



National Transportation Safety Board

Washington, D. C. 20594

Safety Recommendation

Date: December 3, 1991

In Reply Refer To: M-91-37 and -38

Mr. Gerry Grammenos
Vice President and General Manager
Cleveland Tankers, Inc.
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Cleveland, Ohio 44101

On Sunday, September 16, 1990, the 392-foot-long U.S. tankship JUPITER was moored at the Total Petroleum, Inc., terminal (Total Petroleum) located on the Saginaw River in Bay City, Michigan, discharging a cargo of unleaded gasoline. While the JUPITER lay moored at Total Petroleum's pier, the 635-foot-long bulk carrier BUFFALO entered the Saginaw River en route to a bulk materials handling facility at Midland, Michigan, to discharge a cargo of coal. As the BUFFALO passed the JUPITER, the tankship broke away from its berth and its stern swung out into the river, rupturing the discharge hose to the pier and damaging the pipeline on the pier. Gasoline spilled on the pier and onto the deck of the JUPITER. The electrical cables to two motor-operated valves that closed off the pipelines at the end of the pier were torn apart, causing sparks that ignited the spilled gasoline. Fire spread to the deck of the JUPITER, causing a series of explosions in the cargo tanks that destroyed the entire midship section of the vessel. One crewmember died during abandonment of the vessel. The JUPITER, valued at \$9 million, was declared a total loss and later sold for scrap.¹

As the BUFFALO approached, the JUPITER's crew expected their vessel to react to the hydrodynamic forces generated by a passing vessel. Before manning the controls for the constant-tension winches, they stopped the cargo pumps and started the hydraulic pump for the hose winch. The third mate, who was the watch officer at the time of the accident, explained that they took these precautions whenever the vessel was alongside a pier in a narrow waterway and another vessel was approaching. Although the JUPITER's operating manual did not include these precautions, the crew understood that they should follow them.

¹For more detailed information, read Marine Accident Report--"Explosion and Fire Aboard U.S. Tankship JUPITER, Bay City, Michigan, September 16, 1990" (NTSB/MAR-91/04).

The crew's precautions, however, should have included closing the manifold valve and the ullage pipe covers on the vessel and closing the motor-operated valve on the pier. If crewmembers had closed the ullage pipe covers when the JUPITER stopped discharging and allowed the tanks to vent through the P/V valves, the explosions most likely would not have occurred. If they had used the remote switch to close the pier valve and the ship's manifold valve, spillage would have been limited to what was in the cargo hose when it ruptured. The Safety Board believes that because of the potential danger to vessel and crew and the possibility of pollution to the environment, Cleveland Tankers, Inc., should include procedures in its fleet operating manuals for stopping the transfer operation when other vessels pass in the waterway. These procedures should also include a requirement to close the appropriate valves to limit spillage and closing ullage covers to redirect venting of the tanks through the P/V valves.

When gasoline spilled onto the pier from the broken nitrogen purge line connection on the 12-inch pipeline, sparks from the damaged electrical conduit ignited the gasoline. The fire quickly spread to the deck of the tankship and ignited the gasoline that spilled from the ruptured cargo hose. Contained by the 6-inch spill rail, the burning gasoline spread throughout the midships area and around the open ullage pipes. Because the inside periphery of the ullage pipes had no continuous shoulder or ledge to properly support the flame screens and completely seal the space around the periphery of the flame screens (the clearance between the pipe and the edge of the flame screen was wide enough to allow a measuring tape to be kept in the ullage pipe without removing the screen), the fire on deck probably propagated into the tanks through the open ullage pipes. The design of the flame screens conformed to the applicable Coast Guard regulations (46 CFR 30.10-25-Flame Screens); however, the installation of the screens in the ullage pipes rendered them ineffective because the clearance around the edge of the screen was greater than the mesh of the screen itself.

The Safety Board concludes that the most likely cause of the explosions was the propagation of fire around the improperly designed flame screens in the open ullage pipes and into the cargo tanks.

Therefore, the National Transportation Safety Board recommends that the Cleveland Tankers, Inc.:

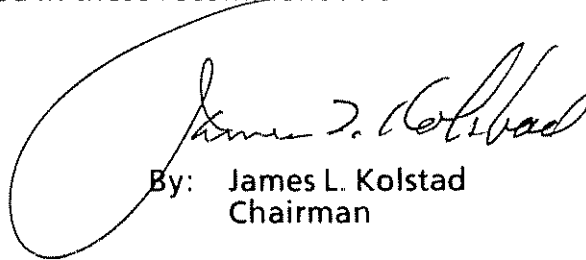
Amend your fleet operating manuals to include written procedures for suspending the bulk transfer of hazardous liquids when a danger of surging exists from passing vessels. These written procedures should include, but not be limited to, stopping pumps, closing valves at the loading/discharge manifold, closing ullage pipes or other tank openings, notifying terminal personnel, and manning and operating mooring winches. (Class II, Priority Action) (M-91-37)

Modify, as necessary, the flame screen installations aboard the vessels in your fleet so that they provide a complete seal around the periphery of the screen. (Class II, Priority Action) (M-91-38)

Also, the Safety Board issued Safety Recommendations M-91-31 through -36 to the U.S. Coast Guard, M-91-39 through -42 to Total Petroleum, Inc., M-91-43 to the Lake Carriers Association; M-91-44 to the State of Michigan; and M-91-45 to the Bay County Emergency Services.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendations M-91-37 and -38 in your reply.

KOLSTAD, Chairman, COUGHLIN, Vice Chairman, and LAUBER, HART and HAMMERSCHMIDT, Members, concurred in these recommendations.

A large, stylized handwritten signature in black ink, which appears to read "James L. Kolstad". The signature is written in a cursive style with a large, sweeping initial "J".

By: James L. Kolstad
Chairman