



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

log# M-332A

Date: November 6, 1987

In reply refer to: M-87-97 through -101

Mr. John Johnson
President
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On December 20, 1986, the U.S. tank barge STC 410 was berthed at the Steuart Petroleum Company (SPC) facility pier at Piney Point, Maryland. Barge tanks Nos. 1, 3, and 5 were being vacuumed or stripped of residual JP-4 jet fuel which was being loaded into a tank truck located on the pier astern of the barge. About 0230, while the vacuuming crew was at the No. 5 tanks and almost completed with vacuuming, an explosion occurred within the No. 5 tanks. The barge tankerman and three persons working on the barge were killed, and a pier gauger located on the pier was injured. The explosion destroyed the after end of the barge from the transverse bulkhead of the No. 4 tanks to the stern and ruptured petroleum pipelines on the pier. A fire ensued that was fueled by petroleum products running out of the ruptured pipelines. The explosion and fire damaged the after end of the barge, a portion of the T-pier, and three vehicles on the pier. The explosion blast caused damage to nearby buildings on shore. Estimated damages to the barge, the pier, vehicles, and nearby facilities exceeded \$2 million. ^{1/}

SPC personnel initially responded to the explosion and fire at the SPC pier. When the relief engineer arrived at the pier, he could not close the pipeline block valves because of the heat from the fire. Normally two engineers (plant engineer and boilertender/relief engineer) were on duty. However, the duty engineer had not reported to work because of illness. Had a replacement engineer been assigned for duty, two persons would have been available for the emergency. Thus, the engineer at the pier could have telephoned or radiotelephoned the engineer at the tank farm to close the block valves at that location, which would have stopped the flow of petroleum fueling the fire earlier. Considering the expanse of the SPC facility at Piney Point, the Safety Board believes that some provision should be made by the company in its operating procedures and instructions to provide a replacement for an engineer if he is unable to be on duty.

The Valley Lee Volunteer Fire Department firefighters were at the pier about 11 minutes after the explosion. Because of prior training and drills at the SPC facilities, the firefighters were prepared to handle the emergency. However, the damage caused to the firemain as a result of the explosion required that firefighters pump water from the river and the nearby pond. To use these alternate sources of water required numerous lengths of hose to reach the fire and caused a delay in extinguishing the fire. Had a block

^{1/} For more detailed information, read Marine Accident Report--"Explosion and Fire Aboard the U.S. Tank Barge STC 410, Steuart Petroleum Company Facility, Piney Point, Maryland, December 20, 1986" (NTSB/MAR-87/09).

valve and hydrant been available in the firemain near the shore end of the pier, the damaged portion of the firemain could have been segregated and the undamaged portion used for water supply.

While the firefighters were laying out hose and shifting to other sources of water, the fire was being fueled by the petroleum products that continued to flow from the pier pipelines. Had the petroleum pipeline block valves installed on the pier been adapted to be remotely operated from the tank farm, the flow of petroleum could have been stopped more readily and the fire could have been brought under control more quickly. In this accident, the block valves on the pier were not damaged, but they were inaccessible because of their proximity to the fire. The fire was brought under control at 0435, slightly more than 2 hours after the explosion. Had it been possible to stop the petroleum flow from the pipelines at the pier more quickly and had the firemain not been ruptured, earlier control of the fire could have been achieved.

The Safety Board believes that this accident highlights the need to use remotely-operated block valves on piers to limit the amount of petroleum products that may be available to fuel fires or cause pollution. However, since remotely-operated block valves installed on the pier may be subject to damage from explosions, the Safety Board also believes that, where secondary block valves are as remotely located as they were in this case (at the SPC tank farm, about 1 mile away), a secondary control set should be located near the shore end of the pier.

The Coast Guard Station at St. Ingoes sent a 41-foot, firefighting capability boat to the accident site; however, because of the distance of the station from the SPC pier, the boat did not arrive at the pier until 0315. Further, because of the possibility of additional explosions on the STC 410, the Coast Guard boat was prevented from immediately attacking the fire from the offshore side of the pier, although the boat was able to search for possible survivors in the vicinity of the pier.

The persons working on the barge had a minimal chance of survival and probably were killed almost instantly when the explosion occurred. The pier gauger was thrown from the pier shack onto the pier. Dazed and injured, he attempted to go toward shore along the main stem of the T-pier; however, that route was blocked by fire. Since he had not carried a portable radiotelephone when he went onto the pier, he was unable to broadcast his plight. Therefore, he tried to use the telephones installed in the pier shacks; however, the telephones were inoperable because of explosion damage. Although the tug PAPA GUY was near the pier, the tug crew was not aware that the pier gauger had survived the explosion and was in need of assistance. Additionally, the PAPA GUY had been directed by the dispatcher to stay away from the pier with its tow.

Although the SPC standard operations manual stated that portable radiotelephones were available to certain personnel including the pier gauger, the pier gauger did not have his radiotelephone with him at the time of the accident when it was critically needed. The Safety Board believes that SPC management needs to increase its supervisory oversight of its personnel to achieve greater compliance with its company's operating procedures, such as requiring the carrying of portable radiotelephones by persons at all times while working about the facility and on tank vessels.

Matches and lighters were found at the barge site. Three of the persons on board the barge at the time of the explosion were identified as smokers--the barge supervisor, the senior gauger, and the tankerman. All three were experienced in the operations being conducted and were, or should have been, aware of the hazards of smoking on tank ships and tank barges. Company policy prohibited smoking and the use of "strike anywhere"

matches except in areas established as smoking areas. Also, precautionary signs warning against smoking and the use of open lights were adequately posted in the vicinity. These prohibitions and precautionary warnings did not specify that matches, lighters, and smoking materials could not be carried into the areas. However, the employees should have been aware, through the SPC indoctrination program, of the flammable properties of JP-4.

Beer cans were recovered from the barge. The autopsies showed that the remains of the senior gauger and the tankerman contained low levels of alcohol content, which were unlikely to have been sufficient to affect the motor skills required for the individuals to perform their duties, or to affect their ability to perceive a potentially dangerous situation. It is possible that having nearly completed the vacuuming of the barge, some of the persons on the barge may have been drinking beer. The tendency for persons who smoke to do so while drinking is quite common. Consequently, the smokers may have relaxed their normal precautions and decided to have a smoke. Although, lighting a cigarette or a pipe could have ignited a flammable vapor cloud from JP-4 cargo in the vicinity of the open hatches and could have caused the explosion, the Safety Board could not positively establish that the use of matches or lighters was the source of ignition in this accident. However, the Safety Board believes that unscheduled inspections should be conducted to deter persons working on the piers and tank vessels from carrying matches, lighters, and smoking materials; from drinking alcoholic beverages in those areas; and from violating other safety precautions.

Therefore, the National Transportation Safety Board recommends that the Stuart Petroleum Company:

Maintain specified manning levels in nighttime duty assignments to handle emergencies, and provide substitutes when regularly assigned persons become unavailable for duty. (Class II, Priority Action) (M-87-97)

Install remotely-operated block valves in petroleum pipelines at the Piney Point facility near the shore end of the pier. (Class II, Priority Action) (M-87-98)

Install a block valve and a hydrant in the firemain near the shore end of the pier so that flow to the firemain on the pier can be stopped if it is damaged or becomes inaccessible. (Class II, Priority Action) (M-87-99)

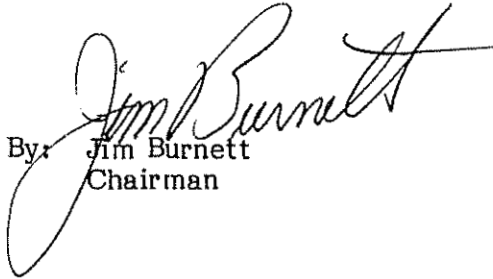
Require that persons assigned to tank vessel operations carry portable radiotelephones with them at all times while on duty. (Class II, Priority Action) (M-87-100)

Improve employee oversight, including conducting unscheduled inspections of persons working on the piers and tank vessels, to deter the carrying of matches, lighters, and smoking materials and the use of alcoholic beverages in those areas or the violation of other safety procedures. (Class II, Priority Action) (M-87-101)

Also, the Safety Board issued Safety Recommendations M-87-95 and -96 to the U.S. Coast Guard, M-87-102 through -104 to the Stuart Transportation Company, and M-87-105 to the American Petroleum Institute.

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 actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations M-87-97 through -101 in your reply.

BURNETT, Chairman, and LAUBER, NALL, and KOLSTAD, Members, concurred in these recommendations. GOLDMAN, Vice Chairman, did not participate.


By: Jim Burnett
Chairman