform estimates of the downwind hazard
    - Determine the nature of and identify the hazard
    - Execute site management and site safety functions
    - Coordinate emergency decontamination of victims
    - Execute technical decontamination of responders

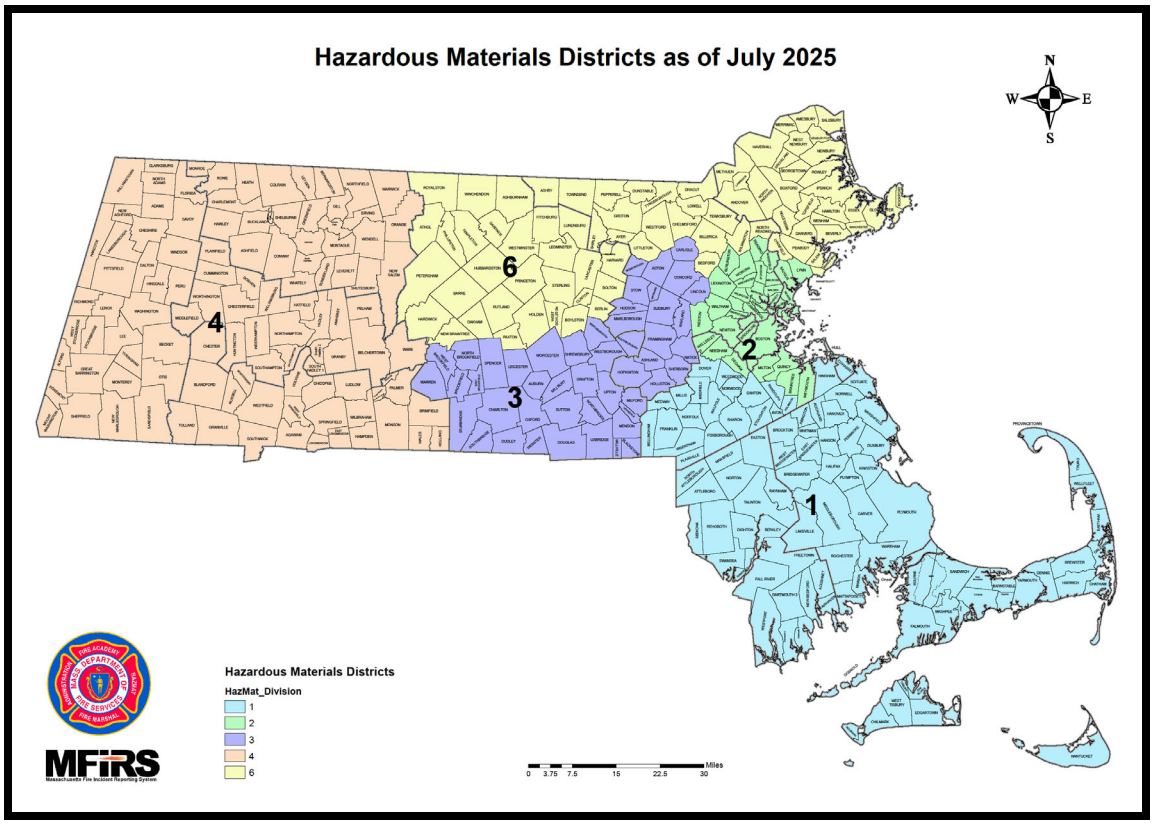


Figure 2 – Hazardous Materials Districts

g. Municipal EMAs and Agencies

i. Logistics Support

The response effort for an LV/HC ethanol incident is expected to last up to 72 to 96 hours before the hazards from the incident are sufficiently reduced and the incident can enter remediation and recovery phases. The local emergency management agency (EMA) and other municipal agencies can provide logistics support for the response to an LV/HC ethanol incident. Specifically, the local EMA can interface with MEMA to coordinate regional and state resources and assist in coordinating local support actions, such as evacuations. In addition, the local Department of Public Works (DPW) can provide support for road closures (e.g., personnel, barriers) and equipment and materials for spill containment, including, but not limited to, front-end loaders, bulldozers, soil, sand, sandbags, and plastic sheeting.

ii. Water/Wastewater Agency

As noted above ethanol readily mixes with water, but the denaturant will separate and float on the water. Therefore, the release from a typical railroad tank car (30,000-gallon capacity) may result in 28,500 gallons of ethanol entering the water and 1,500 gallons of denaturant (i.e., gasoline) floating on the water.

Ethanol will rapidly affect the entire water column, so surface water and groundwater (well) sources that are used for drinking, process water, aquaculture, or cooling water may be

impacted by released ethanol. If there is a potential for a spill to impact any of these water sources, the municipality or firm that uses the water needs to be notified of the potential impacts, so they can take the appropriate actions to stop drawing water from the source and/or treating water that is used.

Ethanol that enters a storm water drain system or a sewer system poses a danger from flammable liquid and vapors in the lines. In addition, the ethanol may disrupt the proper functioning of a receiving wastewater treatment plant (WWTP) because the ethanol may kill the bacteria used in wastewater treatment. Therefore, the municipality or firm that runs the WWTP should be notified if ethanol enters storm water drain systems or sewers.

h. Carrier

The carrier who has an LV/HC ethanol incident is financially response for the incident response and its clean-up and remediation. Also, the responsible carrier will provide technical and tactical support, including equipment and personnel, to the response effort and other carriers may make their resources available upon request, as described in Sections 3.g.ii and iii.

i. Support Agency Responsibilities – other state agencies

Other state and regional agencies will support the response effort for an LV/HC ethanol incident, as needed. Depending on the response needs and potential impacts from the incident, MEMA may stand up other ESF's for support. Key Agencies that MEMA may stand up include:

i. Department of Fire Services

- Coordination of fire mobilization response
- Develop strategies for initial response
- Coordinates incident management teams to assist in command-and-control operation
- Provide HazMat support to contain, confine, and control release as requested
- Coordinate Response of HMRT and Department of Public Utilities (DPU)
- Execute site management and site safety functions
- Provide Incident Support Units (ISU) with additional communications capabilities
- Provide Rehabilitation units to the incident.
- Provide drone support to aid in assessment and documentation

ii. American Red Cross

- Manages and coordinates sheltering and feeding for affected population

iii. Massachusetts Department of Public Health

- Assessment of health, medical, and behavioral health needs
- Provision of emergency medical services
- Coordination of patient and dependent care evacuations
- Assess human exposure to chemical agents by analyzing clinical specimens for contaminants of concern and/or their metabolites
- Carry out testing of environmental and clinical samples for chemical or radioactive materials related to the incident

- Engage federal partners to assist with testing of environmental and clinical samples related to the incident
- Evaluate both short and long-term potential health impacts from exposure and from contamination of food, water, and soil
- Evaluate environmental data for possible health impacts that will inform appropriate actions
- Provide technical and scientific support such as from the Field Assessment Support Team (FAST) and laboratory support from the Wall Experiment Station (WES)
- Facilitate recovery process to include disposal of impacted food, cleanup of indoor spaces, evaluation of housing, and provision of risk communication for the public
- Identify vulnerable populations in the affected area to inform evacuation and long-term treatment issues
- If feasible, conduct health surveillance activities to determine health impact of the release
- Notify and work with healthcare facilities to respond to events
- Provide laboratory identification of unknown chemicals and confirmation of field screening results
- Provide safety guidance for first responders and the public
- Work with Mass DEP, HazMat teams, U.S. Environmental Protection Agency (EPA) and other partners to determine environmental pathways (air, water, soil, and food) for contamination and evaluate human exposure potential that may lead to recommendations for sampling

j. Federal Agencies and Other Resources

Federal responsibilities are outlined in the NRF and the NIMS. Federal resources are available specifically for incidents that expand beyond available local, state, and mutual aid resources.

The USEPA will likely be involved in the response effort for an LV/HC ethanol incident if there is a release of a significant amount of ethanol and/or a fire; the USCG will be involved in the response to a marine incident. The USEPA and USCG not only can provide technical and scientific support, but they also have established contracts with spill response contractors, who maintain minimum staffing levels and stockpiles of spill response equipment that may be employed. MassDEP is expected to be the primary point of contact with these agencies.

5. DIRECTION AND CONTROL

An UC will be established at the ICP when an LV/HC ethanol incident involves several jurisdictions and/or several agencies from the same political jurisdiction and upon request or arrival, state agencies may form a UC with the local on-scene IC. The UC allows the agencies with responsibilities for an LV/HC ethanol incident to establish a common set of incident response objectives and strategies.

State agencies will provide personnel and resources to support the LV/HC response effort, as requested. Personnel from operating departments/agencies assigned to LV/HC incident response responsibilities will remain under the control of their own departments/agencies but will function under the technical supervision of the direct report within the ICS.

6. ADMINISTRATION AND LOGISTICS

a. Staffing

Responding agencies are responsible for providing the appropriate personnel, equipment, and training.

b. Pre-Event Planning and Contracts

Advanced planning for LV/HC incident response involves pre-identifying sources for resources needed to respond and recover from an emergency incident.

Responsible Parties (i.e., carriers) are responsible for maintaining vendor contracts for LV/HC incident response, containment, and recovery. These carriers are identified in **Attachment 5**.

Local jurisdictions and state agencies may also engage in the following pre-event contracts to provide an effective response to typical LV/HC ethanol incidents:

- Spill response, containment, and cleanup
- Emergency worker base camps and typed support packages
- Designated community shelter
- Transportation support
- Debris/waste removal and disposal services
- Other supplies, equipment and human resource needs
- Personnel
- IT and communications

Furthermore, LV/HC ethanol incident will require many resources and generate significant media attention. Therefore, advanced planning should identify pre-designated staging areas for responders and their equipment and supplies, as well as identify pre-designated press areas for the media crews and equipment that may arrive.

c. Mutual Aid

The process for requesting mutual aid from entities either within or outside of Massachusetts is described in the “Mutual Aid” section of the State CEMP Base Plan.

d. Plan Review and Maintenance

MEMA is responsible for coordinating the development and maintenance of the Statewide LV/HC Ethanol Incident Response Plan. The identified state agencies retain the responsibility to maintain their relevant plans and provide the appropriate personnel and training to undertake LV/HC incident response.

This Plan will be reviewed biennially by participating agencies and organizations in a manner conforming to the review and maintenance guidelines contained in the State CEMP Part 1 and the Emergency Management Program Administrative Policy.

e. Forms and Record Retention

Field reporting forms and all necessary federal disaster reporting forms and guidance are located in the SEOC and distributed when necessary. Copies of all documentation are retained in accordance with State record retention policies.

f. Logistics

The SEOC Operations and Logistics Sections will coordinate resource support for responsible agencies to implement this Plan. In addition, responsible agencies are responsible for identifying and address department specific resource needs to support the implementation of this Plan. Logistics support that may be needed for prolonged events includes, but is not limited to, the following:

- Refueling
- Waste containment
- Power / recharging
- Replacement equipment (pods)
- Portable toilets
- Wash Stations
- Water
- Warming or cooling centers

7. AUTHORITIES, RESOURCES, AND REFERENCES

a. Authorities

- The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.
- Title 40 of the Code of Federal Regulations Part 110 [40 CFR 110; Discharge of Oil].
- Title 49 of the Code of Federal Regulations Part 130 [49 CFR 130; Oil Spill Prevention and Response Plans 49 CFR 130.
- The National Response Framework, 4th Edition, October 28, 2019.
- Homeland Security Act of 2002.
- Homeland Security Presidential Directive 5, Management of Domestic Incidents.
- Homeland Security Presidential Directive 8, National Preparedness.
- Public Law 104-321, Joint resolution granting the consent of Congress to the Emergency Management Assistance Compact.
- Comprehensive Emergency Management Plan (CEMP), Massachusetts Emergency Management Agency.
- Code of Massachusetts Regulations 310: Department of Environmental Protection; Massachusetts Contingency Plan (310 CMR 40.0000).

b. Resources and References

In addition to the references provided in the CEMP selected resources, and references for additional information on ethanol, including references with specific information for ethanol firefighting and spill response, are provided in **Attachment 2.**

8. ATTACHMENTS

1. Acronyms and Abbreviations
2. Selected References
3. Ethanol and Ethanol Spill Response
4. Maps of Common Transport Routes and Potential Exposed Populations and Facilities

5. Contact Information for Carriers of Large Volume/High Concentration Ethanol
6. Railroad and Marine Freight Profiles
7. Massachusetts Foam Caches
8. “Quick Reference” Guide for Ethanol Incident Response

Attachment 1 - ACRONYMS AND ABBREVIATIONS

The following acronyms and abbreviations are used in this Plan.

ACP	Area Contingency Plan
AR-AFFF	Alcohol-Resistant Aqueous Film-Forming Foam
CEMP	Massachusetts Comprehensive Emergency Management Plan
CFR	Code of Federal Regulations
CMR	Code of Massachusetts Regulations
DFS	Massachusetts Department of Fire Services
DPH	Massachusetts Department of Public Health
DPW	Department of Public Works
EMA	Emergency Management Agency
Ethanol	Denatured ethanol (i.e., ethanol with 3% to 5% gasoline added)
FBI	Federal Bureau of Investigation
FD	Fire Department
FRA	Federal Railroad Administration
gpm	gallons per minute
HAZMAT	Hazardous materials
HHFT	High Hazard Flammable Trains
HIT	Heat induced tears
HMRT	Hazardous Material Response Team
HTUA	High Threat Urban Areas
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System
LFL	lower flammable limit (same as lower explosive limit)
LV/HC	Large Volume/High Concentration
MCP	Massachusetts Contingency Plan
MassDEP	Massachusetts Department of Environmental Protection
ESF-4	Emergency Support Function 4 – Firefighting
ESF-10	Emergency Support Function 10 – Environmental Protection and Hazardous Materials
MEMA	Massachusetts Emergency Management Agency
MEP	Massachusetts Environmental Police
mph	miles per hour
MTBE	methyl tertiary butyl ether
NIMS	National Incident Management System

NRC	National Response Center
NRF	National Response Framework
NFPA	National Fire Protection Association
NRT	National Response Team
OSRO	Oil Spill Response Organization
PHMSA	Pipeline and Hazardous Materials Safety Administration
PIO	Public Information Officer
PPE	Personal Protective Equipment
PRV	Pressure Relief Valve
RP	Responsible Party
RRT	Regional Response Team
SEOC	State Emergency Operations Center
UC	Unified Command
UFL	upper flammable limit (same as upper explosive limit)
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
WWTP	Wastewater Treatment Plant

Attachment 2 - SELECTED REFERENCES

Listed below are selected references that were used to develop this Plan.

National

Biofuels: Release Prevention, Environmental Behavior, and Remediation, Interstate Technology & Regulatory Council (ITRC) Biofuels Team, September 2011

Field Guide to Tank Cars, Association of American Railroads, Transportation Technology Center, Inc., Bureau of Explosives, 2010

Fuel Ethanol: Guideline for Release Prevention & Impact Mitigation, Renewable Fuels Association, March 2013

Large Volume Ethanol Spills – Environmental Impacts and Response Options, Shaw's Environmental and Infrastructure Group for the Massachusetts Department of Environmental Protection, July 2011

Responding to Ethanol Incidents, International Association of Fire Chiefs, March 2008

Quick Reference Guide: Fuel Grade Ethanol Spills (including E85), National Response Team, 2010

Unit Train Derailment Site Case Study: Emergency Response Tactics, International Association of Fire Chiefs for the Renewable Fuels Association, March 2015

United States Hazardous Materials Instructions for Rail, Association of American Railroads, Bureau of Explosives, January 2011

Massachusetts

Ethanol Response Plan, Franklin Regional Council of Governments

Large Volume Ethanol Spills – Environmental Impacts and Response Options, Massachusetts Department of Environmental Protection

Large Volume / High Concentration Ethanol Incident Response Planning Guidance, Massachusetts Emergency Management Agency

Massachusetts Fire and EMS Mobilization Plan, Massachusetts Department of Fire Services

Plymouth to Salisbury, Massachusetts Area Contingency Plan, United States Coast Guard

Rhode Island and Southern Massachusetts Area Contingency Plan, United States Coast Guard

Safety Impacts of Ethanol Transportation by Rail, Massachusetts Department of Transportation

Attachment 3 - ETHANOL AND RESPONSE TO ETHANOL SPILLS

1. General Conditions

a. Ethanol (ethyl alcohol), as referred to in this Plan, is typically denatured ethanol with 2% to 5% (but may be as high as 7%) gasoline added as the denaturant.
b. High concentration ethanol includes denatured ethanol (93% to 97% ethanol; 3% to 7% gasoline) and E-85 motor fuel (85% ethanol; 15% gasoline).
c. Placards on shipments of high concentration ethanol may have label 1987 (denatured ethanol; 95% to 99% ethanol) or 3475 (ethanol and gasoline mixture; up to 94% ethanol); ethanol that has not been denatured may have label 1170 (ethanol or ethyl alcohol; 100% ethanol) or 3065 (alcoholic beverage).
d. Ethanol is blended into nearly half the gasoline produced in the United States, including most of the gasoline used in Massachusetts.
e. Ethanol-blended fuels, including E-85, are available in Massachusetts.
f. Ethanol use continues to increase, as well as fuel stations offering E-85.
g. Large volume transportation of high concentration ethanol within the Commonwealth occurs primarily via rail (railroad tank cars) and water (barges), and to some extent via road.
h. Railroad tank cars used to transport ethanol are often the DOT 111 or CPC 1232 design; newer, safer type DOT 117 tank cars are being phased in for general use for transporting ethanol.
i. Transloading of ethanol, where ethanol is moved from a railroad tank car to a tanker transport (i.e., tractor-trailer tank trucks) on a rail siding, occurs on rail sidings that may have minimal fire control equipment.
j. The fittings for transloading from a railroad tank car are not uniform and tank cars from different manufacturers require different fittings (five or more different fittings are currently in use).Tank car information to determine the appropriate fitting is discussed in **Attachment 6**.
k. Depending on the type and scope of the incident, supplemental state resources may be required to assist in responding to ethanol release.

2. Properties of Ethanol

a. Colorless liquid with a characteristic alcohol odor.
b. Polar solvent that is completely miscible (soluble) in water.
c. A good electrical conductor, so electrocution and ignition hazards (e.g., static electricity) may be present.
d. Ethanol and gasoline may separate on contact with water (surface water, groundwater, or firefighting water); ethanol mixes with water and gasoline does not (often remains on the water surface)
e. Diluted ethanol has higher flash points: 20% ethanol in water has a flash point of 97^{o} F; 10% ethanol in water has a flash point of 120^{o} F.
f. Flash point is 55^{o} F for pure ethanol, which decreases, and may be as low as -5 ^{o} F when gasoline is added.
g. Diluted ethanol (20% ethanol in water) has a flash point of approximately 97^{o} F
h. Vapors are heavier than air (vapor density 1.59) and hang low to the ground.
i. For ethanol vapors in air the lower flammable limit (LFL) is 3.3% and the upper flammable limit (UFL) is 19% (i.e., the flammable range is 3.3% to 19%).

j. Below an outside temperature of approximately 51° F, vapor pressure is outside the flammable range (i.e., ethanol cannot evaporate rapidly enough to achieve vapor concentration within the flammable range).
k. Specific gravity is 0.79 (liquid density is 6.5 pounds per gallon).
l. Breakdown products from aerobic degradation include:
m. Breakdown products from anaerobic degradation include:

3. Firefighting

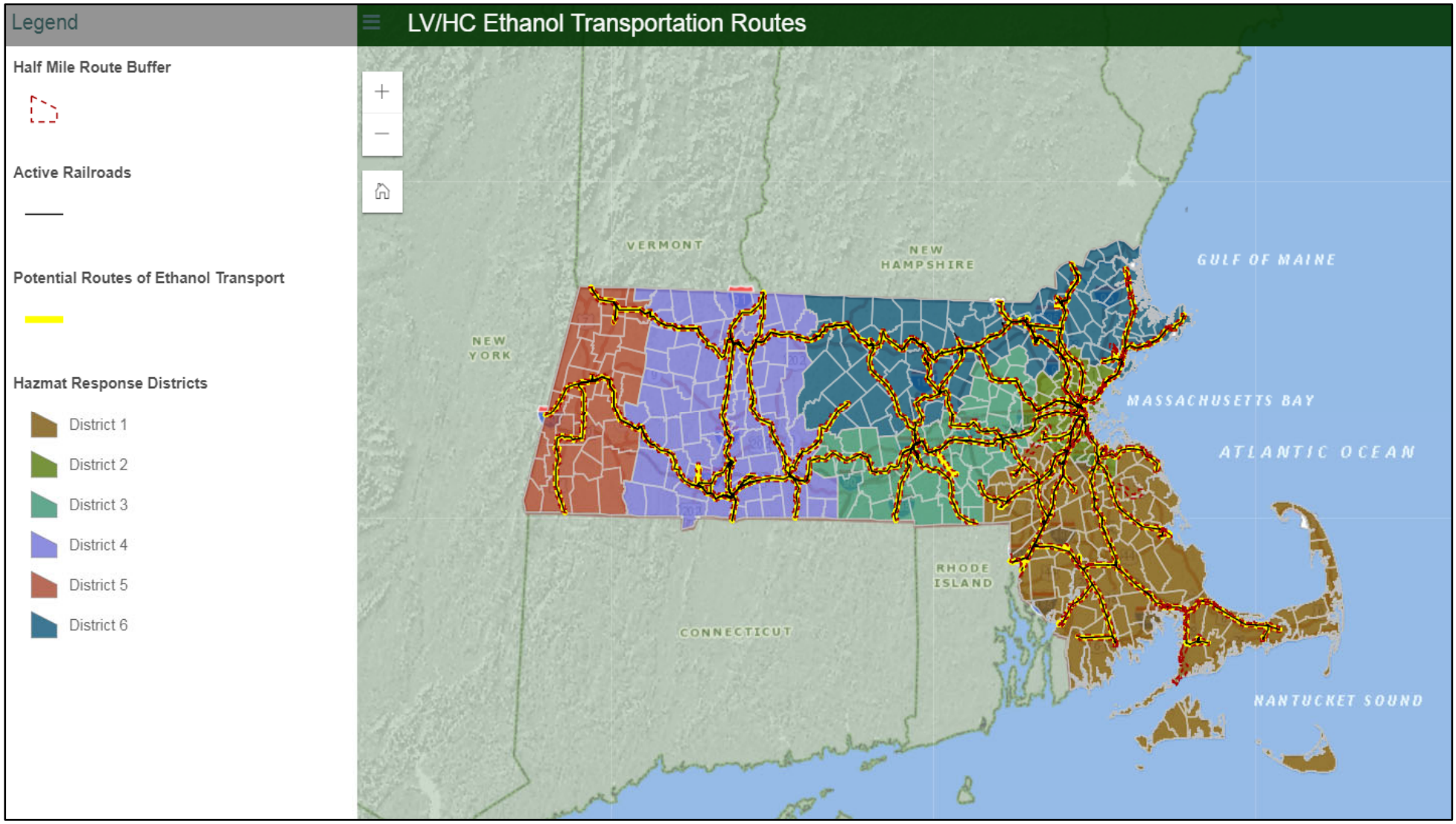
a. Ethanol and ethanol fuel blends have different properties than gasoline and require different firefighting techniques and equipment than gasoline or other hydrocarbons.
b. Under fire conditions, high-concentration ethanol has less visible smoke than a gasoline fire and ethanol burns with a virtually invisible flame after the denaturant (typically gasoline) burns off.
c. Radiant heat flux from an ethanol fire can be 2 to 5 times greater than the heat flux from a gasoline fire.
d. Only Alcohol Resistant Aqueous Film-Forming Foam (AR AFFF) and copious amounts of water are effective fire suppression techniques for fire involving ethanol.
e. AR-AFFF appears to be effective only when using a Type II discharge scenario (i.e., fixed discharge applied to a vertical surface to provide a gentler application that minimizes plunging or submergence).
f. Massive quantities of foam concentrate, water and large application devices are required to handle a serious ethanol fire.
g. Foam Concentrations will be mixed and applied according to the manufacturer's instructions. **Attachment 7** includes a list of AR-AFFF needs (concentrate and water amounts and application rates) for ethanol fires covering 100 square feet to 6,000 square feet.
h. In general, do not expect a local airport Aircraft Rescue and Firefighting vehicle to effectively fight an ethanol fire; the FAA requires airport firefighting vehicles to carry straight AFFF for aviation fuel fires, not AR foam. Note that the Massachusetts Port Authority Fire Department has capabilities that have AR-AFFF foam concentrate, and these units are located at Boston Logan International Airport.
i. Large foam caches of AR AFFF that may be critical to successful fire control are strategically located throughout Massachusetts in readily transportable large volume containers (see **Attachment 7**).

4. Spill Response

a. Ethanol and ethanol fuel blends have different properties than gasoline and require different spill response techniques and equipment than gasoline or other hydrocarbons.
b. Stop leaks if you can do it without risk.
c. Ethanol is water miscible. Once ethanol enters waterways it is not recoverable by emergency responders; gasoline used to denature ethanol will separate in water and the response needs to use the techniques for responding to hydrocarbon (i.e., non-polar solvent) spills).
d. Spills should be prevented from entering storm water systems, sewers and waterways, as well as basements and confined spaces.
e. Ethanol can be contained by diking and/or damming with dirt, sand, or portable containment systems.

f. Vacuum trucks will not work to recover ethanol once ethanol has entered water. Vacuum trucks may be effective in recovering ethanol that has accumulated in depth and containment and confinement areas established by emergency responders.
g. Absorb ethanol or cover with dry earth, sand, or other noncombustible material.
h. Absorb ethanol with water-absorbent materials (cat litter, pads, pillows, socks, booms, etc.) – universal absorbents may be effective (check with manufacturer); "oil only" absorbents, pads, and booms will only collect the gasoline component.
i. Due to the flammability of ethanol, use clean non-sparking tools to collect absorbed material.
j. Determine if sensitive water intakes (e.g., drinking, process, aquaculture, or cooling water), as well as wastewater treatment plants (WWTP), are threatened because ethanol rapidly affects the entire water column of the receiving water body; warn owners/operators of sensitive water intakes and WWTP that may be threatened.
k. Aeration of water bodies may be effective in increasing the dissolved oxygen in the water and increasing biological degradation of ethanol, but aeration needs to be kept in the spill plume and guidance for optimizing aeration (air volumes, bubble size, contact time) is not available.
l. Water quality monitoring should occur in all standing water bodies and in downstream locations to confirm dissolved oxygen levels are adequate.

Attachment 4 - Maps of Common LV/HC Ethanol Transportation Routes



Maps of Common LV/HC Ethanol Transportation Routes can also be provided by MEMA separately. MassMapper layers helps identify potentially exposed populations and facilities are summarized below, for local ethanol response planning:

State Facilities

State Lease Facilities Max 20000
DCAM Lease Facilities Max 20000
State Lease Facilities Min 20000
DCAM Lease Facilities Min 20000

Cultural Resources

Schools: Pre-kindergarten to High School Buildings
Schools: Pre-kindergarten to High School Labels

Infrastructure

Acute Care Hospitals: Acute Care Hospitals Buildings
Acute Care Hospitals: Acute Care Hospitals Labels
Dams: Dams (by Hazards Code)
Dams: Dams (by Hazards Code) Labels
Fire Stations: Fire Stations
Fire Stations: Fire Stations Labels
MassDOT Roads: Major MassDOT Roads: Major MassDOT Routes
MassDOT Roads: MassDOT Roads: MassDOT Roads by Road Type
Long Term Care Residences: Long Term Care Residences
Long Term Care Residences: Long Term Care Residences Labels
Police Stations: Police Stations
Police Stations: Police Stations Labels
Prisons: Prison Buildings
Schools: College and University Buildings
Schools: College and University Buildings Labels
Schools: Pre-kindergarten to High School Buildings
Schools: Pre-kindergarten to High School Labels
Town Halls: Town Halls
Town Halls: Town Halls Labels
Trains: Railroads: Railroads – Active Service
Trains: Railroads: Railroads by Type of Service

Physical Resources

Public Water Supplies: Public Water Supplies

Regulated Areas

Surface Water Protection Areas: Zone A
Surface Water Protection Areas: Zone B
Surface Water Protection Areas: Zone C
Wellhead Protection Areas: IWPAs
Wellhead Protection Areas: Zone Is
Wellhead Protection Areas: Zone IIs

Attachment 5 - CONTACT INFORMATION FOR LARGE VOLUME/HIGH CONCENTRATION ETHANOL CARRIERS

1. Railroads

Emergency Contact Numbers for Massachusetts Common Freight Carriers (i.e. railroads)

- **Bay Colony Railroad (BCLR**) ..... 24-hour Emergency Number: (855) 300-6193
- **Connecticut Southern Railroad (CSO**) ..... 24-hour Emergency Number: (866) 527-3499
- **CSX Transportation (CSXT)** ..... 24-hour Emergency Number: (800) 232-0144
- **East Brookfield and Spencer Railroad (EBSR)** ..... Office: (508) 885-4664
- **Fore River Transportation Corporation (FRVT; operates on the Massachusetts Water Resources Authority [MWRA] tracks)** ..... MWRA Security Center (877) 697-6972
- **Grafton and Upton Railroad (GU)** ..... Dispatcher: (508) 481-6095
- **Housatonic Railroad (HRRC)** ..... Dispatcher: (860) 824-0850 ..... or Headquarters: (860) 824-7936
- **Massachusetts Central Railroad (MCER)** ..... 24-hour Contact Number: fc(978) 355-0029
- **Massachusetts Coastal Railroad (MC)** ..... Office: (508) 291-2116
- **New England Central Railroad (NECR)** ..... 24-hour Emergency Number: (866) 527-3499
- **Pan Am Railways (ST)** ..... 24-hour Emergency Number: (800) 955-9208
- **Pan Am Southern (PAS)** ..... 24-hour Emergency Number: (800) 955-9208
- **Pioneer Valley Railroad (PVRR)** ..... Emergency Number: (800) 613-2212
- **Providence & Worcester Railroad (PW)** ..... 24-hour Number: (802) 527-3499

2. Tug and Barge Companies

For information on the carrier for an incident on a navigable water, such as a barge incident, contact the U.S. Coast Guard (USCG) at the USCG Command Center telephone: (617) 223-5757. All shipments of "certain dangerous cargoes," such as ethanol, are required to provide the USCG with notice of scheduled arrivals at least 24 hours, but not more than 96 hours, before arriving at the terminal for a cargo transfer.

Attachment 6 - RAILROAD AND MARINE FREIGHT PROFILES

1. Rail Freight Profile

Ethanol tank cars may be in a unit train (i.e., a train consisting of 100 or more ethanol tank cars) or a general consist (i.e., a freight train with mixed freight cars that includes one or more ethanol tank cars).

Information on the contents of the cars and the car location in general is on the Waybill (i.e., shipping papers) and the train conductor and the railroad dispatcher have copies of these papers.

Tank cars used to transport ethanol are typically the DOT 111, DOT 117, CPC 1232, or AAR T108 design.

The fittings for unloading railroad tank cars are not uniform; different manufacturers use different fittings and there are five or more different fittings currently in use.

To determine the correct outlet fittings for a tank car, the tank car manufacturer and number is needed. This information is located on the Builders Plate, which is located above the car's wheels near the Brake End (B End) of each tank car.

2. Barge Freight Profile

Tank barges are non-self-propelled vessels that have minimal or no crew accommodations onboard.

Tugs push or tow tank barges through the water.

Tank barges typically have cargo capacities of 420,000 to 630,000 gallons.

Attachment 7 - MASSACHUSETTS FOAM CACHES

Massachusetts AR-AFFF Foam Response Capabilities

(Source: Massachusetts Emergency Management Agency Survey October 2024)

Foam Capabilites

Location	Ownership	Fire District	HSAC Region	MassDEP Region	Unit Type[1]	Type of Foam Concentrate	Amount of Foam Concentrate[2]	Onboard tank, tote, or buckets	Stockpile (not on truck/trailer)
Ayer	Muni	6	NERAC	CERO 2	OBT	AR-SFFF Universal Green 3%-3%	90	OBT and Buckets	5 gal Buckets
Brockton	Muni	2	SERAC	CERO 2	OBT	AR-AFFF 3 % Universal Green	1060	OBT and Buckets	5 gal Buckets
Chelsea	Muni	13	MBHSAC	NERO 3	AFT/OBT	AR-AFFF 3 % or 6%	800	OBT/AFT/Tote	Totes
East Longmeadow	Muni	11	WERAC	WERO 1		AR-Synthetic 3%	140	Buckets	5 gal Buckets
Fairhaven	Muni	3	SERAC	SERO 4		AR-AFFF 3%	55	Buckets	
Gardner	Muni	8	CMHSAC	CERO 2	OBT	AR-AFFF 3%; Class A	215	Buckets	
Grafton	Muni	7	CMHSAC	CERO 2	AFT	AR-AFFF 3% Univ.l Gold (PFAS)	275		
Hatfield	Muni	10	WERAC	WERO 1		AFFF 0.1 to 1% ; AR-AFFF 3 to 6%	50	Buckets	5 gal Buckets
Hopkinton	Muni	14	NERAC	CERO 2	OBT	AR-AFFF Green Plus 3% Synth	350	OBT and Tender	
Lawrence	Muni	15	NERAC	NERO 3	AFT	AFFF PFAS Free 3%	300	AFT and Buckets	5 gal Buckets
Lynn	Muni	13	NERAC	NERO 3		AR-AFFF 3% to 6%	50	Buckets	5 gal Buckets
Medway	Muni	4	CMHSAC	CERO 2	OBT	Fluorine free synthetic foam 3-6%	550	OBT and Drum	55 gal Drums
Milford	Muni	14	CMHSAC	CERO 2	OBT	Synthetic Foam 3%	105	OBT and Buckets	
North Andover	Muni	15	NERAC	NERO 3	FT	AR-AFFF 3% or 6%	500		
Norton	Muni	3	SERAC	SERO 4		AR-AFFF 0.5%	340	OBT and Buckets	5 gal Buckets
Onset	Muni	2	SERAC	SERO 4	OBT	Fluorine Free Class A/B 3%	205	OBT and Buckets	5 gal Buckets
Plymouth	Muni	2	SERAC	SERO 4		Nova Cool, Silvex .1% to .5%	130	Buckets	5 gal Buckets
Sandwich	Muni	1	SERAC	SERO 4	AFT	AFFF 1% and 3%	565	Trailer / Buckets	5 gal Buckets
Southborough	Muni	14	CMHSAC	CERO 2	OBT	Synthetic Foam Novacool, 0.4%	50	OBT and Buckets	5 gal Buckets
Springfield	Muni	11	WERAC	WERO 1		AR-SFFF 3%	350	Buckets	5 gal Buckets
Sunderland	Muni	9	WERAC	WERO 1		Phos Chek WD881 Class A Synthetic Foam 0.1% to 1%	75	OBT and Buckets	
Sutton	Muni	7	CMHSAC	CERO 2	OBT	AR-AFFF	360	OBT and Buckets	5 gal Buckets
Weston	Muni	13	NERAC	NERO 3	OBT	Synthetic Foam 0.5%	260	OBT and Buckets	5 gal Buckets
Devens, MA	Muni	6&8	CMHSAC	CERO 2		Green PFAS free AR-AFFF 1-3%	50	Trailer / Buckets	
Nantucket	Muni	1	SERAC	SERO 4	AFT	PFAS AR-AFFF 1% - 3%	500	Trailer	
Tisbury	Muni	1	SERAC	SERO 4	AFT	PFAS AR-AFFF 1% - 3%	500	Trailer	

Aircraft Fire Equipment - AR-AFFF

Location	Ownership	Fire District	HSAC Region	MassDEP Region	Unit Type[1]	Type of Foam Concentrate	Amount of Foam Concentrate[2]	Onboard tank, tote, or buckets	Stockpile (not on truck)
Logan Airport 1	MassPort	13	MBHSAC	NERO 3	OBT	ANSUL T-Storm AR-AFFF 3%	1,275	OBT, Trailer	55-gal drums
Logan Airport Marine	MassPort	13	MBHSAC	NERO 3	FT	ANSUL T-Storm AR-AFFF 3%	537.5	Tank and Bucket	500 gal tank/ 5-gal bucket
Hanscom AFB	MassPort	14	WERAC	WERO 1	OBT	ANSUL T-Storm AR-AFFF 3%	220		
Joint Base Cape Cod	Mass State	1	SERAC	SERO 4		BIOEX Fluorine Free (F3) MIL Spec 3%	1260	OBT/FT/Tote	

Aircraft Fire Equipment - NOT AR-AFFF

Location	Ownership	Fire District	HSAC Region	MassDEP Region	Unit Type[1]	Type of Foam Concentrate	Amount of Foam Concentrate[2]	Onboard tank, tote, or buckets	Stockpile (not on truck)
MMR Otis AFB	Military	1	SERAC	SERO 4	FT	AFFF 3%			
Worcester Airport	MassPort	7 & 8	CRHSAC	CERO 2	OBT	Milspec ANSUL Ansulite 3% AFFF	2800	OBT	
Westover AFB	Military	11	WERAC	WERO 1	FT	AFFF 3%			
Logan Airport 1	MassPort	13	MBHSAC	NERO 3	OBT	Milspec ANSUL Ansulite 3% AFFF	8,245	OBT, Trailer, Drum, buckets	5-gal buckets
Logan Airport 2	MassPort	13	MBHSAC	NERO 3	OBT	Milspec ANSUL Ansulite 3% AFFF	2,760	OBT, Trailer, Drum, buckets	
Logan Airport Marine	MassPort	13	NERAC	NERO 3		Milspec ANSUL Ansulite/ Propack 3% AFFF	17.5	Buckets	5-gal containers
Logan Airport Marine	MassPort	13	NERAC	NERO 3		High Expansion 1 1/2% National Foam	20	Buckets	5-gal containers
Hanscom AFB	MassPort	14	WERAC	WERO 1	OBT	Milspec ANSUL Ansulite 3% AFFF	2720	OBT	
Hanscom AFB	Military	14	WERAC	WERO 1	FT	AFFF 3%			

Stockpiles of AR-AFFF

Location	Ownership	Fire District	HSAC Region	MassDEP Region	Unit Type[1]	Type of Foam Concentrate	Amount of Foam Concentrate[2]	Tote or buckets (Forklift?)	Already on a truck?
FT&S Tyngsboro	Vendor	All			Tender	AR-AFFF 1% - 3%	550	Tank	Yes
FT&S Tyngsboro	Vendor	All			Box truck	AR-AFFF 1% - 3%	450	Drum (8)	Yes
FT&S Tyngsboro	Vendor	All			Facility	AR-AFFF 1% - 3%	1,000	Drum (20)	No
FT&S Springfield	Vendor	All			Box truck				
FT&S Springfield	Vendor	All			Facility				
Braintree (CITGO 1)	Industry	13	NERAC	NERO 3	Trailer	AR-AFFF 3% - 6% UC working to replace with non-PFAS			
Braintree (CITGO 2)	Industry	13	NERAC	NERO 3	Trailer	AR-AFFF 3% - 6% UC working to replace with non-PFAS			
Braintree (CITGO 2)	Industry	13	NERAC	NERO 3	Trailer	AR-AFFF 3% - 6% UC working to replace with non-PFAS			

Notes:
1. AFT = Attack Foam Trailer (includes foam monitor); FT = Foam Trailer (no monitor); OBT=Onboard Tank
2. Amount in gallons

Attachment 8 - "QUICK REFERENCE" GUIDE FOR ETHANOL INCIDENT RESPONSE

INCIDENT COMMANDER'S QUICK REFERENCE

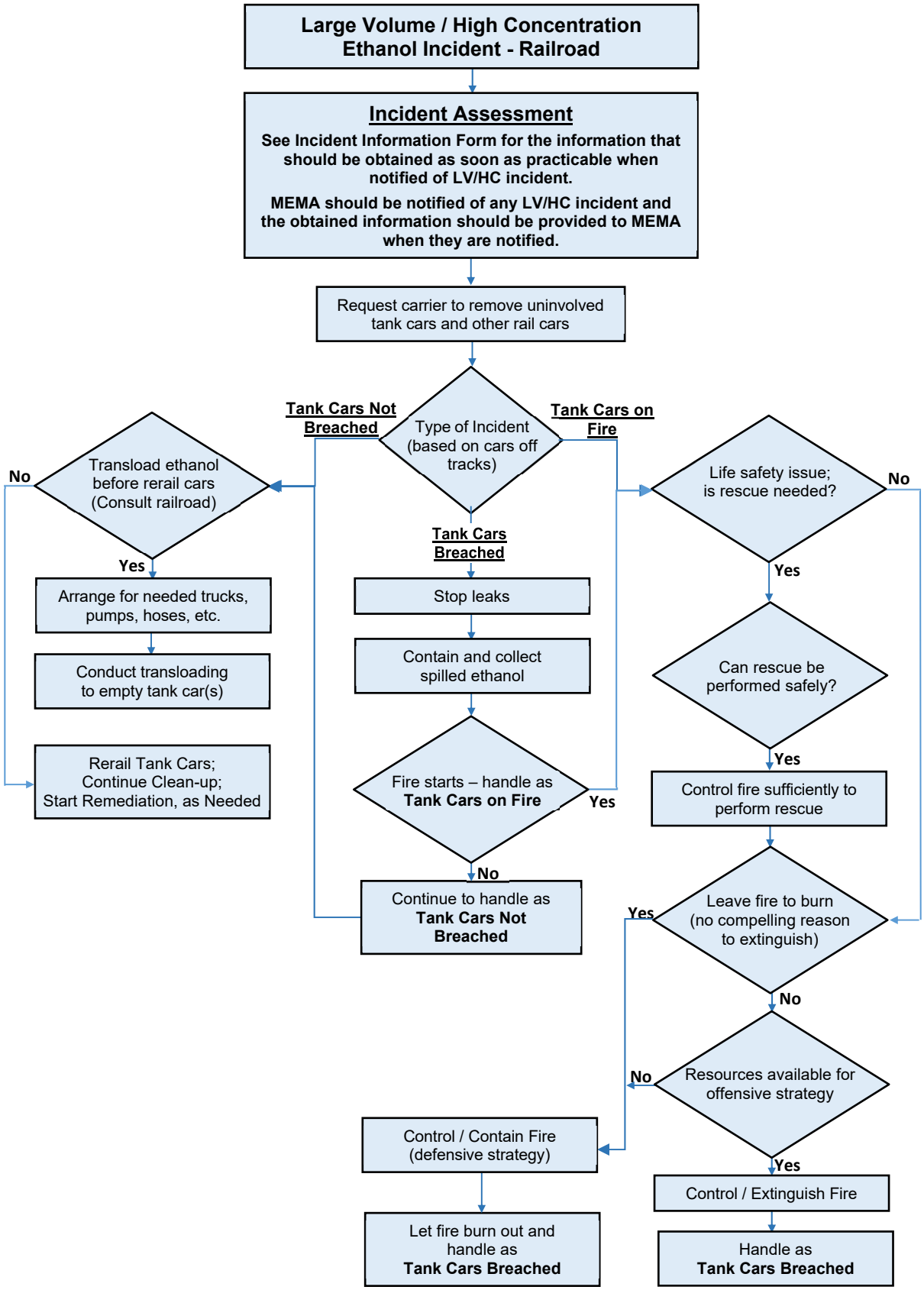
Contacts for Incident Support

- MA Department of Environmental Protection (MassDEP) 1-888-304-1133
- Massachusetts Emergency Management Agency (MEMA) (508) 820-2000

Critical Information for an Ethanol or Denatured Ethanol Incident

1. It is usually better to control and contain LV/HC ethanol fire and let it burn out. Fire suppression should only be attempted for life safety (i.e., rescue), and only if an offensive strategy can be implemented safely.
2. Placards on ethanol shipments may be 1987 (denatured ethanol; 95% to 99% ethanol), 3475 (ethanol and gasoline mixture; up to 94% ethanol), 1170 (ethanol or ethyl alcohol; 100% ethanol), or 3065 (alcoholic beverage).
3. After railroad tank cars breach and ethanol starts burning, there are less than two hours when offensive firefighting strategies can be effectively implemented.
4. Response effort for LV/HC ethanol incident is expected to last up to 72 to 96 hours before the hazards are sufficiently reduced and the incident can enter remediation and recovery phases.
5. Large quantities of Alcohol Resistant Aqueous Film-Forming Foam (AR AFFF) and huge amounts of water are needed to fight an ethanol fire and AR-AFFF is effective only when using a Type II discharge scenario to minimize plunging or submergence.
6. Foam Concentrations will be mixed and applied according to the manufacturer's instructions.
7. Ethanol will mix completely with water and is a good electrical conductor, so electrocution and ignition hazards (e.g., static electricity) may be present.
8. Ethanol vapors heavier than air (vapor density 1.59); ethanol is easily ignitable in open air with a flammable range of 3.3% (LFL) to 19% (UFL).
9. Ethanol burns with a nearly invisible flame and has less visible smoke than burning hydrocarbons, such as gasoline or crude oil.
10. Radiant heat flux from a burning ethanol fire can be 2 to 5 times greater than radiant heat flux from a gasoline fire.
11. Ethanol spills should be prevented from entering storm water systems, sewers, and waterways, as well as basements and confined spaces.
12. Ethanol can be contained on land by diking and/or damming with dirt, sand, plastic sheeting, or portable containment systems. Fire-resistant booms laid on the ground may be used to contain burning ethanol. Note: containment booms are ineffective on water because ethanol does not float.
13. Oil-only absorbents will not work with ethanol or denatured ethanol.
14. Surface and underground (well) water sources, such as used for public drinking water, industrial process/cooling water, or agriculture, can be severely impacted by ethanol release. Rapid notification to shut down these water withdrawals is critical to protect these systems' infrastructure.
15. Ethanol that gets into storm water systems or sewers can damage wastewater treatment plants because the ethanol may kill the bacteria used in wastewater treatment.

See the Large Volume/High Concentration Ethanol Incident Response Planning Guidance for additional information.


Large Volume / High Concentration Ethanol Incident - Railroad
Incident Assessment
See Incident Information Form for the information that should be obtained as soon as practicable when notified of LV/HC incident.
MEMA should be notified of any LV/HC incident and the obtained information should be provided to MEMA when they are notified.
Request carrier to remove uninvolved tank cars and other rail cars
Type of Incident (based on cars off tracks)
Tank Cars Not Breached
Tank Cars on Fire
Tank Cars Breached
Transload ethanol before rerail cars (Consult railroad)
No
Yes
Arrange for needed trucks, pumps, hoses, etc.
Conduct transloading to empty tank car(s)
Rerail Tank Cars; Continue Clean-up; Start Remediation, as Needed
Stop leaks
Contain and collect spilled ethanol
Fire starts – handle as Tank Cars on Fire
Yes
No
Continue to handle as Tank Cars Not Breached
Life safety issue; is rescue needed?
No
Yes
Can rescue be performed safely?
Yes
Control fire sufficiently to perform rescue
Leave fire to burn (no compelling reason to extinguish)
Yes
No
Resources available for offensive strategy
No
Yes
Control / Contain Fire (defensive strategy)
Let fire burn out and handle as Tank Cars Breached
Control / Extinguish Fire
Handle as Tank Cars Breached

Incident Information Form

Do Not Delay Notifications While Obtaining the Information

Incident Information **Date:**	**Time:**
Carrier Name:	
Carrier Contact:	
Address or Location:	
Nearest City:	**Distance:**
Involved Parties: **Individual Reporting**	**Incident Commander**
Name:	
Position:	
Telephone Number:	
Organization:	

Incident Details	
Type of Units:	**Type of Product:**
Number of Units:	**Number of Units Breached:**
Estimated Quantity Spilled:	**Is flow stopped?** **YES NO**
Is Spill Contained? **YES NO** **If NO, Direction and Speed Spilled Product Flowing:**	
Spill Enter Water or a storm drain or sewer system (the System)? **YES NO**	
If YES, Name of Water Body / System:	
If YES, Estimated Quantity in Water / System:	
If YES, Direction and Speed in Water / System:	
Injuries? YES NO If YES, Number:	**Fatalities? YES NO If YES, Number:**
Is there fire? YES NO If YES, Number of Units Involved:	
Evacuation necessary? YES NO If YES, Distance/Area Evacuated:	
Additional Information/Comments:	

Prepared by TRC JUNE 2016

Large Volume/High Concentration Ethanol Incident Response Quick Reference

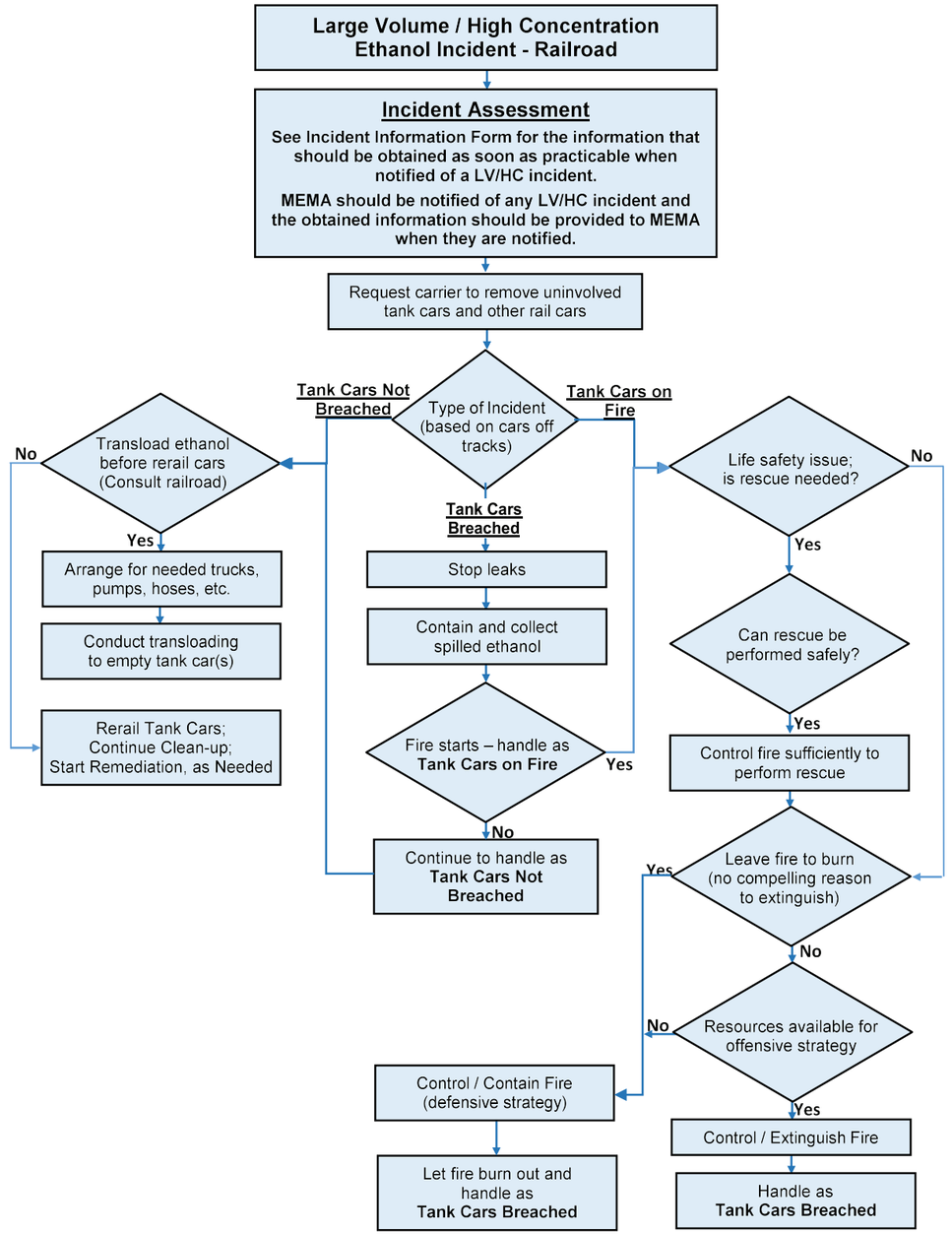
Emergency Contacts for Incident

Critical Information
Ethanol or Denatured Ethanol Incident

- Plan for response effort to last up to 72 to 96 hours.
- Preferred to control and contain a LV/HC ethanol fire and let it burn out. Only attempt fire suppression for life safety (i.e., rescue) and only if it can be done safely.
- There are less than two hours after railroad tank cars breach and fire starts before incident growth expected to make efforts to suppress fire ineffective.
- Placards on shipments: Typ. 1987 (denatured ethanol; 95% to 99% ethanol), 3475 (ethanol/gasoline mixture; ≤ 94% ethanol), 1170 (ethanol; 100% ethanol).
- Large quantities of AR AFFF and huge amounts of water are needed to fight an ethanol fire and AR-AFFF is effective only with a Type II discharge to minimize plunging or submergence.
- 500 gallons of foam concentrate mixed at 3% (mixed with 16,300 gallons of water) can handle a spill about 75 ft by 75 ft (5,600 sq ft; 370 gallons, 6 inches deep). Required foam application rate of 1,100 gpm for 15 minutes.
- In water, the ethanol component will readily mix with water and the denaturant will separate and float on the water surface.
- Ethanol and ethanol mixed with water are good electrical conductors. Electrocution and ignition hazards (e.g., static electricity) may be present.

See the MEMA LV/HC Ethanol Incident Response Planning Guidance for additional information

- Ethanol vapors (vapor density 1.59) heavier than air; vapors ignite easily in air - flammable range: 3.3% to 19%.
- Ethanol burns with a nearly invisible flame and has less visible smoke than burning gasoline or crude oil.
- Radiant heat flux from a burning ethanol fire can be 2 to 5 times greater than radiant heat flux from a gasoline fire.
- Prevent ethanol spills from entering storm water systems, sewers, and waterways (and basements and confined spaces); vapors in confined spaces are explosion hazard.
- Oil-only absorbents do not work for denatured ethanol, use universal absorbents or water absorbing material.
- Contain ethanol on land by diking and/or damming with dirt, sand, plastic sheeting, or portable containment systems. Fire-resistant booms laid on the ground may be used to contain burning ethanol. **Note:** containment booms not effective on water since ethanol does not float.
- The HMRT are trained and equipped to stop leaks and MassDEP technicians are trained and equipped for spill containment and collection, so both agencies may be needed for the incident response.



Notes:

Primary Activities

Primary objective for a LV/HC ethanol incident is life safety; secondary objectives are the protection of property and the environment. To achieve these objectives, the primary response activities include fire control and spill control.

Firefighting

It is preferred to control and contain a LV/HC ethanol fire and let it burn out. Only attempt fire suppression for life safety (i.e., rescue) and only if it can be done safely. Generally, the Incident Commander has less than approximately two hours to implement an effective offensive firefighting strategy; however, do not start an offensive strategy if there are not adequate water, AR-AFFF concentrate, and trained firefighters available for the estimated size and needs of a given incident.

After six to 12 hours, most of the ethanol will have burned, infiltrated into the ground, and/or become sufficiently diluted with water, and offensive tactics to extinguish any remaining fire may be appropriate.

Spill Response

To prevent potential serious environmental impacts and since ethanol is relatively clean burning, control and containment and allowing ethanol to burn off is preferred if it catches fire. Note that receiving permission from the regulatory agencies for in situ burning of released ethanol to re-ignite a fire after it has been suppressed is not expected to be granted in a timely manner.

Secondary Activities

Security - Establishing and maintain a perimeter, crowd control, and traffic control.

Communication - Primary communication between the Incident Command Post, the local EMAs, and SEOC is via radio, telephone, and e-mail. It is imperative that these systems be activated and/or installed as soon as practicable after the Incident Command Post (ICP) has been established.

Public Information - Warnings and on-going service announcements and/or information sharing, will be coordinated. In addition, the UC must approve information disseminated regarding the specific incident, including press releases and media interviews.

Evacuation/Shelter-in-Place - When a LV/HC ethanol incident impacts or has the ability to impact the nearby population, a shelter-in-place or evacuation decision must be made.

Clean-up, Remediation, and Recovery - Once the response phase of a LV/HC ethanol release is complete, recovery actions and remediation activities will begin. Depending on the incident, the recovery action process is usually overseen by MassDEP.

Ethanol Spill Response Considerations

- Response effort for a LV/HC ethanol incident is expected to last up to 72 to 96 hours before the hazards from the incident are sufficiently reduced and the incident can enter remediation and recovery phases.
- Ethanol and denaturant (i.e., gasoline) will separate on contact with water (surface water, groundwater, or firefighting water); ethanol component will readily mix with water and the denaturant will typically separate and float on the water surface.
- Ethanol and ethanol fuel blends have different properties than gasoline and require different spill response techniques and equipment than gasoline or diesel fuel.
- Leaks should be stopped (e.g., valves closed, leaks plugged) if this can be done safely.
- Surface and underground (well) water sources (drinking water, process water, cooling water, aquaculture), can be severely impacted by an ethanol release. Rapid notification to shut down these water withdrawls is critical to protecting these systems' infrastructure.
- Spills should be prevented from entering storm water systems, sewers and waterways, as well as basements and confined spaces.
- Ethanol in storm water systems or sewers can damage wastewater treatment plants because the ethanol kills the bacteria used in wastewater treatment.
- Ethanol can be contained by diking and/or damming with dirt, sand, or portable containment systems.
- Ethanol readily mixes with water and once it enters waterways it is not easily recoverable by emergency responders.
- Ethanol in surface water bodies may cause significant fish kills and other damage by direct contact and/or depleting dissolved oxygen fish and other water life need.
- Aeration of water bodies may be effective in increasing the dissolved oxygen in the water and increasing thee biological degradation of ethanol.
- Most vacuum trucks will not work to recover ethanol, unless they have special filters designed for polar solvents.
- Absorb with water-absorbent materials (cat litter, pads, booms, etc.) – universal absorbents may be effective (check with manufacturer); "oil only" absorbents, pads, and booms will only absorb the gasoline component, but not ethanol.
- Use clean non-sparking tools to collect absorbed material.
- Ethanol may harm water supplies used for drinking, process, aquaculture, or cooling water, as well as WWTP, so warn owners/operators of water intakes and WWTP that may be threatened.

Ethanol Firefighting Considerations

- Ethanol and ethanol fuel blends have different properties than gasoline and require different firefighting techniques and equipment than gasoline or other hydrocarbons.
- Under fire conditions, high concentration ethanol has less visible smoke than a gasoline fire and ethanol burns with a virtually invisible flame after the denaturant (typically gasoline) burns off, so thermal imaging devices or other means (e.g., straw broom held above suspected areas) should be used to detect areas that may still be burning.
- Incident heat flux from an ethanol fire can be 2 to 5 times greater than the incident heat flux from a gasoline fire.
- Only AR-AFFF and copious amounts of water are effective fire suppression techniques for fire involving ethanol.
- 500 gallons of foam concentrate mixed at 3% (mixed with 16,300 gallons of water) can handle a spill about 75 ft by 75 ft (5,600 sq ft; 370 gallons, 6 inches deep). Required foam application rate of 1,100 gpm for 15 minutes.
- AR-AFFF appears to be effective only when using a Type II discharge scenario (i.e., fixed discharge applied to a vertical surface so as to provide a more gentle application that minimizes plunging or submergence).
- Foam does not work if material is too hot, so if foam is to be applied to an ethanol fire, surfaces may need to be cooled first.
- Massive quantities of foam concentrate and water, large application devices, and well-trained personnel are required to handle a large volume ethanol fire – do not expect to have adequate resources to fight a rail car fire.
- Although available AR-AFFF foam and other resources may not be sufficient to put out a LV/HC ethanol fire, foam may can be used in other ways to control an incident. For example, if ethanol enters a storm drain or sewer, AR-AFFF foam can be used to suppress vapors in the lines and minimize the potential for igniting the vapors and causing additional damage.
- Large foam caches of AR-AFFF strategically located and readily transportable in large volume containers are critical to successful fire control and extinguishment.
- In general, do not expect a local airport Aircraft Rescue and Firefighting vehicle to effectively fight an ethanol fire; the FAA requires airport firefighting vehicles to carry straight AFFF for aviation fuel fires, not AR-AFFF. Note that the Massachusetts Port Authority Fire Department has one fire engine (Engine 5) and a foam trailer (Foam Trailer 1) that have AR-AFFF foam concentrate and these units are located at Boston Logan International

Shipping Name / Description	Placard
Denatured alcohol; alcohols not otherwise specified; 95% to 99% ethanol	
Ethanol and gasoline mixture, with more than 10% ethanol (typically up to 94% ethanol)	
Ethanol or ethanol solution (typically 100% ethanol that has not been denatured)	
Alcoholic beverages (ethanol for consumption)	

Notes: