



# National Transportation Safety Board

Washington, D. C. 20594

## Safety Recommendation

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**Date:** December 3, 1991

**In Reply Refer To:** M-91-31 through -36

Admiral J. William Kime  
Commandant  
U.S. Coast Guard  
Washington D.C. 20593-0001

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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.<sup>1</sup>

Over the years, many vessels had docked successfully at Total Petroleum's terminal, and its pier and mooring devices had received and passed visual examinations by the Coast Guard. However, the continued use of the wood mooring piles without a proper internal inspection of the piles ultimately resulted in a failure of one of the piles at a critical time. Although a Department of Agriculture laboratory could not quantify the strength of the broken wood mooring pile, the test sample did show evidence of rot, indicating the strength of the wood piling had declined. *The annual inspection of the pier and the mooring devices should include probing of the wood pilings to determine whether the wood has deteriorated to the*

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<sup>1</sup>For 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).

extent that the strength of the pile may be affected. The Coast Guard should also examine the mooring devices during its periodic inspections of the terminal.

When the BUFFALO arrived off the entrance to the Saginaw River, the first mate, as watch officer, broadcast a security call over VHF-FM channel 16 to advise marine traffic in the area of the vessel's position and destination. Following the security call, he established radio contact with Coast Guard Station Saginaw River and requested the height of the river. Later, as the BUFFALO entered the river, Station Saginaw River called the vessel and asked whether it was inbound or outbound. After responding to the request, the master broadcast a second security call, giving his vessel's position and destination. Because the JUPITER's crew did not customarily man the navigating bridge or monitor the VHF-FM radio while the vessel was moored, the watch officer on the tankship was unaware of the BUFFALO's approach. The crew on deck was expected to watch for approaching vessels. The third mate first became aware of the BUFFALO's presence when he heard its whistle signal requesting the opening of the Independence Bridge and when he sighted the vessel passing the D&M railroad bridge.

Because the JUPITER's crewmembers were busy tending to the cargo transfer, they could easily have failed to notice the BUFFALO, particularly if the BUFFALO's master had opted to call the Independence Bridge by VHF-FM radio rather than sounding a whistle signal. The Safety Board believes that current practices fail to ensure that personnel aboard a vessel moored at the terminal or terminal personnel have sufficient time to suspend transfer operations and take precautionary measures. The radio watchstander at Station Saginaw River was aware of the BUFFALO's presence in the river and could have telephoned the Total Petroleum terminal to alert terminal personnel that large vessels were moving in the waterway; those personnel in turn could have notified the JUPITER. The Safety Board believes that while the infrequency of large vessel transit in the Saginaw River does not warrant a formal, structured vessel traffic system, it does believe that the Coast Guard could enhance area waterway safety and security by requiring vessels to call Station Saginaw River and advise them of their expected movement so that the Coast Guard could alert area terminals if necessary. Because the Safety Board advocates that tank vessels berthed at the Total Petroleum take additional precautionary measures when discharging cargo, it is essential that both the berthed vessel and terminal personnel be notified by the Coast Guard of impending traffic so that they can undertake shutdown procedures in a timely manner.

The amount of gasoline that spilled on the JUPITER's deck from the ruptured cargo hose generated a fire that the vessel's crew probably could have extinguished before heat caused ignition in the tanks. However, when the fire spread around the open ullage pipes the flame screens in the pipes did not have a proper seal to block the propagation of the fire into the tanks. Although the design of the flame screens conformed to Coast Guard regulations (46 CFR 30.10-25- "Flame Screens"), 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 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 Coast Guard regulations do not address this problem. Instead, a Coast Guard spokesman characterized it as a "common sense" item that inspectors should check during Coast Guard vessel examinations. Therefore, the Safety Board urges the Coast Guard to tell their inspectors to pay particular attention to flame screen

installations to ensure that the flame screen completely seals the opening around its periphery.

During April 1990, Coast Guard examiners inspected the Total Petroleum facility at Bay City and reviewed the company's Terminal Operations Manual for compliance with Federal regulations; they made another "spot" inspection in August 1990. Inclusion of shutdown procedures in the Coast Guard regulations would ensure that the operators of the terminal and the vessel both have responsibility for the vessel's safety and for safeguarding the waterway from pollution. Although the Coast Guard approved the Bay City facility's operating manual, acknowledging that it was in compliance with existing regulations for liquid bulk transfer operations, the manual does not address a shutdown requirement by vessels transferring liquid cargo when large vessels are expected to pass. The Safety Board believes the Coast Guard should amend the regulations so that Coast Guard-approved Marine Oil Transfer Facility operating manuals include procedures for stopping the transfer of product between the terminal and tankships moored at the terminal when the danger of surging exists from passing vessels.

When Coast Guard personnel at Station Saginaw River received word that the JUPITER had suffered explosions and was on fire, they immediately dispatched a boat and were on scene 13 minutes after receiving notification from the RCC. If the fire and explosions had forced the tankship's crew into the water before the Coast Guard rescue units arrived, the chance of injuries would have increased. The Coast Guard station's location close to the accident site enabled the boats to reach the scene quickly. When the Coast Guard units attempted to fight the fire, they soon realized it was beyond their capability and concentrated their efforts on recovering persons from the water. The Safety Board believes that the Coast Guard units involved should be commended for their promptness and their decision to attend to the JUPITER's crew first. The Safety Board concludes that the timely and effective on-scene response by the Coast Guard units limited the fatalities and injuries.

Despite the timely response of local fire and other emergency units, fire fighting efforts were not immediately effective because of the magnitude of the fire. Through their combined efforts, local firefighters, the Coast Guard, and a commercial fire fighting company extinguished the fire after it had burned for 2 1/2 days. During a December 6 critique of the initial response held in Bay City, participants agreed that they allowed the fire to burn because "there was no equipment or trained personnel to extinguish it." Although shipboard fires, in particular tankship fires, occur infrequently in the Bay City/Saginaw River area, the JUPITER accident highlighted the fact that local fire departments need specific training in fighting shipboard fires.

Units from Station Saginaw River assisted in deploying the oil booms, and the Coast Guard District Commander provided the buoy tender BRAMBLE as a platform from which commercial fire fighters could work. The Bay City area does have a contingency plan, but the plan does not provide for training in shipboard fires or other marine catastrophes. The Safety Board has previously recommended that the Coast Guard integrate Coast Guard planning and training efforts with those of local authorities in developing port contingency plans that involve participation by the local waterfront facilities, the local fire and police departments, existing port authority agencies, and other disaster preparedness agencies. In 1985, as a result of a cruise ship fire in Port Canaveral, Florida, the Safety Board issued the following recommendation to the Coast Guard:

M-85-29

Direct the Captain-of-the-Port, Jacksonville, Florida to participate in establishing a port contingency plan for Port Canaveral with the Canaveral Port Authority and local jurisdictions in the port community.

A similar recommendation was made to the Canaveral Port Authority. (M-85-36)

The recommendation to the Coast Guard has been incorporated in the Marine Safety Manual;<sup>2</sup> it directs the Captain-of-the-Port (COTP) to develop a fire fighting contingency plan that addresses fire fighting in each port in the COTP zone. The recommendation to the Canaveral Port Authority resulted in acquisition of and training in the use of emergency equipment in the port. Both recommendations have been classified "Closed--Acceptable Action." The Safety Board recommends that the Detroit Coast Guard COTP, who has responsibility for the Bay City/Saginaw River area, in cooperation with local authorities, develop a port contingency plan that includes shipboard fire fighting training and drills.

Therefore, the National Transportation Safety Board recommends that the U.S. Coast Guard:

Amend 33 CFR Part 154, Oil Pollution Prevention Regulations for Marine Oil Transfer Facilities, to require that the Facility Operating Manual include procedures for stopping the transfer of product between a vessel and the terminal when a danger of surging exists from passing vessels. (Class II, Priority Action) (M-91-31)

Direct the Captain-of-the-Port of Detroit to instruct the Officer-in-Charge of Coast Guard Station Saginaw River to notify in a timely manner area marine bulk oil/hazardous material terminals in the Bay City/Saginaw port area within Coast Guard jurisdiction of impending river traffic so that personnel at the terminals and aboard moored vessels can take appropriate measures to suspend the transfer operations, thereby enhancing safety. (Class II, Priority Action) (M-91-32)

Direct the Captain-of-the-Port of Detroit to work with State and local jurisdictions to establish a port contingency plan for the Saginaw River/Bay City port area that includes training and drills for shipboard fire fighting. (Class II, Priority Action) (M-91-33)

Include in the Coast Guard inspection instructions for marine oil transfer facilities a requirement that inspectors check the condition of the mooring facilities. The inspection should include a determination of the overall adequacy of the mooring facilities to safely berth vessels of varying lengths. (Class II, Priority Action) (M-91-34)

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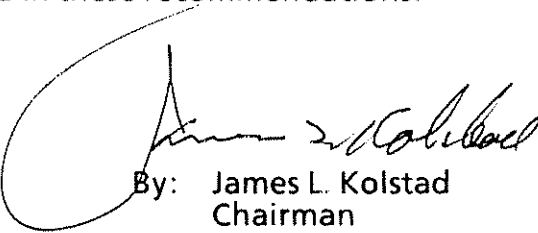
<sup>2</sup>U.S. Coast Guard Marine Safety Manual, Volume VI, Chapter 8, Paragraph B.

Instruct Coast Guard inspectors to determine that the flame screens installed aboard tankships provide a complete seal around the periphery of the screen. (Class II, Priority Action) (M-91-35)

Disseminate the information contained in this accident report to the marine industry by means of Coast Guard publications and notices, emphasizing the requirements of 33 CFR Part 164. (Class II, Priority Action) (M-91-36)

Also, the Safety Board issued Safety Recommendations M-91-37 and -38 to Cleveland Tankers, Inc., 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.

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



By: James L. Kolstad  
Chairman