National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: June 29, 2000

In reply refer to: I-00-7

Honorable Charles N. Jeffress
Assistant Secretary of Labor for Occupational Safety and Health
Occupational Safety and Health Administration
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendation in this letter. The Safety Board is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

This recommendation is derived from the Safety Board's recent investigation of two accidents involving the unloading of hazardous materials from cargo tanks. In one accident, the driver was killed; in the other, more than 3,000 people were either evacuated or ordered to stay inside and keep doors and windows closed.[1] This recommendation is consistent with the evidence we found and the analysis we performed. As a result of these investigations, the Safety Board has issued seven safety recommendations, one of which is addressed to the Occupational Safety and Health Administration. Information supporting the recommendation is discussed below. The Safety Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.

On June 4, 1999, at approximately 3:30 a.m., a Quality Carriers, Inc., truckdriver arrived at Whitehall Leather Company[2] in Whitehall, Michigan, and was directed by a Whitehall Leather Company shift supervisor to an area to unload his cargo tank, which was filled with sodium hydrosulfide solution. The driver connected the cargo delivery hose, at the direction of the supervisor, to the wrong storage tank, one that contained aqueous ferrous sulfate. Only one transfer connection was at that location, and it was clearly marked "FERROUS SULFATE."

[1] For more information, see Hazardous Materials Accident Briefs HZB/00/02, *Chemical Reaction During Cargo Transfer, Louisville, Kentucky, November 19, 1998*; and HZB/00/03, *Chemical Reaction During Cargo Transfer, Whitehall, Michigan, June 4, 1999.*

[2] A division of Volunteer Leather and a GENESCO Company.

When sodium hydrosulfide from the cargo tank mixed with ferrous sulfate solution in the storage tank, a reaction occurred that produced hydrogen sulfide, a poisonous gas.

About 10 minutes after the transfer operation started, an employee in the basement of the tannery building smelled a pungent odor and lost consciousness. The employee said that after regaining consciousness about 10 minutes later, he made his way out of the tannery and to an area adjacent to the south parking lot, where he found other employees on break. One of those employees called 911. The driver was found unconscious inside the tannery building, about 230 feet from the transfer area. He was pronounced dead at the scene and was later determined to have been overcome by hydrogen sulfide gas. Damages in the accident exceeded $411,000.

About 7 months before the Whitehall Leather accident, the Safety Board investigated a similar accident at Ford Motor Company's Kentucky Truck Plant in Louisville, Kentucky. On the morning of November 19, 1998, a truckdriver driving a Matlack, Inc., cargo tank truck arrived at the plant to deliver a liquid mixture of nickel nitrate and phosphoric acid. At the plant's chemical transfer station, a plant pipefitter connected the truck's transfer hose to a transfer connection, then departed the area, leaving the truckdriver to complete the delivery alone. But the pipefitter had inadvertently connected the hose to the wrong connection. The driver did not check whether the connection was correct and began unloading product, thereby introducing nickel nitrate and phosphoric acid solution into a storage tank containing sodium nitrite solution.

When the nickel nitrate and phosphoric acid solution mixed with the sodium nitrite solution, a chemical reaction occurred that produced toxic gases of nitric oxide[3] and nitrogen dioxide.[4] About 10 minutes after the transfer operation started, an orange vapor cloud was observed coming from the bulk storage building. As a result, 2,400 people were evacuated from the plant and surrounding businesses, and about 600 local residents were told by authorities to remain inside their homes. Three police officers, three Ford Motor Company employees, and the driver were treated for minor inhalation injuries. Damages exceeded $192,000.

In both investigations, the Safety Board identified deficiencies in emergency communications capability at the hazardous materials transfer site. In the Whitehall accident, after the reaction started between the sodium hydrosulfide and ferrous sulfate solutions, the driver apparently shut the emergency valve in the rear of the truck to stop the transfer of cargo and then entered the loading dock east of the transfer station and turned off the air hose that was supplying compressed air to the cargo tank. The driver then presumably proceeded into the plant through the loading dock to try to notify others of the emergency. He collapsed and sustained fatal injuries as a result of hydrogen sulfide poisoning.

Had an emergency communication system been available at the transfer station, the driver would have been able to notify plant personnel about the emergency without entering the plant. The Safety Board concludes that in the Whitehall Leather Company accident, had emergency communication equipment been installed at the bulk chemical transfer station, the driver would not have had to enter the plant to warn personnel about the emergency and thus would not have been exposed to a possibly greater concentration of poisonous gas.

[3] Nitric oxide is toxic when inhaled and is a strong irritant to skin and mucous membranes.

[4] Nitrogen dioxide may be fatal if inhaled.

In the Louisville accident, the driver started the transfer of hazardous materials after the Ford employee left the area. Approximately 10 minutes after the transfer began, the driver observed an orange vapor above the bulk storage room. Although he was not certain that the unloading operation was related to the vapor, the driver immediately shut down the unloading operation as a precaution and waited for someone to come out of the building. Since no plant personnel were present, the driver was not familiar with the plant layout, and he had no readily available means of emergency communications at the transfer station, he was unable to notify anyone of the emergency. After several minutes, a Ford employee ran out of the building and gestured for the driver to stop the unloading process.

Although the plant employee responsible for assisting in the unloading of hazardous materials was required by company instruction to stay with the driver during the unloading operation, he instead left the area. The transfer location was not equipped with a radio, telephone, or alarm device that could have allowed the driver or a plant employee to notify appropriate plant personnel that there was a problem.

Although the incident did not result in serious injuries, the Safety Board concludes that had emergency communication equipment been installed at the Ford Motor Company's Kentucky Truck Plant bulk chemical transfer station, the driver would not have suffered extended exposure to the irritating and poisonous gases.

Given the thousands of hazardous materials that are loaded and unloaded daily and the potential risks associated with the unintentional release of those materials, the ability to immediately notify people who may be affected is crucial. Accidents involving the reactions of two incompatible chemicals can be catastrophic and can be a serious threat to public health and safety.

The National Transportation Safety Board therefore recommends that the Occupational Safety and Health Administration:

> Require that facilities where bulk hazardous materials are transferred be equipped with a means of emergency communications. (I-00-7)

The Safety Board also issued safety recommendations to the Research and Special Programs Administration, the American Chemistry Council, National Truck Carriers, Inc., and Ford Motor Company. In your response to the recommendation in this letter, please refer to Safety Recommendation I-00-7. If you need additional information, you may call (202) 314-6170.

Chairman HALL and Members HAMMERSCHMIDT, GOGLIA, BLACK, and CARMODY concurred in this recommendation.

Original Signed

By: Jim Hall
Chairman