

IAFF SAFETY ADVISORY

RESPONDING TO TRAIN DERAILMENTS WITH VENT AND BURN CONSIDERATIONS • AUGUST 2024



Recent events – including the February 2023 train derailment in East Palestine, Ohio – have underscored the critical importance of proper safety measures when responding to hazardous materials incidents. One such measure is the “vent and burn” procedure, a controlled release and ignition of hazardous gases to prevent explosions or uncontrolled releases.

This advisory provides comprehensive guidance on managing these high-risk situations, highlighting the circumstances of the East Palestine incident, the importance of obtaining information from the shipper, and the availability of federal guidance on when the vent and burn method may be appropriate.

2023 EAST PALESTINE, OHIO DERAILMENT

The train derailment in East Palestine involved several rail cars carrying hazardous materials, including vinyl chloride (VCM), a highly flammable and toxic chemical. It is important to note that the Safety Data Sheet for VCM was generic and not applicable to the stabilized product being shipped. Therefore, contact with the shipper and chemical experts to confirm is always the best method of obtaining more accurate information.

The decision to implement a vent and burn procedure was based on the interpretation of an energetic Pressure Relief Device (PRD) actuation followed by its cessation, leading to the belief that VCM had polymerized, obstructing the PRD and causing a build-up of pressure. However, expert assessments and available evidence indicated that polymerization was unlikely and would only occur if there were an intrusion of oxygen into this stabilized, non-inhibited material. According to the NTSB report, despite these expert opinions and evidence suggesting otherwise, the decision to proceed with a vent and burn was made. This incident underscores the importance of careful consideration and thorough evaluation before implementing such procedures.

KEY TAKEAWAYS FROM THE NTSB REPORT:

- The importance of consulting with chemical experts and incorporating their assessments into the decision-making process.
- Continuous monitoring of tank car temperatures to provide critical data for assessing the risk of polymerization and/or a Boiling Liquid Expanding Vapor Explosion (BLEVE).
- Effective communication of expert opinions and findings to decision-makers – including emergency responders – to ensure a well-informed response.

SAFETY CONSIDERATIONS

OBTAIN COMPREHENSIVE INFORMATION FROM THE SHIPPER

- Ensure accurate identification of hazardous materials involved. This includes chemical composition, volume, and potential hazards.
- Obtain shipping documents (e.g., Safety Data Sheets, shipping manifests) from the rail carrier and/or chemical manufacturer. These documents provide critical physical and chemical properties as well as emergency response considerations for the chemical(s) involved in the incident.
- Incident command should have a direct line of communication with the shipper to obtain real-time information and updates on the hazardous materials.

SCENE ASSESSMENT

- Conduct a thorough risk assessment of the derailment site. Consider factors such as fire potential, explosion risk, environmental impact, and public/community safety.
- Coordinate with hazardous materials experts, including local/state HazMat teams, railroads, shippers, and federal agencies, to determine the best course of action for incident stabilization.
- Account for environmental factors, weather conditions, and topography that may influence the behavior of hazardous materials and the efficacy of response measures.

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FEDERAL GUIDANCE ON VENT AND BURN PROCEDURES

- Utilize federal resources and guidelines from agencies such as the National Transportation Safety Board, Environmental Protection Agency, and the Department of Transportation to inform decision-making processes.
- Understand the specific criteria and scenarios where vent and burn procedures are appropriate. These guidelines consider factors such as chemical properties, environmental conditions, and potential risks to responders and the public.
- Ensure all actions comply with relevant federal, state, and local regulations to maintain legal integrity and public trust.

EXECUTE WITH CAUTION

- Ensure all safety protocols and personal protective equipment (PPE) are in place before initiating a vent and burn procedure. This includes flame-resistant clothing, respiratory protection, chemical-resistant gloves, and fire suppression mediums, preferably through unmanned water master streams.
- Establish a secure perimeter and maintain control over the incident scene to prevent unauthorized access and ensure the safety of all personnel. Implement exclusion zones and use barriers to control access.
- Continuously conduct air monitoring of the scene and surrounding area and maintain clear communication with all involved parties, including local authorities and the public.

IT IS THE RECOMMENDATION OF THE IAFF THAT VENT AND BURN IS ALWAYS THE LAST AND FINAL OPTION.

In East Palestine, a cold tap (drilling of holes into a live tank without the use of welding or hot work) was unachievable due to damaged fittings.

1. Conduct an assessment with the shipper and railroad to determine the necessity and feasibility of a vent and burn procedure. Note: In rail cars that are jacketed, it is unlikely to obtain a true temperature reading with a thermal imaging camera.
2. Establish a safety perimeter based on the potential blast radius and downwind hazards.

3. Carefully vent the hazardous material in a controlled manner to prevent uncontrolled release or explosion.
4. Ignite the released material in a controlled manner to ensure complete combustion and minimize environmental impact.
5. Monitor the burn process to ensure it remains controlled and does not spread beyond the intended area.
6. Conduct post-incident environmental impact assessments to identify and mitigate any residual hazards.

No emergency responders should actively participate in the vent and burn process without adequate training and personal protective equipment.

RESOURCES AND FURTHER READING

- **National Transportation Safety Board (NTSB):** www.nts.gov
- **Norfolk Southern Railway Derailment and Hazardous Materials Release NTSB Report:** <https://www.nts.gov/investigations/Pages/RRD23MR005.aspx>
- **Environmental Protection Agency (EPA):** www.epa.gov
- **Department of Transportation (DOT):** www.transportation.gov
- **Emergency Response Guidebook:** A comprehensive resource for first responders dealing with hazardous materials incidents.
- **IAFF HazMat Training:** www.iaff.org/hazmat-training