Log # M-327B

National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: June 15, 1987

In reply refer to: M-87-26

Mr. Cordell H. Hayman
President
Petroleum Service Corporation
Post Office Box 1743
Baton Rouge, Louisiana 70821

On July 31, 1986, the U.S. tank barge TTT 103 exploded and sank while loading gasoline at the Chevron Oil Refinery in Pascagoula, Mississippi. The tank barge, partially loaded with diesel fuel, burned and spilled the fuel into Bayou Casotte. The fuel ignited and fire spread under the refinery's pier rupturing pipelines and engulfing the shore end of the pier in flames.

A tankerman aboard the TTT 103 at the time of the explosion was thrown into the water. He suffered numerous burns to his face, arms, and back, but managed to make his way to shore and was subsequently taken to a hospital for treatment.

Immediately after the explosion, the Chevron operator on the pier actuated the emergency shut-down system, stopped the flow of products to the pier, and notified refinery officials. He then activated the water and foam fire monitors on the pier and directed them toward the barge. Within 5 to 6 minutes, the refinery's firefighting team was on scene and started to fight the fire.

The TTT 103 sank alongside the pier and was declared a constructive total loss. It was valued at $500,000. Damage to the terminal facilities was estimated to be $4,500,000. 1/

The API Recommended Practice 2003 addresses the known factors that contribute to electrostatic charge generation. These factors include: turbulent flow, splash loading, trace impurities, water, and high velocity flow. Trace quantities of water in a petroleum product are an ideal static generator; however, the evidence indicates that the gasoline contained no water. The tankerman reported that there was vigorous turbulence in the bottom of the tank when the flow was increased to the maximum flow rate. Furthermore, the bellmouth in the tank was not submerged in the gasoline during the initial loading process before the flow rate was increased which contributed to the splashing and turbulence.

1/ For more detailed information, read Marine Accident Report—"Explosion Aboard the U.S. Tank Barge TTT 103, Pascagoula, Mississippi, July 31, 1986" (NTSB/MAR-87/06).

Based on recent information from the petroleum industry and Chevron, the National Transportation Safety Board has determined that loading restrictions at various terminals are being implemented for highly volatile, flammable, low conductivity petroleum products such as gasoline. In fact, Chevron has decided to follow the safety guidelines (ISGOTT) for loading its products rather than the API Recommended Practice 2003. The reason for this change is to improve safety because of two uncertainties that may exist in a loading operation: (1) deficient equipment such as foreign material in a tank; and (2) unknown operating deficiencies such as a mixed fuel. Furthermore, the Safety Board understands that the API Recommended Practice 2003 probably will be revised based on the explosion and fire that occurred on the TTT 103.

Chevron U.S.A., operators of the Pascagoula terminal, have detailed instruction manuals with procedures to be followed by their own personnel and vessel personnel while at the loading/discharging wharves. Issued in several volumes the instructions detail wharf operations, blending/shipping, and facility operations. A Facility Operations Manual was submitted to the Coast Guard as required by the Code of Federal Regulations (33 CFR Parts 154.325, 154.310, and 154.300.0).

The instructions in the Wharf Operations Manual issued by Chevron require a pretransfer conference whereby the wharf operator and the vessel personnel plan the transfer step-by-step, including connecting of the hose(s), checking connections, flow rate, communications, and determining the electrostatic generating precautions concerning the product. A detailed inspection report attesting to this fact was completed and signed by both the wharf operator and the tankerman.

According to Chevron's pretransfer conference instructions, 2/ the vessel's operator-in-charge (tankerman) should refer to chart No. 1 to determine which precautions are necessary for loading the product. Based on chart No. 1, no loading restrictions are imposed on high volatility stock (gasoline) when the last product in the tank was an intermediate or high volatility stock, whether the tank is gas-free or not.

An industry-recognized publication, the "International Safety Guide for Oil Tankers and Terminals" (ISGOTT) 3/ discusses static electricity in Chapter 19, Section 19.3.1:

> The generally accepted method for controlling electrostatic generation in the initial stages of loading is to restrict the flow rate of the static accumulator oil into the tank until all splashing and surface turbulence in the tank has ceased.

The section discusses also the potential source of electrostatic electricity when water is mixed with the product entering the tank. Chevron's "Morning Stock Report" for the gasoline scheduled for loading into the TTT 103 did not show any water. A Chevron representative stated that water is noted on that report on an "exception basis."

Therefore, as a result of its investigation, the National Transportation Safety Board recommended that the Petroleum Service Corporation:

2/ Appendix XVII d, Chevron's Wharf Operations Manual and Section K:8, Chevron's Shipping Manual.

3/ International Safety Guide for Oil Tankers and Terminals, Second Edition, Oil Companies International Marine Forum (OCIMF) and the International Chamber of Shipping (ICS), London, 1984.

Before assigning an employee as a qualified tankerman to act as person-in-charge of a vessel loading volatile stocks, ensure that the person is thoroughly familiar with the loading procedures of the particular terminal, emphasizing the importance of the preloading conference with the terminal representative. (Class II, Priority Action) (M-87-26)

Also as a result of its investigation, the Safety Board issued Safety Recommendation M-87-21 and -22 to the U.S. Coast Guard, M-87-23 through -25 to Chevron, U.S.A., and M-87-27 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 recommendation in this letter. Please refer to Safety Recommendation M-87-26.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and LAUBER, NALL, and KOLSTAD, Members, concurred in this recommendation.

By: Jim Burnett
Chairman