

EXECUTIVE SUMMARY

There have been numerous losses involving hazardous waste at treatment, storage and disposal facilities (TSDFs) ranging from small to large fires to vapor cloud explosions. Some losses are localized to a drum, its contents and one or more workers to spreading throughout buildings and the plant and, in some cases, prompting community evacuations. The fire problem spans from small storage facilities to larger TSDF processing plants and has involved a cross section of hazardous materials. Numerous TSDFs have had repeat occurrences. TSDFs are unique in many respects. TSDFs may use, handle and store the entire cross section of physical and health hazard materials in widely fluctuating quantities. TSDFs rely on the generator to properly classify the waste; some waste is brokered by a thirdparty. A hazardous waste may have multiple hazards and TSDFs may have mixed hazardous materials stored together.

This project examined the TSDF fire problem, hazardous waste regulations and the fire codes which apply to these facilities. Numerous gaps were identified: two gaps were National Fire Protection Association (NFPA)-related while nine additional gaps were found to relate more to TSDF stakeholders. The first major gap was **recognition and proper implementation of the fire codes** by the U.S. Environmental Protection Association (EPA), authorities having jurisdiction (AHJs) and TSDF stakeholders. Prior to the first edition of NFPA 400 *Hazardous Materials Code* in 2010, it was likely less clear that the NFPA codes and standards covered hazardous waste. NFPA 400 better clarifies that hazardous materials codes includes hazardous waste. Once properly classified, NFPA 1 *Fire Code*, NFPA 400 and other hazardous materials codes and standards give guidance on the fundamental safeguards for the use, handling and storage of hazardous waste based on the physical hazard class. NFPA 484 *Standard for Combustible Metals* has a new chapter on recycling and waste management facilities that handle combustible metal scrap and waste. As an industry, TSDFs are likely aware of other TSDF losses and of NFPA codes and standards as industry standards in fire prevention and protection. Where fire codes are locally adopted, the AHJ has to understand the TSDFs have to comply.

Proper implementation of the fire code should occur and/or be verified during the permitting process. Where not locally adopted, the AHJs could require compliance with the building and fire codes using their ‘omnibus authority provision’ granted by federal regulations. Implementation of building and fire codes at TSDFs would reduce the risk of most emergency events involving hazardous materials.

A second gap identified was the **classification of hazardous waste**. Improperly EPA-classified waste and highly hazardous materials were identified as root causes and/or responsible for fatalities and rapid spread of fire of some TSDF losses. The classification of waste by NFPA in light of EPA waste characteristics and regulations is not clear.

Mixtures; the lack or inconsistency of test methods; that dilution is not always the solution; and lack of Material Safety Data Sheet (MSDS)-type chemical hazard information are some of the issues related to classification. Some waste streams may be fairly constant and well-characterized; others can vary or be unique like site clean-up waste after train derailments, tank ruptures, process upsets, spills, etc. The well-characterized have established hazards; their risk

increases with quantity and proximity to other hazardous materials, tanks, structures, the neighboring communities, etc. High-hazard chemicals can be defined, identified and listed in a NFPA 400 annex. Identification of unwanted reactions is more challenging. Expert assistance may be required to perform a hazard determination of some waste.

If required, a subsequent project could explore a strawman classification for hazardous waste. One recent loss involved pyrotechnic waste. The special case of how best to classify and handle pyrotechnic waste as hazardous waste is addressed.

Other, sometimes inter-related, gaps identified not attributed to the NFPA but to the TSDF owners and operators were chemical hazard awareness including recognizing high hazard chemicals; need to establish a procedure for off-spec or unique waste; emergency response training; and, lack of or not properly performed process safety management and/or hazard and operability studies. Once fire protection strategies are established per the building and fire codes including NFPA 400 and other hazardous materials codes and standards, vigilance would be required to maintain the inventory that can be protected by the fire protection system as designed, if present or per specified separation.

Recommendations are made to the hazardous chemicals technical committee including consideration of a chapter similar to NFPA 484 *Standard for Combustible Metals* Chapter 19 addressing Recycling and Waste Management Facilities and also annex material specific to hazardous waste. NFPA 400 and this report should address and resolve previous and recent U.S. Chemical Safety Board (CSB) recommendations stemming from TSDF losses to develop a standard for TSDFs.