

What We Learned from Ethanol Train Derailment Fires

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Hildebrand and Noll Associates, Inc. (HNA) and TRC Companies, Inc. (TRC), recently assisted the Massachusetts Emergency Management Agency (MEMA) develop the Large Volume/High-Concentration Ethanol Appendix (the Appendix) to the Hazardous Material Annex of the Commonwealth of Massachusetts Comprehensive Emergency Management Plan. The purpose of this Appendix was to promote situational awareness and outline the operational activities for a state response to an emergency involving large volumes of high concentration ethanol, such as a derailment of tank cars transporting denatured ethanol. To facilitate development of the Appendix, HNA and TRC performed an in-depth analysis of eleven ethanol train derailments for unit trains or general freight trains with multiple ethanol tank cars coupled in sequence that occurred in the United States from 2006 through 2015.

The analysis primarily used the information from the National Transportation Safety Board (NTSB) and Federal Railroad Administration (FRA) databases, which was supplemented with additional information from news reports, as needed. Our objective was to identify key planning assumptions that would be used in developing the Appendix, by focusing on the number and types of cars derailed, approximate train speeds at the time of the derailment, number of cars breached, amount of product released, and whether or not the released ethanol caught fire.

As a result of this study, some of the planning assumptions for an ethanol train derailment and subsequent fire, where applicable, are as follow:

- Most ethanol tank train derailments will result in car failures regardless of tank car type;
- Expect a rapid escalation in the incident, which will require a rapid response and the need for an Incident Management Team;
- Prepare for large ethanol fires involving multiple tank cars because the fire attack must be successful in the first two hours to change the outcome;
- Expect large volumes of ethanol to be released or involved in fire, so long term environmental impacts from burning off product versus impacts to water or soil should be considered;
- The risk of breach and failure during a low speed derailment in an urban area where track speeds may be regulated to 10 or 25 miles per hour is still significant.