National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: DEC 15 2004

In reply refer to: R-04-10

Mr. Samuel G. Bonasso
Acting Administrator
Research and Special Programs Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

About 9:30 a.m. central daylight time on September 13, 2002, a 24,000-gallon-capacity railroad tank car, DBCX 9804, containing about 6,500 gallons of hazardous waste, catastrophically ruptured at a transfer station at the BASF Corporation chemical facility in Freeport, Texas. The tank car had been steam-heated to permit the transfer of the waste to a highway cargo tank for subsequent disposal. The waste was a combination of cyclohexanone oxime, water, and cyclohexanone. As a result of the accident, 28 people received minor injuries, and residents living within 1 mile of the accident site had to shelter in place for 5 1/2 hours. The tank car, highway cargo tank, and transfer station were destroyed. The force of the explosion propelled a 300-pound tank car dome housing about 1/3 mile away from the tank car. Two storage tanks near the transfer station were damaged; they released about 660 gallons of the hazardous material oleum (fuming sulfuric acid and sulfur trioxide).[1]

The National Transportation Safety Board determined that the probable cause of the rupture of railroad tank car DBCX 9804 was overpressurization resulting from a runaway exothermic decomposition reaction initiated by excessive heating of a hazardous waste material. Contributing to the accident was the BASF Corporation's failure to monitor the temperature and pressure inside the tank car during the heating of the hazardous waste.

As a result of its investigation of the accident, the Safety Board identified the adequacy of procedures for heating hazardous materials cargoes in railroad tank cars before transfer as a safety issue.

The Safety Board addressed issues involving the heating of hazardous materials cargoes prior to unloading in its investigation of the rupture of a railroad tank car that took place in Clymers, Indiana, on February 18, 1999.[2] The Safety Board determined that the tank car

[1] For additional information, read National Transportation Safety Board, *Rupture of a Railroad Tank Car Containing Hazardous Waste, Freeport, Texas, September 13, 2002*, Hazardous Materials Accident Report NTSB/HZM-04/02 (Washington, DC: NTSB, 2004).

[2] National Transportation Safety Board, *Rupture of a Railroad Tank Car Containing Hazardous Waste Near Clymers, Indiana, February 18, 1999*, Hazardous Materials Accident Report NTSB/HZM-01/01 (Washington, DC: NTSB, 2001).

overpressurized and catastrophically ruptured after a waste material had been heated in it for more than 28 hours over several days. As in the Freeport accident, the internal tank conditions were not monitored during the heating process. In the Clymers investigation, the Safety Board determined that the failures in the procedures were attributable to the companies involved with the shipment and heating. Consequently, the Safety Board issued the following safety recommendations to the specific companies involved with the generation and disposal of the waste material in the Clymers accident:

> I-01-2 through -5
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> Collaborate with applicable producers, shippers, consignees, and end-users in the development and implementation of specific and written procedures for the loading or offloading of any chemical or waste material from a railroad tank car, highway cargo tank, or other bulk transportation vessel when the chemical or waste material exhibits properties that require special handling or processing during the loading or offloading operation.

Two of the four companies receiving the safety recommendations did not respond. Safety Recommendations I-01-2 and -3 were therefore classified as "Closed—Unacceptable Action—No Response Received" on July 31, 2003. The third company responded that it considered the recommendation unwarranted. Consequently, Safety Recommendation I-01-4 was classified as "Closed—Unacceptable Action" on September 12, 2001. The fourth company ultimately determined not to implement Safety Recommendation I-01-5, which was classified as "Closed—Unacceptable Action" on September 16, 2004. Because of the lack of action by the companies involved in the Clymers accident, as well as the circumstances of the Freeport accident, the Safety Board is concerned that the heating of hazardous materials cargoes in railroad tank cars remains a significant safety problem.

The U.S. Department of Transportation (DOT) hazardous materials regulations (49 *Code of Federal Regulations*, Subchapter C) do not specifically address the heating of cargo in tank cars. On October 30, 2003, the Research and Special Programs Administration (RSPA) published a final rule under docket HM-223 that was intended to clarify the applicability of the hazardous materials regulations to the loading, unloading, and storage of hazardous materials during transportation. Under this final rule, with respect to tank cars and other bulk containers, RSPA has interpreted "unloading incidental to movement," which is subject to the DOT hazardous materials regulations, to take place only when a hazardous material is emptied from its bulk packaging after the material has been delivered to the consignee and prior to the delivering carrier's departure from the consignee's facility or premises. Because virtually all tank cars are unloaded by the consignee after the delivering rail carrier has departed, this rule in effect means that RSPA no longer considers the unloading of a tank car to be a RSPA-regulated transportation function.

The final rule under HM-223 was to have become effective on October 1, 2004. In a *Federal Register* notice published on May 28, 2004, RSPA stated it was delaying the effective date to January 1, 2005. In the notice, RSPA stated that it had received 14 appeals to the final rule. According to RSPA, the appellants raised a number of issues concerning the consistency of the final rule with Federal hazardous materials transportation law, State and local regulation of

hazardous materials facilities, the relationship of the DOT hazardous materials regulations to Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) regulations, the definition of "unloading incidental to movement," and other aspects of the final rule. Also, 11 industry associations filed a petition on December 29, 2003, in the U.S. Court of Appeals for the District of Columbia to reverse the HM-223 final rule.

The Safety Board initially summarized its concerns in an October 29, 2001, response to the Notice of Proposed Rulemaking for HM-223 by stating that the proposed rule may result in the elimination of effective Federal oversight of hazardous materials loading/unloading operations for bulk transportation containers. The Safety Board also emphasized in its response that the Board has historically and consistently considered loading and unloading operations, particularly of bulk containers such as tank cars, to be transportation-related functions. The Board also expressed its belief that the DOT has both the statutory mandate and the authority to regulate loading and unloading operations, and that the DOT should strengthen its oversight of these operations rather than ignore these issues.

The Safety Board's concerns were reinforced as a result of its investigation of the July 14, 2001, accident at a chemical plant in Riverview, Michigan.[3] In this accident, methyl mercaptan, a poisonous and flammable gas, was released and ignited during the offloading of a railroad tank car. Three plant employees were killed and about 2,000 residents were evacuated from their homes for 10 hours. Although the unloading operations involving the accident tank car were subject to OSHA's process safety management and the EPA's risk management programs, the Safety Board concluded that effective oversight of hazardous materials loading and unloading operations from tank cars and other bulk containers was not provided by the Federal Railroad Administration, the EPA, or OSHA. As a result, the Safety Board issued the following safety recommendations to the DOT:

> I-02-1
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> Develop, with the assistance of the EPA and OSHA, safety requirements that apply to the loading and unloading of railroad tank cars, highway cargo tanks, and other bulk containers that address the inspection and maintenance of cargo transfer equipment, emergency shutdown procedures, and personal protection requirements.
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> I-02-2
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> Implement, after the adoption of safety requirements developed in response to Safety Recommendation I-02-1, an oversight program to ensure compliance with these requirements.

The Safety Board also issued Safety Recommendations I-02-3 and -4 to OSHA and the EPA, respectively, to recommend that they assist the DOT in the development of the safety requirements referred to in Safety Recommendations I-02-1 and -2.

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[3] National Transportation Safety Board, *Hazardous Materials Release from Railroad Tank Car With Subsequent Fire at Riverview, Michigan, July 14, 2001*, Hazardous Materials Accident Report NTSB/HZM-02/01 (Washington, DC: NTSB, 2002).

In a November 25, 2002, response to Safety Recommendations I-02-1 and -2, RSPA noted that it had worked closely with OSHA and the EPA on various hazardous materials issues and that it was proceeding with the HM-223 rulemaking. In a February 25, 2003, reply to RSPA's response, the Safety Board again expressed its concern that the rulemaking could have an adverse effect on the safety of loading and unloading operations, and the Board classified both recommendations "Open—Unacceptable Response." OSHA and the EPA responded to Safety Recommendations I-02-3 and -4 in August and October 2002, respectively. The two agencies pledged to work with the DOT to develop the needed safety requirements. As a result, the Safety Board classified Safety Recommendations I-02-3 and -4 "Open—Acceptable Response."

The Safety Board's investigation of the Riverview accident identified a lack of effective oversight of hazardous materials loading and unloading operations with respect to inspection and maintenance of equipment, emergency shutdown procedures, and personal protection. Further, the accidents in Clymers and Freeport identify a lack of Federal oversight when hazardous materials in railroad tank cars are heated prior to unloading the materials. In the absence of any apparent Federal regulations addressing this issue, and given the uncertainty over the eventual outcome of the appeals to HM-223, the Safety Board concluded that Federal oversight of operations for heating hazardous materials in railroad tank cars prior to unloading is inadequate.

Therefore, the National Transportation Safety Board makes the following safety recommendation to the Research and Special Programs Administration:

> In cooperation with the Occupational Safety and Health Administration and the Environmental Protection Agency, develop regulations that require safe operating procedures to be established before hazardous materials are heated in a railroad tank car for unloading; at a minimum, the procedures should include the monitoring of internal tank pressure and cargo temperature. (R-04-10)

The Safety Board also issued safety recommendations to the Occupational Safety and Health Administration and the Environmental Protection Agency.

Please refer to Safety Recommendation R-04-10 in your reply. If you need additional information, you may call (202) 314-6177.

Vice Chairman ROSENKER and Members CARMODY, HEALING, and HERSMAN concurred in this recommendation. Chairman ENGLEMAN CONNERS did not participate.

By: Mark V. Rosenker
Vice Chairman