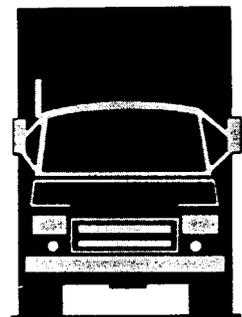
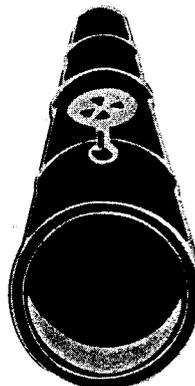
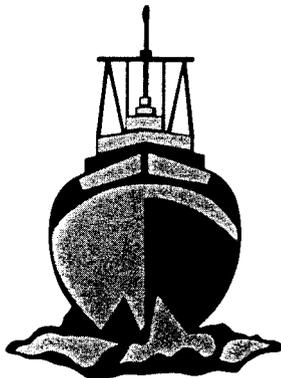
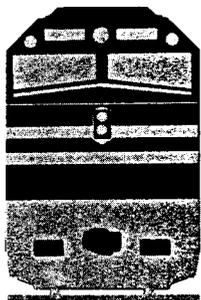


NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

HAZARDOUS MATERIALS ACCIDENT REPORT

OVERFLOW OF GASOLINE AND FIRE
AT A SERVICE STATION-CONVENIENCE STORE
BILOXI, MISSISSIPPI
AUGUST 9, 1998



7120A

National Transportation Safety Board. 1999. *Overflow of Gasoline and Fire at a Service Station-Convenience Store, Biloxi, Mississippi, August 9, 1998. Hazardous Materials Accident Report NTSB/HZM-99/02. Washington, DC.*

Abstract: This report explains the gasoline overflow and resulting fire that occurred during a cargo transfer by Premium Tank Lines, Inc., to an underground storage tank at a Fast Lane gasoline station-convenience store in Biloxi, Mississippi, on August 9, 1998. The fire engulfed three vehicles at a nearby intersection, which ultimately resulted in the deaths of five occupants and the serious injury of one. Damages were estimated at \$55,000.

From its investigation of this accident, the Safety Board identified safety issues in the following areas: Premium Tank Line, Inc.'s management oversight; R.R. Morrison and Son, Inc.'s procedures for accepting petroleum product deliveries to underground storage tanks; and Federal requirements and oversight. Based on its findings, the Safety Board made recommendations to the Federal Highway Administration, the Research and Special Programs Administration, the Environmental Protection Agency, Premium Tank Lines, Inc., R.R. Morrison and Son, Inc., the American Petroleum Institute, the National Tank Truck Carriers Association, the National Association of Convenience Stores, the National Association of Truck Stop Operators, the Petroleum Marketers Association of America, the Service Station Dealers of America, and the Society of Independent Gasoline Marketers of America.

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Hazardous Materials Accident Report

Overflow of Gasoline and Fire at a Service Station-Convenience Store Biloxi, Mississippi August 9, 1998

NTSB/HZM-99/02
PB99-917007
Notation 7120A
Adopted: September 21, 1999



National Transportation Safety Board
490 L'Enfant Plaza, S.W.
Washington, D.C. 20594

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Executive Summary

On August 9, 1998, about 12:53 a.m., a Premium Tank Lines, Inc., truckdriver was transferring gasoline from a cargo tank to underground storage tanks at a Fast Lane gasoline station-convenience store in Biloxi, Mississippi, when an underground storage tank containing gasoline overflowed. An estimated 550 gallons of gasoline flowed from the storage tank, across the station lot into the adjacent highway, through an intersection, and into a storm drain. The gasoline ignited, and fire engulfed three vehicles near the intersection, which ultimately resulted in the deaths of five occupants and the serious injury of one. Damages were estimated at \$55,000.

The National Transportation Safety Board determines that the probable cause of the accident was the failure of Premium Tank Line, Inc.'s officials to follow established company procedures in hiring and training new drivers, the company's lack of adequate procedures for dispatching drivers and delivering cargo to customer facilities, and the failure of R.R. Morrison and Son, Inc., to have adequate safety procedures for accepting product offered for delivery at its Fast Lane stations. Contributing to the accident was the truckdriver's various and numerous operating errors during the gasoline transfer process that led to the underground storage tank overflow.

The following safety issues are discussed in this report:

- Premium Tank Line, Inc.'s management oversight;
- R.R. Morrison and Son, Inc.'s procedures for accepting petroleum product deliveries to underground storage tanks; and
- Federal requirements and oversight.

As a result of its investigation of this accident, the Safety Board makes recommendations to the Federal Highway Administration, the Research and Special Programs Administration, the Environmental Protection Agency, Premium Tank Lines, Inc., R.R. Morrison and Son, Inc., the American Petroleum Institute, the National Tank Truck Carriers Association, the National Association of Convenience Stores, the National Association of Truck Stop Operators, the Petroleum Marketers Association of America, the Service Station Dealers of America, and the Society of Independent Gasoline Marketers of America.

Factual Information

Accident Synopsis

On August 9, 1998, about 12:53 a.m., a truckdriver for Premium Tank Lines, Inc., (Premium) was transferring gasoline from a cargo tank to underground storage tanks at a Fast Lane gas station-convenience store in Biloxi, Mississippi, when gasoline from one of the underground storage tanks began to overflow. An estimated 550 gallons of gasoline flowed from the storage tank, across the station lot into the adjacent highway, through the intersection, and into a storm drain. The gasoline ignited, and fire engulfed three vehicles near the intersection. Each of the three vehicles had two occupants. Of the six people, five sustained fatal injuries and one received serious injuries. Additionally, a firefighter dispatched to the accident site sustained minor injuries while attempting to suppress the fire. Damages were estimated at \$55,000.

Accident Narrative

Preaccident Events

Shortly after 5:30 p.m. on August 8, 1998, a Biloxi-based Premium truckdriver, in accordance with the company's operating practices, telephoned the weekend dispatcher at Premium's headquarters in Jackson, Mississippi, to obtain the assigned deliveries for his evening shift. The safety director, who was serving as dispatcher, told the truckdriver the delivery locations and the type and amount of gasoline to be delivered that evening. He said that he told the driver to make deliveries to the following Fast Lane stations: Nos. 742, 743, and 736. The driver's notes indicated that he wrote down the following station numbers: 742, 743, and 741.¹ The driver did not, nor was he required by written company procedures to, repeat or read back the information to the dispatcher to verify its accuracy during the telephone call.²

The Premium truckdriver departed Biloxi about 9:00 p.m. and drove his tractor-cargo tank trailer combination about 70 miles to the Shell Refinery in Saraland, Alabama, where he arrived about 10:08 p.m. He loaded one of the cargo tank's four compartments with 2,473 gallons of premium unleaded gasoline and the other three compartments with a total of 5,891 gallons of regular unleaded gasoline. He left the refinery at 10:23 p.m.

¹ The Premium dispatch records indicate that this same driver had made a delivery to Fast Lane station No. 741 on his shift that ended the morning of August 8; no delivery was scheduled to the station during his shift that ended on August 9.

² Premium did not have a policy of providing its drivers with confirmation of assigned deliveries by means of a written letter, facsimile, or electronic mail. Information about company policies appears later in this report.

Events at Fast Lane Station No. 741

Arriving at Fast Lane station No. 741 about midnight, the truckdriver parked the tractor cargo tank combination next to the remote fill ports (figure 1). Premium's operating practices require its drivers to present the bill of lading to the station operator before making the gasoline transfer. The truckdriver, however, did not do this. Drivers are also required to determine and document the gasoline level in an underground storage tank by inserting a graduated measuring stick that they carry on the cargo tank truck into the direct fill ports before and after transferring gasoline. This procedure, which drivers refer to as "sticking the tank," provides drivers with a product level reading in inches.³

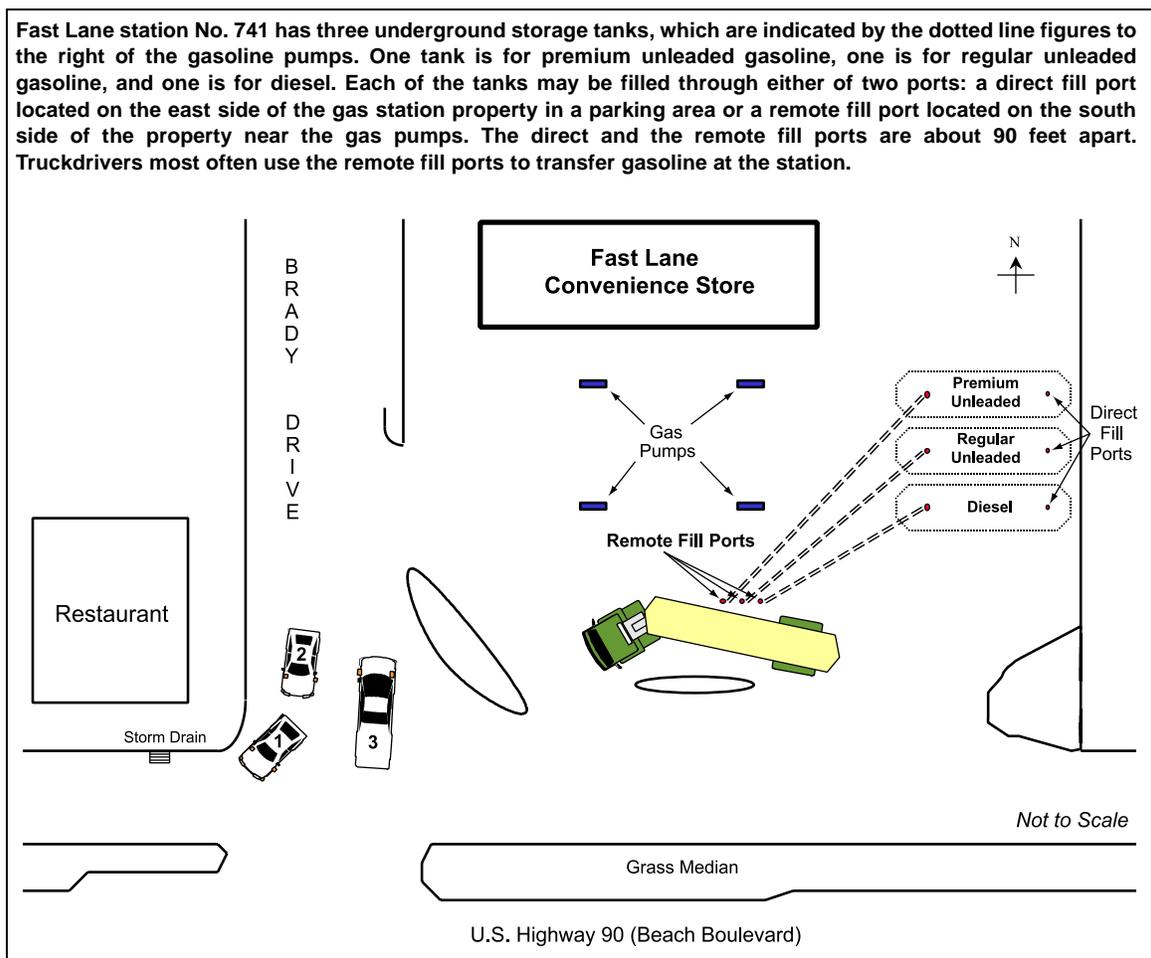


Figure 1. Layout of accident site. The vehicles numbered 1, 2, and 3 are, respectively, a 1995 four-door Hyundai sedan, a 1997 four-door Mazda sedan, and a 1999 Ford pick-up truck.

³ Because the sizes of storage tanks differ, the inch level of gasoline does not directly correlate with the number of gallons in a tank. The method drivers use to determine the number of gallons in a storage tank is discussed later in this report.

According to the truckdriver, he was able to stick the premium unleaded tank, but access to the regular unleaded direct fill port initially was blocked by a parked vehicle. He therefore went into the convenience store to obtain an inventory printout from the on-site Red Jacket™ system terminal.⁴ He said that he did not know how to use the Red Jacket™ system so he asked for help from a Fast Lane employee. The store's assistant manager then generated a printout for him. Although the Red Jacket™ printout showed the gallons of gasoline and ullage⁵ in each of the underground storage tanks, the driver later told Safety Board investigators that he did not fully understand the printout and that he had obtained it only for the inch reading that he was required to record on his paperwork.⁶

The truckdriver said that, upon exiting the store, he discovered that the vehicle blocking the direct fill port had moved. He was then able to stick the regular unleaded tank for his reading. He said that he did not use the inch readings to calculate the available space in the underground storage tanks. Instead, he relied solely on the information he had obtained earlier from the Premium dispatcher. After taking the inch readings, he did not replace the lids on the direct fill ports.

The truckdriver told Safety Board investigators that he took the inch readings before he began transferring gasoline, that he hooked up the unloading hoses for both the premium and regular gasoline at the same time, and that he began unloading regular and premium simultaneously. The Red Jacket™ system printouts indicate the order of events listed in table 1.

Station No. 741's video surveillance system tape shows the truckdriver entering the station at 12:04:14 a.m., walking to and from the restroom corridor, and then leaving at 12:05:29 a.m.⁷ The video tape shows the truckdriver reentering the store at 12:11:20, walking past the checkout counter, and then leaving the store at 12:18:01.⁸

⁴ The Red Jacket™ system is an automatic computer-based system that monitors the product levels in the underground storage tanks. Data from the Red Jacket™ system is transmitted to Premium's headquarters, which uses the information to determine the amount of product to be dispatched. Additional information about the Red Jacket™ system appears later in this report.

⁵ Ullage is the amount by which a container lacks being full; in this case, the space above the liquid in the tank.

⁶ On September 23, 1998, an independent contractor evaluated the Red Jacket™ system at station No. 741 and concluded that, although the Red Jacket™ system was a good indicator of liquid levels in underground storage tanks, sticking a tank with an accurate measuring device was a more precise measurement method.

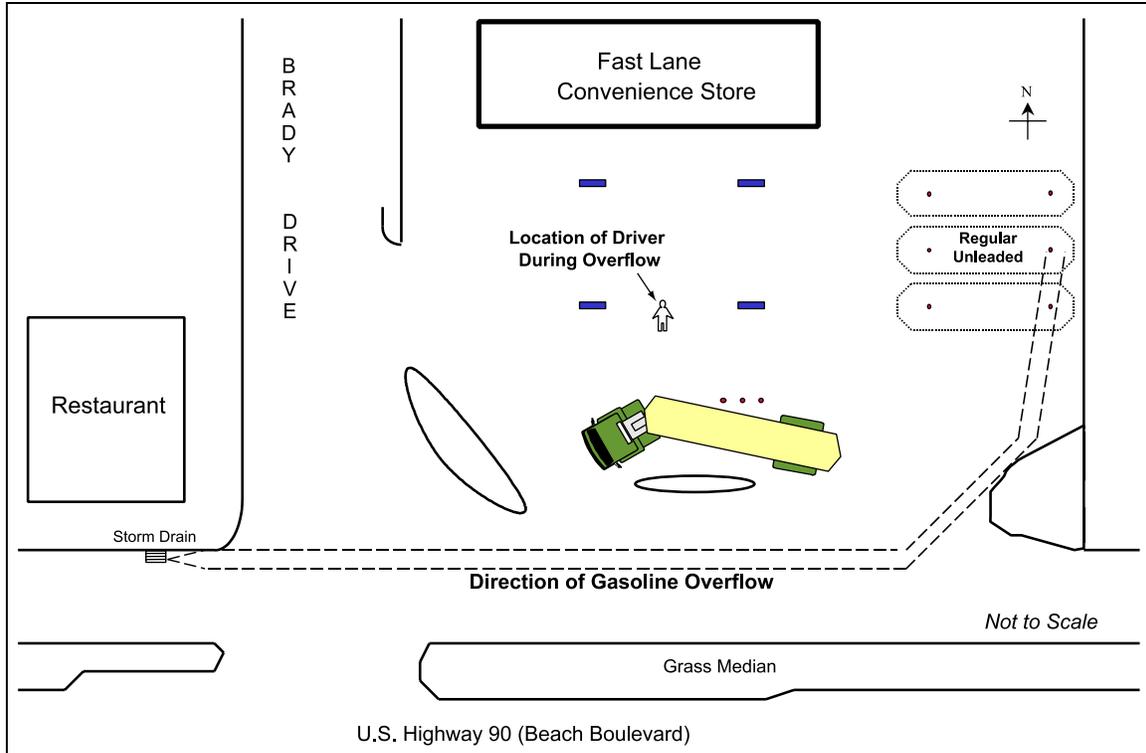
⁷ The Red Jacket™ system and the video camera system were not synchronized.

⁸ After viewing the video tape, store employees stated that they thought the truckdriver went into the room behind the checkout area where the automatic tank monitoring system printer was located. The truckdriver was identified on the video tape by the two store employees and by the customer who had alerted the truckdriver to the overflow.

Table 1. Events recorded by Red Jacket™ computer-based monitoring system

Time	Event
11:58:18	Transfer of gasoline into premium gasoline tank begins
12:16:39	Inventory report generated [by Fast Lane assistant manager]
12:17:44	Transfer of gasoline into regular unleaded gasoline tank begins
12:17:57	Transfer of gasoline into premium gasoline tank ends
12:40:21	Transfer of gasoline into regular unleaded gasoline tank ends

The truckdriver transferred the cargo compartment of premium unleaded gas and two of the three compartments of regular unleaded gas into the underground storage tanks without incident. During the transfer from the cargo tank's third compartment into the regular unleaded underground storage tank, a customer witnessed gasoline flowing from the direct fill port on the east side of the station property. (See figure 2.) The customer said that he saw the truckdriver standing near the cargo tank, seemingly unaware of the gasoline as it washed across the parking area in front of him. The customer described the gasoline stream as "several feet wide" and said that it "should have been visible to the truckdriver." The customer said that the truckdriver appeared to be "gazing" beyond the overflow "toward the casinos on U.S. Highway 90 (US 90)." The customer said that he told the truckdriver that gasoline was overflowing. The truckdriver then responded, "Okay, thanks," and closed a valve on the cargo tank to stop the flow.

**Figure 2.** Dotted lines from the regular unleaded underground storage tank to the storm drain represent the flow of the gasoline overflow.

The customer said that when he returned from the convenience store to his car, he saw the truckdriver looking down at the transfer hoses. The truckdriver then climbed the ladder on the rear of the cargo tank, walked forward along the top of the tank, opened the manhole cover, and looked down inside the tank.

The driver stated that after he was approached by the customer, he shut off the flow of regular unleaded gasoline from the cargo tank, walked to the open direct fill port to make sure it was no longer overflowing, and then climbed on top of the tank to assess the amount of gasoline remaining inside the cargo tank.

About 550 gallons⁹ of regular unleaded gasoline overflowed the underground storage tank. The excess gasoline flowed south from the open fill port through the gas station parking lot, then west along the north side of US 90 across the Brady Drive intersection, where it entered a storm drain under the highway. The drain emptied into an open concrete culvert, which ran southward toward the Gulf of Mexico.

At the time of the overflow, three passenger vehicles, each of which had two occupants, were near the US 90-Brady Drive intersection. Two sedans were waiting in line to turn onto US 90, while an eastbound pickup truck was turning onto Brady Drive. Biloxi Police Department reports indicate that witnesses observed a fire ignite under one of the cars and engulf all three vehicles. (See figure 3.) The fire ultimately caused the fatal injuries of five occupants and the serious injury of one occupant. The fire, following the fuel flow, spread to the open fill port lid in the Fast Lane station and through the storm drain.



Figure 3. One of the sedans and the pickup after emergency responders extinguished the blaze. The Premium cargo tank truck is in the background.

⁹ Investigators determined how many gallons the station's underground tank and its associated piping would have held by identifying the pretransfer ullage. They next subtracted the gallons of regular unleaded gasoline left in the truck's cargo tank from the amount that had been loaded on the cargo tank to determine how many gallons had been pumped. They compared these figures to determine the overflow amount.

Emergency Response

Police Response

About 12:53 a.m., a Biloxi police officer on routine motor patrol on US 90 observed a large fire consume an automobile at the intersection of US 90 and Brady Drive. The police officer radioed for assistance, and additional officers arrived within the next 10 minutes. The police evacuated a total of 80 people from the area, including the customers and staff from a restaurant at 2200 Beach Boulevard (US 90), a hotel on Brady Drive, and Fast Lane station No. 741.

Fire Department Response

At 12:53 a.m., a caller notified the Biloxi 911 operator that a person was on fire at the Fast Lane gas station. At 12:54 a.m., a Biloxi fire engine company was dispatched to the accident site, where it arrived about 12:59 a.m. In response to a second alarm at 12:56 a.m., two engines, an aerial truck, and supervisory personnel were dispatched to the scene, arriving between 1:00 a.m. and 1:03 a.m. Responders established a command post on US 90, east of the fire scene. Fire units used about 50 gallons of foam and engaged in fire suppression and rescue operations until 1:40 a.m., when the fire was extinguished.

Injuries

Table 2 is based on the injury criteria of the International Civil Aviation Organization, which the Safety Board uses in accident reports for all transportation modes.

Table 2. Injuries sustained in Biloxi, Mississippi, accident

	Drivers	Passengers	Others	Total
Fatal	2	3	0	5
Serious	1	0	0	1
Minor	0	0	1	1
None	-	-	-	-
Total	3	3	1	7

49 Code of Federal Regulations (CFR) 830.2 defines *fatal injury* as "any injury which results in death within 30 days of the accident" and *serious injury* as "an injury which: (1) requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received; (2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (3) causes severe hemorrhages, nerve, or tendon damage; (4) involves any internal organ; or (5) involves second- or third-degree burns, or any burn affecting more than 5 percent of the body surface."

Harrison County coroner records indicate that five of the six occupants of the vehicles died as a result of the fire. The Hyundai sedan operator, a 25-year-old male, sustained serious injuries and survived. The Mazda sedan passenger, a 20-year-old female, and the Ford pick-up truck passenger, a 56-year-old female, died at the accident scene. The Hyundai passenger, an 18-year-old male, the Mazda operator, a 43-year-old female, and the Ford operator, a 58-year-old male, died from their injuries after being admitted to

area hospitals. A firefighter who received minor injuries was treated and released from a local hospital.

Damages

The convenience store, adjacent landscaping, restaurant signs, and cargo tank truck sustained minor thermal damage. Estimated damages totaled about \$55,000 and included the value of the three destroyed passenger vehicles and the costs of repairing the truck tractor, of repairing and testing the cargo tank, and of reopening Fast Lane station No. 741.

Vehicle Information

The tractor of the semitrailer combination vehicle was a 1992 Freightliner. It was coupled to an elliptically shaped aluminum MC 306 cargo tank, which had been manufactured to Federal specifications in 1978 by Pullman Trailmobile of Chicago. The cargo tank had four separate compartments. Table 3 shows the capacity of each of the compartments and the total capacity of the cargo tank.

Table 3. Capacity of cargo tank

Compartment	Capacity (gallons)
1 (Forward)	2,500
2	2,000
3	1,750
4 (Aft)	2,750
Total	9,000

Premium company records and exterior markings on the front head of the cargo tank indicated that the cargo tank had been inspected and tested in accordance with Federal regulations. Following the accident, certified Mississippi Public Service Commission (MPSC) inspectors completed a CVSA¹⁰ (Commercial Vehicle Safety Alliance) inspection on the tractor and the cargo tank and noted no defects that would have rendered them out of service before the accident.

Hazardous Materials Information

The U.S. Department of Transportation (DOT) classifies gasoline as a hazard Class 3 (flammable liquid). Gasoline has a flash point of -40° Fahrenheit, an auto ignition temperature of 500° Fahrenheit, and a flammable range of 1.3 to 7.6 percent in air.

¹⁰ The CVSA is a body composed of Federal, State, and industry representatives who meet regularly to formulate uniform inspection procedures for commercial motor vehicles involved in the transportation of hazardous and nonhazardous cargoes.

Facility Information

General

At the time of the accident, Fast Lane station No. 741 was 1 of 55 gas station-convenience stores in Louisiana, Mississippi, and Tennessee owned by R.R. Morrison and Son, Inc., (Morrison) which is headquartered in Vicksburg, Mississippi. The station has three underground storage tanks, each with a capacity of 12,032 gallons.

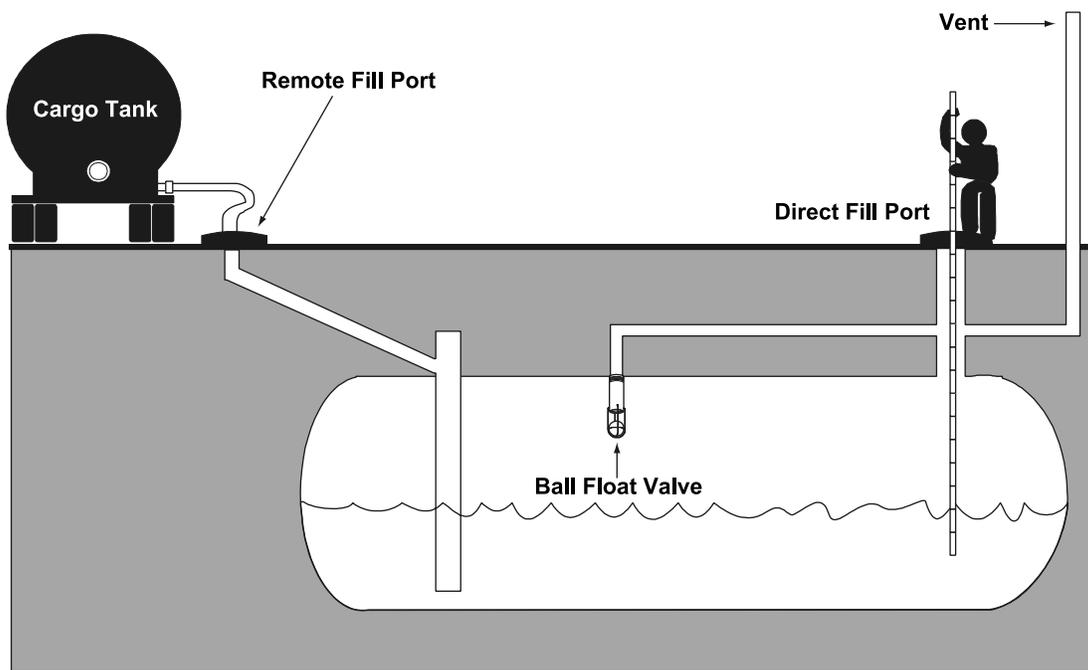
At most Fast Lane stations, each underground storage tank has one fill port through which gasoline is transferred. At four sites, however, each underground storage tank has two fill ports; one is a direct fill port, and the other is a remote fill port. Those sites are station No. 741 and stations in Bay St. Louis, Mississippi, Jackson, Tennessee, and Bastrop, Louisiana. Figure 4 illustrates a typical gas station that has both direct and remote fill ports. According to Premium officials and drivers, using the remote fill ports at station No. 741 for gasoline transfers affords drivers greater safety. Drivers said that they preferred to use the remote fill port at station No. 741 because doing so enabled them to drive forward to exit the site. If they use the direct fill port, they have to exit the station by backing onto US 90.

Federal regulations contained in 40 CFR 280.20 require that underground storage tanks be equipped with safeguards to prevent spilling and overfilling during gasoline transfer. Morrison elected to install float valves (figure 4) in the tank vents of the Fast Lane station storage tanks. The float valve rises as gasoline fills the tanks, eventually seating against the end of the vent pipe and restricting the vapor flow through the vent pipe, which causes pressure to build. The pressure in the tank works against the head of the liquid in the cargo tank and the transfer hoses, causing a reduction in the flow of gasoline. Because the operation of a float valve is pressure controlled, at a station having both direct and remote fill ports, such as Fast Lane station No. 741, only one fill port should be open during a gasoline transfer. If a second fill port is open, the vapor can escape through it, rendering the float valve safety feature ineffective.

Other Overfills at Station No. 741

On July 15, 1996, a different Premium truckdriver was involved in an overfill of about 50 to 60 gallons at Fast Lane station No. 741. That truckdriver told Safety Board investigators that he was transferring gasoline through the remote fill ports when it began to overfill through the direct fill ports, which he had left open after gauging the underground storage tanks. This truckdriver told Safety Board investigators that he was not aware of any Premium document explaining transfers at facilities with remote fill ports.

Gasoline transferred through the remote fill ports does not flow directly into the underground storage tanks but through pipes that extend at an angle from the port openings. Because of the angle of the pipes, measurements to gauge the amount of gasoline in the tank cannot be taken through the remote fill ports but must be made through the direct fill ports.



At Fast Lane station No. 741, the Red Jacket™ monitoring system was designed to trigger an alarm whenever the gasoline level in a tank reached 90-percent capacity.

The vent of the underground storage tank is equipped with a float valve, which is designed to rise as gasoline fills the tanks. At a predetermined level, the stainless steel ball float seats against the end of the vent pipe, restricting the vapor flow through the tank vent, which creates pressure in the underground tank that affects the flow of gas from the cargo tank. If the direct and the remote fill ports to an underground storage tank are both open during the gasoline transfer, the pressure will not build but will escape through the open fill port, which renders the float valve safety feature ineffective.

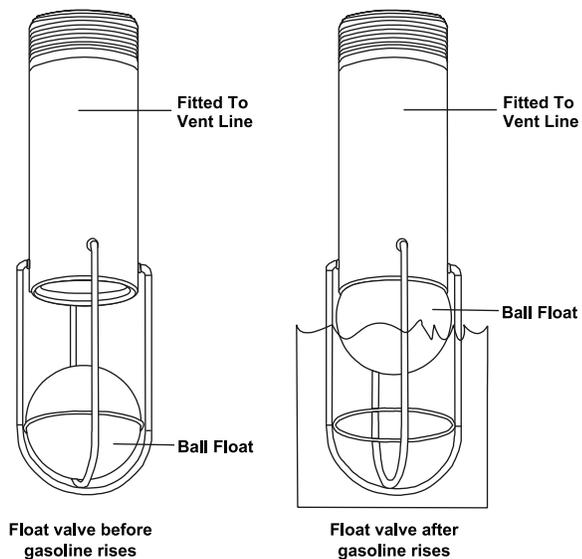


Figure 4. Top illustration is a cutaway of a typical service station having both direct and remote fill ports. Lower illustration shows a typical float valve, which was the type of safeguard against spills and overfills that the Morrison company had installed in many Fast Lane stations.

Personnel Information

Driver's Military Background

The truckdriver involved in the Biloxi accident was a 20-year veteran of the U.S. Navy who had retired from military service in 1997. He had graduated from high school before enlisting in the military. While in the Navy, he completed six college-level correspondence courses and, in 1994, military law enforcement school. His military skills list shows that, as of 1993, he had received training in operating or been awarded military licenses to operate the following vehicles: truck tractors and trailers, cranes and attachments, graders, crawlers, front-end loaders, forklifts, and buses. His military service history records show that, among other assignments, he had driven trucks and operated heavy equipment, including cargo cranes for unloading ships.

His military records also indicate that he had been involved in a series of accidents that resulted in referrals for medical evaluation and, ultimately, his suspension from operating heavy equipment in 1989. He subsequently was transferred to maintenance duties. In 1991, his licenses were reinstated, and he served in northern Iraq during the Persian Gulf Conflict, making aircraft runway repairs and driving ambulances. From 1993 until his retirement in 1997, he worked in maintenance services and security. His records show that his security duties consisted primarily of investigating mishaps, giving examinations for equipment operating licenses, dispatching security vehicles, and scheduling vehicle maintenance.

His military personnel evaluations were favorable. Many contained comments from various supervisors on his accuracy and excellent work, his dedication to the Navy, and his care in observing military dress standards. With occasional exceptions, he was recommended for retention and for promotion.

Civilian Training and Work History

On July 27, 1997, the truckdriver enrolled, in a 6-week semitractor-trailer driving training course at the Commercial Driver Institute, Inc., (CDI) in Gulfport, Mississippi. He received a passing overall score of 86.95 percent for the class work and, on August 22, 1997, was issued a Mississippi Commercial Drivers License (CDL) that included both a hazardous materials and cargo tank endorsement.

While in training at the CDI, on August 4, 1997, the truckdriver applied for a job with Werner Enterprises, Inc., (Werner) of Omaha, Nebraska, an interstate freight carrier. Upon successful completion of his CDI training, Werner hired him. Company personnel records indicate that the driver's employment was terminated on September 12, 1997, during his training period for "not progressing as a trainee." His Werner personnel file contains two documents that deal directly with the cause for his dismissal. One document is a complaint and incident report stating that his driver-trainer found the truckdriver to be unsuitable and a "danger to himself and others." The other document, a "Driver-Trainee

Status Worksheet,” indicates the driver was not progressing as a trainee and contains the annotation, “Driver has grossly unsafe instincts and practice(s).”¹¹

The truckdriver did not report his job with Werner on the applications for his next two jobs.¹²

After leaving Werner, the truckdriver was employed in September 1997 by John Fayard Fast Freight Trucking (Fayard) of Gulfport, Mississippi, as an over-the-road driver for van-type tractor-trailers. As required of all new Fayard drivers, he had a 1-week training class and an 8-week probationary period during which he was accompanied by a driver-trainer while on his routes.

The driver-trainer observed that the truckdriver operated safely and characterized him overall as a “pretty good driver.” He described the truckdriver as being conscientious about watching over his rig when it was parked and keeping his log book current and accurate. The driver-trainer noted that the truckdriver had problems with company paperwork, paying attention during training, noticing roadway signs, and backing the truck. He said that sometimes the truckdriver was “hard to reason with.” On one occasion, the driver-trainer observed the truckdriver taking medication and asked him what it was. The truckdriver told him it was Ritalin.¹³ The driver-trainer reported the incident to the company. Personnel records indicate that the truckdriver worked for Fayard as a regular driver for 5 months, until he quit without notice in April 1998.

The truckdriver was hired by Premium on April 20, 1998. He received 6 days of training, which began with 1 day of company orientation that included information and two video tapes on hazardous materials. He was required to take a written examination on hazardous materials, which he passed. During the next 5 days, he was in an on-the-job training (OJT) status, during which he was accompanied by a driver-trainer on deliveries.

The driver-trainer said the OJT began with the trainer performing the delivery work on the first day so that the new employee could see how things were to be done. During the rest of the OJT period, the truckdriver was supposed to perform the tasks while the driver-trainer observed and provided explanations or instructions as necessary. The driver-trainer told Safety Board investigators that he explained to the truckdriver how to convert inch readings to gallon figures using a tank chart and asked the truckdriver to let

¹¹ Safety Board investigators made numerous attempts to contact the Werner driver-trainer. He is no longer employed with the company and could not be located. Other Werner officials were unable to recall the specific details of the truckdriver’s employment with the company.

¹² The truckdriver also did not disclose his employment with Werner during interviews with Safety Board investigators. The Safety Board obtained this and other information about the truckdriver from depositions taken later during civil proceedings.

¹³ Ritalin is the brand name for methylphenidate hydrochloride, a mild prescription stimulant commonly used to treat attention deficit disorders (typically characterized by a history of chronic short attention span, distractibility, emotional lability, impulsivity, and moderate-to-severe hyperactivity) and narcolepsy (typically characterized by excessive daytime sleepiness with involuntary daytime sleep episodes, disturbed nighttime sleep, and sudden weakness). The most common adverse reactions to Ritalin are nervousness and insomnia.

him know if he wanted a copy of the tank charts. The driver-trainer said the truckdriver never asked for them. The truckdriver said that Premium never provided him with any charts or handbooks for determining whether the cargo tank load was greater than the available capacity of the receiving tanks.

The driver-trainer told investigators that after he checked underground tank levels using the direct fill ports, he always ensured that he replaced the lids to the direct ports if he chose to use the remote fill ports for the gasoline transfer. He said that he had instructed the truckdriver to do the same.

The driver-trainer said that, during the OJT period, the truckdriver sometimes took notes in a spiral notebook. Safety Board investigators found a spiral notebook in the cab of the accident truck. Most of the notebook's pages contain personal rather than work information. One page contains the notes shown in figure 5.

Unloading Procedures

1. Stick tanks Get reading
2. Open tank valves
3. Remove caps
4. Hook up hose
5. Fill out bills/need manifest
6. Make sure [to] send in a Fax on all Morrison loads

On remote tank sick [sic] first The[n] use tank chart
Customer gets green, yellow [and] blue

Figure 5. Notes written in truckdriver's spiral notebook.

During the OJT period, the driver-trainer and the truckdriver made two deliveries to Fast Lane station No. 741. The truckdriver's first visit to the station was on his second day of OJT, when, according to the training protocol, he was supposed to make the gasoline delivery while the driver-trainer oversaw his work. Instead, the driver went inside the convenience store for a sandwich while the driver-trainer made the transfer. The truckdriver made a delivery to station No. 741 on his last day of OJT. On this occasion, the driver-trainer noted no problems with the delivery.

In his interview with Safety Board investigators, the driver-trainer described the truckdriver as "a nice guy" but said he was "hard to reason with" and "hard headed." He said that the truckdriver frequently did not pay attention when things were explained to him. He said that the truckdriver consistently demonstrated two operating problems, backing the cargo tank and unloading the gasoline at the stations. The driver-trainer indicated that after working with the driver for 4 days, he was going to "turn him down"; however, when he informed the safety director of his determination, the safety director told him to "take him out again." The driver-trainer said that, during the next day of OJT, he gave the truckdriver a "sharp lecture" about his lack of attentiveness before they began making deliveries, and the truckdriver performed well. When they returned to Premium's

headquarters that evening, the driver-trainer told the safety director about the truckdriver's improved performance.

The next day was a Sunday. The truckdriver asked and was given permission to take off to attend church. The following day, Monday, the driver-trainer was off duty. When the truckdriver returned to work on Monday, the safety director told him that he could work alone.

The driver-trainer told Safety Board investigators that he did not learn that the truckdriver had been allowed to work by himself until several days later. He said that he never approved the truckdriver's working alone, and he thought that he (the trainer) should have spent 2 or 3 more days with him to "go over everything again" to "ensure that things were clear in the driver's mind." The driver-trainer said that the safety director told him to complete and backdate the truckdriver's certificate and other materials showing that he had successfully completed the training so the truckdriver could be paid at the end of his second work week. The driver-trainer complied with the safety director's instructions and backdated the items to show that the driver had successfully completed the driver training program.

The safety director said he hired the truckdriver because he had "a soft spot for vets" and preferred hiring career veterans over other applicants. The safety director said that his reason for instructing the truckdriver to make his first solo trip was that he needed a driver and the trainer had told him that the truckdriver had shown improvement on his last day of training. The safety director said that the truckdriver was allowed to continue working alone because everything went smoothly on his delivery run.

Other Overfills by the Truckdriver

Several weeks before the fire, the truckdriver overfilled an underground storage tank at the Bay St. Louis Fast Lane station. On this occasion, the truckdriver made the delivery to the correct facility.

Like station No. 741, the Bay St. Louis Fast Lane station has both direct and remote fill ports, although they are much closer together. The incident occurred during the day, and the driver noticed the overfill after a small amount of gasoline (about 5 to 10 gallons) overfilled. The truckdriver contacted Premium's Jackson office; and the operations manager, who was not aware that the Bay St. Louis station had remote fill ports, instructed him to climb on top of the cargo tank and determine how much of the load remained by looking into the cargo tank compartment. The operations manager directed the truckdriver to gauge all the receiving tanks and unload the rest of the gasoline into the premium unleaded underground storage tank. Morrison, the owner of the facility, maintained no records of the overfill at the Bay St. Louis Fast Lane station.

Operating Violations

The truckdriver's personnel file shows that, from May 5 to July 9, 1998, Premium officials noted 20 hours-of-service violations, including 15 70-hour violations, 3 10-hour

violations, and 2 15-hour violations.¹⁴ According to Premium's safety director, the company issued the truckdriver three letters of reprimand for his violations.

The *Premium Tank Lines Driver's Manual* (driver's manual) lists the following consequences for failing to comply with Bureau of Motor Carrier Safety¹⁵ rules:

First Offense - Letter of reprimand

Second Offense - 3-day layoff

Third Offense - 1-week layoff

Premium's records do not indicate that the company pursued any action other than issuing disciplinary letters to the truckdriver for his infractions.

Medical

Federal Requirements. Title 49 CFR 391.41 states that drivers of commercial motor vehicles must be physically qualified and provides instructions for individuals performing and recording physical examinations. The regulations stipulate that a person who has a "mental, nervous, organic, or functional disease or psychiatric disorder that is likely to interfere with his ability to drive safely" is not qualified to drive a commercial vehicle. Federal regulations further stipulate that "the examining physician is required to certify that the driver does not have any physical, mental, or organic defect of such a nature as to affect the driver's ability to operate safely a commercial motor vehicle." Federal regulations do not require that physicians verify the information given by drivers during the examination.

Driver's Medical Background. As noted earlier, while with the Navy, the truckdriver was referred for medical evaluation because he had been involved in a series of equipment operating accidents. Military physicians made a diagnosis of "attention deficit disorder" (ADD) and prescribed Ritalin for the condition. The medical records indicate that the truckdriver did well on the Ritalin. Nonetheless, as a result of a neurological evaluation in June 1989, Navy physicians made the following observation:

It is recommended that this individual be cross-trained into some field where his attention deficits and visual-motor coordination problems will have less impact on his job safety and performance.

Additionally, the truckdriver's military medical records note that he was referred for evaluation because "Co-worker reports patient sits and stares sometimes up to 15 minutes." The military medical files do not contain the results of a CT scan, an EEG (electroencephalogram), or an MRI (Magnetic Resonance Imaging test) or physicians' comments indicating that the truckdriver had been the subject of such tests.

¹⁴ For a 70-hour violation, the driver had to exceed 70 hours of driving and being on duty in an 8-day period. For a 10-hour violation, he had to exceed 10 hours of driving without an 8-hour break. For a 15-hour violation, he had to exceed 15 hours of being on duty and driving without an 8-hour break.

¹⁵ The name of the Bureau of Motor Carrier Safety has been changed to the Office of Motor Carrier and Highway Safety (OMCHS).

Records indicate that after retiring from the Navy, the truckdriver received two DOT physical examinations: the first for his acceptance into the CDI, the second for his employment with Premium. Neither examination form indicates any type of psychiatric disorder or any other nervous disorder. The physician who performed the truckdriver's most recent medical examination said that he had no knowledge of the truckdriver's neurological history.

At the time of the Biloxi accident, the truckdriver had a current medical card, and the only medical restriction on his personal operator's license and his CDL was for wearing corrective lenses while driving. His medical records indicate that he had myopia (nearsightedness) with astigmatism, which was corrected to 20/20 vision with glasses.

Work-Rest Routine

The truckdriver told Safety Board investigators that he was not fatigued on the morning of the fire. He had arranged with Premium to work the night shift. He said that he normally slept about 6 hours during the day, left for work about 9:00 p.m., and arrived back home between 8:00 and 9:00 a.m. His "Driver's Daily Log" indicates that on August 5 to 7, he went on duty at 10:45 p.m., 11:00 p.m., and 7:15 p.m., respectively. On August 8, he said, he went to bed at 11:30 a.m. and awoke at 5:30 p.m., at which time he called the dispatcher. His shift that evening began at 9:00 p.m.

Toxicological Testing

Investigators found bottles of ginseng, aspirin, and "Bee Awake," a bee pollen product, in the truck cab after the accident. The truckdriver said that the bee product was intended to boost his energy. He said that he had taken one ginseng tablet, one aspirin tablet, and no other medication on the night before the accident.

Biloxi police officials stated that, in anticipation of a possible criminal case, their personnel collected postaccident blood samples from the truckdriver and sent the specimens to the Mississippi State Crime Laboratory in Jackson. When the Safety Board became involved in the investigation, it asked that samples be forwarded to the Civil Aeromedical Institute (CAMI) in Oklahoma City for alcohol and drug testing. The analysis included testing to determine whether the truckdriver had taken Ritalin at therapeutic levels. The test results for alcohol, drugs, and Ritalin were negative.

Carrier Information

General

Premium is a for-hire¹⁶ motor carrier that primarily delivers petroleum products to storage tanks at service stations and other facilities. In addition to the drivers who work

¹⁶ The DOT defines *for-hire* as "a person engaged in the transportation of goods or passengers for compensation."

out of the Jackson headquarters, Premium has cargo tank truckdrivers based in the following Mississippi cities: Collins, McComb, Meridian, Vicksburg, and Biloxi.

Premium was formed and incorporated in 1986. In 1992, the company expanded to include trash and waste hauling. It sold all but one trash route in 1996. In 1997, Premium was hired by Morrison to monitor and fill underground storage tanks with gasoline and diesel fuel at selected Fast Lane gas stations. At the time of the accident, Premium serviced 12 Fast Lane stations along the Mississippi Gulf Coast, including station No. 741.

As of mid-1998, Premium's petroleum distribution division employed 25 full-time drivers, 2 part-time drivers, and 7 office staff members; its fleet included 30 company-owned truck tractors, 13 owner-operator truck tractors, 54 company-owned cargo tanks, and 3 leased cargo tanks. Premium's waste hauling division employed 3 full-time and 2 part-time drivers; its fleet had 6 truck tractors and 9 trailers, which were all company owned.

Hiring Procedures

Premium's safety director, who is responsible for hiring drivers, stated that Premium usually hires truckdrivers with about 2 years of over-the-road experience. Although the driver involved in the accident did not have 2 years of over-the-road experience, the safety director hired him because of his military background.

Federal regulations at 49 CFR 391.23 require motor carriers to investigate a driver applicant's employment record during the preceding 3 years. Section 391.23(c) states:

The investigation of the driver's employment record...must be made within 30 days of the date his/her employment begins. The investigation may consist of personal interview, telephone interview, letters, or any other method of obtaining information that the carrier deems appropriate. Each motor carrier must make a written record with respect to each past employer contacted.

The Premium safety director made the Federally required employment check with Fayard concerning the truckdriver. He said that he did not attempt to contact the military because he did not think it would be possible to obtain information. The safety director did not check with Werner because the truckdriver's employment application did not show his work experience with Werner. The safety director said that the truckdriver had the necessary licenses and his State motor vehicle record (MVR) did not reveal any violations. Premium hired the truckdriver after he passed a physical examination and drug screening.

Training

Regulatory Requirements. Federal requirements contained in 49 CFR Subpart H, “Training,” Section 172, stipulate that a hazardous materials (hazmat) employer¹⁷ must ensure that (hazmat) employees¹⁸ receive training and are tested on subjects in the following categories: general awareness and familiarization, function-specific, and safety.

Highway-specific training requirements at 49 CFR 177.816 (b) stipulate that each person who operates a cargo tank be trained in a number of areas, including attendance to a hazardous materials vehicle and loading and unloading procedures.

Overview of Premium’s Program. Premium’s driver training program, which spanned 1 to 2 weeks, began with a 1-day orientation taught by company officials at the Jackson headquarters. New drivers were shown several videotape presentations, including two tapes about hazardous materials, and were given a test on the information presented. Most of the orientation information was general in nature and included such topics as pretrip equipment inspections; required documents, stickers, and shipping papers; customer service; defensive driving; and emergency procedures. The instruction did not include discussions about how to transfer gasoline at stations, how to use tank charts, or how to determine the ullage in a tank. According to Premium’s safety director, instruction directly related to gasoline transfers was handled by the driver-trainer who spent the remainder of the training period with the new employee and evaluated the trainee for suitability as a regular company driver.

When a newly hired driver successfully concluded the training period, the new driver was issued a certificate of training completion signed by the driver-trainer that indicated the driver was prepared to work independently. The *Premium Tank Lines’ Driver Trainer Manual* (trainer’s manual) states that the driver-trainer is “the final decision-maker on whether or not the new hire will be a good, safe professional driver, capable of handling all the duties required....”

Driver-Trainer Qualifications. Premium selected its driver-trainers based on their experience, knowledge of operations, and work record. The driver-trainer for the driver involved in the overfill had worked for petroleum companies since 1977 and Premium since 1987, when he joined the company as a lease operator. His background included several years as a dispatcher and extensive experience in tank operations. He had been a trainer of cargo tank truckdrivers for a previous employer; while at Premium, he had trained between 10 and 15 drivers. When not instructing new employees, the driver-trainer served as a full-time driver in Premium’s coastal region.

¹⁷ Section 171.8 states, in part, “a hazmat employer means a person who uses one or more employees in connection with: transporting hazardous materials in commerce.”

¹⁸ Section 171.8 states, “a hazmat employee means a person who is employed by a hazmat employer and in the course of employment directly affects hazardous materials transportation safety.” The definition includes an individual who “loads, unloads, or handles hazardous materials” and who “operates a vehicle used to transport hazardous materials.”

Premium's safety director said that, because of the driver-trainer's thoroughness, he had intentionally teamed him with the truckdriver. The driver-trainer told Safety Board investigators that he was knowledgeable about the subjects listed in the trainer's manual but that he did not have a complete understanding of the Red Jacket™ automatic tank gauging system.

Training Materials. Premium's 37-page driver's manual, which is distributed to employees when they are hired, contains safety policies and general work procedures, including alcohol and drug policies and testing, emergency and accident procedures, defensive driving, and loading and unloading cargo. The driver's manual contains some safety requirements regarding unloading gasoline, including stipulations that a driver must stay in attendance while the unit is being unloaded¹⁹ and must shut down the unloading process when away from the controlling valve. The driver's manual cautions, "Be sure you are at the right plant or station." The manual contains no guidance advising drivers how or when they should make this determination, but it does stipulate, "Before unloading, always get the consignee to check and sign your Bill of Lading." The driver's manual does not contain instructions for determining the ullage in underground storage tanks or a discussion of tank charts.

The 17-page trainer's manual contains information on company practices, daily training activities, and lists general subjects that should be explained to truckdrivers during the training period. The trainer's manual does not state that the trainer should ensure that a new driver knows how to determine the ullage in underground storage tanks. Like the driver's manual, the trainer's manual states that drivers are to remain with the unit when gasoline is being unloaded. The driver-trainer told investigators that he had explained to the truckdriver the importance of staying with the unit when unloading.

Neither manual contains specific instructions explaining safeguards against overfills or factors to consider when unloading gasoline at facilities with remote fill ports.²⁰

In addition to the trainer's manual, each driver-trainer had a 2-page checksheet (appendix B) that lists subjects to review and critique during a new hire's OJT phase. Page one of the checksheet, at the top, has an area for remarks by the driver-trainer. The checksheet next has two blocks, one entitled "tractor" and the other "trailer," listing items to be explained by the driver-trainer to the new hire. Item 2 in the trailer block is "Where calibration charts are and how to use them." Premium officials stated that this reference is to the calibration charts that are used to determine the available space in the cargo tank.

The remainder of the checksheet form contains 17 operating categories that the driver-trainer is to critique and check if the new hire does not perform the procedure satisfactorily. Most of the subjects deal with inspecting and operating the vehicle.

¹⁹ Title 49 CFR 177.834 stipulates that a truckdriver must stay within 25 feet of the cargo tank during unloading.

²⁰ No Federal requirements stipulate that a hazmat employer or carrier have specific written procedures addressing loading and unloading gasoline.

Category XVI, "Loading and Unloading," has nine check items, including "Doesn't unload before checking address of customer with address on bill of lading" [item A]; "Doesn't break seals or unload until the customer has initialed bill of lading and inspected load" [item B]; and "Stays with unit; stands by product control valve (Driver controlled loading and unloading)" [item E].

Safety Briefings

According to the company safety director, he travels to Premium's five bases of operations quarterly to conduct safety briefings with the truckdrivers assigned to those locations. He plans his briefings based on the kind of problems the company is experiencing. He said that recent briefings conducted before the Biloxi accident had focused on DOT regulations, driving habits, and paperwork, among other subjects. Two of the five Biloxi-based truckdrivers had experienced overfills before the accident discussed in this report. None of the five drivers recalled station overfills or stations with remote fill ports being discussed at company safety briefings in Biloxi. Before the August 9 accident, the safety director's last safety briefing in Biloxi had been on August 7.

Dispatch Procedures

Premium's customers order gasoline to be delivered in a variety of ways. Some customers monitor their own storage tanks and, when a delivery is necessary, telephone or fax a request to Premium's Jackson office. In the case of Morrison, it hired Premium not only to deliver gasoline but also to monitor the gasoline levels at selected Fast Lane service stations by means of a computer link between the Red Jacket™ system and Premium's headquarters computer system.²¹ When data indicated that an underground storage tank needed to be filled, a Premium employee estimated the amount of gasoline to be sold to the station owner based on the present quantity of gasoline in the tank and the anticipated amount of gasoline that would probably be sold to the public before delivery could be made. As a safeguard against overfills, the Premium employee adjusted the amount of gasoline to be delivered to the underground tank based on 90 percent of its capacity. Headquarters personnel then prepared a master dispatch sheet assigning deliveries to the drivers, who obtained their assignments by telephone.

According to the Premium operations manager, a miscalculation by Premium's headquarters personnel, slow retail sales at the gas station, or a maintenance problem at a station could result in too much gasoline being dispatched for a particular underground storage tank.

The dispatch sheet indicates that, on the day before the accident, the same driver was dispatched to deliver 6,600 gallons of regular unleaded gasoline and 1,900 gallons of premium unleaded gasoline to Fast Lane station No. 741. Delivery reports verify that the underground storage tanks were filled during the early morning hours of August 8.

²¹ Premium's computers use Pathway™ software to convert data from the Red Jacket™ system.

On the eve of the accident, the safety director was operating from his home and using a photocopy of the dispatch sheet to issue delivery assignments. He said that he directed the truckdriver to make the following deliveries to Fast Lane stations: No. 742 (6,000 gallons regular and 2,500 gallons premium gasoline); No. 743 (6,000 gallons regular and 2,500 gallons premium gasoline); and No. 736 (6,000 gallons regular and 2,500 gallons premium gasoline). He said that he did not learn that the truckdriver had gone to station No. 741 until he was contacted from the fire scene.

The truckdriver stated that he wrote down what the safety director told him while they were still on the telephone. After the accident, in the truck cab, investigators found a small note on which was written the following: “742, 743, and 741; 31, 34, and 33,²² and 6000NL and 2500P.” The truckdriver told Safety Board investigators that, although he had previously made deliveries to the same station twice in one day, he had never made deliveries that frequently to station No. 741.

Both the safety director and the operations director indicated that they had made dispatch errors in the past; the safety director stated, however, that he was sure that he did not make an error on the evening of August 8.

Since this accident, Premium has sent its dispatchers a memorandum outlining the operating changes that are being incorporated into the company’s dispatch functions. Under “Procedures,” the revised operating manual will stipulate:

- A. Dispatcher will give drivers instructions concerning products, amounts, customer location, etc., in written form whenever possible. (via personal written or fax)
- B. When it is not possible to provide written instructions to the driver, the dispatcher will give the instructions to the driver no less than two (2) times, then will require the driver to repeat the instructions to be sure the instructions have been communicated clearly.

Transfer Procedures

The Safety Board interviewed all five Biloxi-based truckdrivers regarding gasoline transfer procedures, in particular, about determining the ullage in an underground tank and making deliveries at stations with remote fill ports.

Calculating Existing Ullage. The Premium driver’s manual states, “Before unloading, always get the consignee to check and sign your Bill of Lading. By so doing, you are protecting yourself and your company.” Neither the driver’s manual nor the trainer’s manual lists a standard procedure for calculating the volume of the underground storage tanks.

²² The numbers 31, 34, and 33, which represent the line numbers on the dispatch sheet, show the scheduled deliveries for Gulfport Fast Lane station No. 742, Biloxi Fast Lane station No. 743, and Long Beach, Mississippi, Fast Lane station No. 736.

Drivers convert the stick readings of underground storage tanks levels from inches to gallons by using the appropriate calibration chart, also called a tank chart.²³ By subtracting the gallons of gasoline in the tank from its total storage capacity, drivers can determine the available space. They can then compare this gallon figure to that shown on their shipping papers to determine whether the total amount of gasoline loaded on the cargo tank will fit into the underground storage facility. According to a Morrison official, each Fast Lane station maintains tank charts specific for that facility.

Four of the five Biloxi-based Premium drivers stated that, based on their experience, they could generally tell from the “stick readings” whether the tank would hold the gasoline to be delivered. Most said that they checked the tank charts only if the stick reading indicated that the delivery might nearly fill the tank to capacity. Two of the drivers had obtained charts for each of the different sized tanks to which they delivered. The third driver, who was the truckdriver’s driver-trainer, had most of the tank charts; the fourth driver did not carry any charts. The driver who did not carry tank charts said that if he had a question about the delivery, he either asked the service station personnel or called the dispatcher.

The truckdriver involved in the accident (the fifth Biloxi-based driver) said that he never used a tank chart to figure the available space in the underground storage tank. He told investigators that he did not consider it his responsibility to know how much was in the tanks and that he thought he was required to stick the tanks to obtain a figure for billing purposes, not for assessing the space available in them. He said that, when making gasoline transfers, he relied solely on Premium’s telephonic dispatch to provide the correct amount of gasoline and the station location.

Using Remote Fill Ports. Neither the driver’s manual nor the driver-trainer manual lists a standard procedure for transfer at facilities that have both direct and remote fill ports.

The four other Biloxi-based truckdrivers told investigators that insect nests and other debris occasionally clogged the storage tank vents at station No. 741, making gasoline transfers difficult. The driver-trainer and another driver said that they always replaced the lids before a gasoline transfer. One driver said that he occasionally left the lids off if the transfer was slow.²⁴ The fourth driver, who was the Premium employee involved in the July 15, 1996, overfill at station No. 741, stated that he had never been told a specific procedure for delivering to stations with remote fills. He said that dirt dauber²⁵ nests occasionally plugged vents at station No. 741 and that leaving the lid off the direct fill port made the gasoline transfer easier. After his overfill at the station, however, he was

²³ Tank charts differ depending on the volume of the tank and list both an inch reading and an equivalent gallon figure.

²⁴ By opening the second port during the gasoline transfer, the pressure that slows the gasoline flow will not build but will escape through the open fill port.

²⁵ Dirt daubers, also called mud daubers, are wasps that build nests of mud for their larvae.

careful to replace the lids before every transfer. He said that if he found the vents to be clogged, he would contact the facility owner.

Carrier Oversight by the Federal Highway Administration

An OMCHS inspector last performed a complete review of Premium in June 1992. During the compliance review, the inspector took a sampling of 154 duty status records and identified 6 hours-of-service violations in the records reviewed. The agent recommended that Premium “Ensure all employees involved in handling hazardous materials shipments are properly trained and familiar with the regulations applicable to their jobs in the hazardous materials transportation system.”²⁶ Premium received a *satisfactory*²⁷ rating as a result of the review and has not been the subject of a complete OMCHS audit since 1992.

Red Jacket™ Monitoring System

According to product literature, the Red Jacket™ underground storage tank monitoring system is used for complete leak detection and inventory management of underground storage tanks containing petroleum-based gasolines. The Red Jacket™ system was linked to computers at Premium, which used the Pathway™ software to extrapolate data and to determine the deliveries at some Fast Lane stations, including station No. 741.

Each station equipped with the Red Jacket™ system has a remote terminal that prints different types of reports, including inventory, delivery, tank leak detection, and alarms. Each of these reports includes the date, time, station information, report name, tank number, gasoline type, and tank capacity. Reports may be scheduled, event-driven, or initiated by the key pad.

The Red Jacket™ system has a feature that sounds an alarm inside the convenience store for a number of reasons, including when an underground storage tank reaches 90-percent capacity. The monitoring system does not have the capability to shut down a gasoline transfer when the alarm activates. The station’s assistant manager described the alarm as a “mild beep” that lasts 2 to 3 seconds and then shuts off. She said that she typically heard the Red Jacket™ alarm about twice a month when deliveries were made. She indicated that, over the months, she had become accustomed to the alarm sound and usually did not respond to it any longer. Although the Red Jacket™ system printout indicates that an alarm sounded when the gasoline level in the underground tank reached

²⁶ Safety Board investigators questioned the agent, who no longer works for the OMCHS, regarding Premium’s compliance review. Due to the passage of time, she could not remember many specifics of the audit but did remember the hours-of-service violations. Regarding her recommendation for hazardous materials training, she stated that she could not remember a problem with the training. She said that she often listed recommendations in review areas where she did not discover a violation, adding, “There is always room for motor carriers to evaluate areas of their program and make improvements.”

²⁷ Motor carriers may receive a *satisfactory*, a *conditional*, or an *unsatisfactory* rating based on the OMCHS evaluation.

90-percent capacity on the day of the accident, neither of the two Fast Lane employees then on duty recalled hearing the beep. They said that they were busy stocking or were with customers in the convenience store.

Following the accident, an independent contractor conducted an evaluation of the Red Jacket™ system and noted no significant problems with it.²⁸

Fast Lane Employee Training

The Fast Lane chain owner and the convenience store clerks working at the time of the accident stated that Fast Lane employees do not receive any specific training for monitoring or responding to the Red Jacket™ system for gasoline dispatch and transfer. Station employees are trained to use the Red Jacket™ system primarily to complete inventory and other paperwork requirements. Station employees are not trained to respond to the overfill alarm.

The Fast Lane chain owners indicated that station employees usually signed the driver's paperwork following a gasoline delivery. The station employees stated that sometimes they were not aware that a delivery had been made until the driver entered the store for signature.

Environmental Protection Agency Requirements

Safeguards Against Overfills

Federal regulations enacted by the Environmental Protection Agency (EPA) in 1988 require that underground storage tanks be equipped with a means of preventing overfills and spills. As defined by 40 CFR 280.12, an *overflow release* occurs when a tank is filled beyond its capacity, resulting in a discharge of the regulated substance to the environment. *Spilling* is a release of hazardous materials that "results from improper dispensing practices such as disconnecting the delivery hose from the tank's fill pipe before the hose has drained completely."²⁹ Federal regulations at 40 CFR 280.20 require that underground storage tanks be equipped with safeguards to prevent spilling and overfilling during gasoline transfer. The EPA regulations list several acceptable safeguard devices or methods that owners can use. The Morrison company elected to install float valves in the underground tanks at its Fast Lane stations.

Regulations Pertaining to Monitoring Transfers

Title 40 CFR 280.30 (a), "Spill and overfill control," stipulates that

²⁸ The contractor found that the amount recorded by the monitoring system was slightly greater than the actual amount of product in the underground tanks.

²⁹ "Analysis of Today's Rule," *Federal Register*, Vol. 53, No. 185, p. 37133, published September 23, 1988.

Owners and operators must ensure that releases due to spilling or overfilling do not occur. The owner and operator must ensure that the volume available in the [underground storage] tank is greater than the volume of product to be transferred to the tank before the transfer is made and that the transfer operation is monitored constantly to prevent overfilling and spilling.

In response to the 1988 rulemaking, operators of certain facilities, such as tank farms, indicated that constant direct monitoring would be extremely difficult. The EPA, therefore, changed the final rule to allow monitoring with remote equipment.

In its analysis of the rule, the EPA took the position that the owner of the underground storage system is responsible for any release. The analysis states:

Although EPA agrees that responsible carriers are the primary agents in the field to prevent spills and overfills, for the purpose of complying with today's requirements, the UST [underground storage tank] system owner and operator is responsible for preventing spills and overfills. The agency must take this approach because it has no legal authority to regulate transporters under Subtitle I. Thus, regardless of whether the owner and operator decides to share (by contract) responsibility for the monitoring of the transfer with the carrier, under today's final regulations the owner and operator will continue to be responsible in the event that there is a release during delivery.

EPA State Program Approval

In discussing the challenges for compliance, the EPA stated that a regulatory program of underground storage systems can best be carried out by "those closest to the problem, who can respond quickly, and who can create a visible presence, that is, the State and local governments." Toward this end, the EPA initiated a process of examination, called the State Program Approval, in which Federal EPA officials review State underground storage tank regulations to determine that they are "no less stringent" than Federal law. The criteria for the no-less-stringent determination include general operating requirements stipulating, in part, that all underground storage systems:

prevent spills and overfills by ensuring that the space in the tank is sufficient to receive the volume to be transferred and that the transfer operation is monitored constantly.

State or local agencies whose regulations meet Federal requirements are accorded the primary responsibility for implementing and, when necessary, enforcing underground storage tank regulations. To date, the District of Columbia, Puerto Rico, and 27 States, including Mississippi, have been granted enforcement authority under the EPA State Program Approval. In Mississippi, the Mississippi Department of Environmental Quality (DEQ) serves in this capacity. According to EPA and DEQ representatives, Mississippi adopted verbatim the Federal regulations related to underground tank storage safety, including the requirements for overfill protection.

Regulatory Enforcement

In States that have EPA State Program Approval, the EPA relies primarily upon State agencies to enforce regulations, although EPA inspectors may also enforce the regulations. According to the EPA's Office of Underground Storage Tanks (UST), Federal and State inspectors enforce underground storage tank regulations by various means, including warnings or fines, depending upon the severity of the violation. EPA officials indicated that in the agency's oversight of underground storage tanks, it has focused on equipment safeguards and preventing underground storage tank leaks.

The Mississippi DEQ has four inspectors who regulate about 10,000 underground storage tanks, of which about 8,500 are currently in use and about 1,500 are temporarily out of use. Mississippi DEQ officials indicated that, based on available staff and funding, its inspectors visit a facility about every 4 years. Before the August 1998 accident, Mississippi DEQ representatives last inspected the underground storage tanks at station No. 741 in December 1997 and noted no significant violations at that time. After the accident, DEQ inspectors performed a visual inspection of the site to determine whether the top of the tank had loose fittings that may have caused or contributed to the release from the underground storage system. They found that all the fittings appeared to be tight.

Interviews with Mississippi DEQ officials indicated that the State has not enforced requirements that facility owners in Mississippi determine available underground storage space or monitor product transfers. Moreover, the State has not cited any facility owners for violating 40 CFR 280.30 (a).

For this investigation, the Safety Board contacted the acting director of the EPA's Office of UST to determine the scope of enforcement of 40 CFR 280.30 (a) by EPA investigators. The UST official surveyed EPA regional directors, of whom none could cite any specific case of enforcement.

Notification of Hazardous Materials Incidents

Soon after the fire erupted, the truckdriver notified the Premium safety director, who immediately drove from Jackson to the accident scene, a distance of about 170 miles. The safety director later stated that he maintained a telephone list of agencies to contact in the event of an emergency and that he made several unsuccessful attempts to report the accident to the National Response Center (NRC) while he was at the accident scene throughout the day. He said that he then drove back to his home in Jackson, where he fell asleep. When he awoke about 9:00 p.m., he remembered that he had been unsuccessful in reporting the accident and again tried to telephone the NRC with no success. He said that he then left his residence and drove to the Premium headquarters to check the phone number. At the office, he discovered that the number he had been using was incorrect, whereupon he called the NRC, which recorded the notification at 12:22 a.m. eastern standard time,³⁰ about 23 hours after the accident occurred.

³⁰ 11:22 p.m. central standard time in Jackson.

Title 49 CFR 171.15, “Immediate notice of certain hazardous materials incidents,” requires that motor carriers who transport hazardous materials report by telephone incidents meeting specified criteria, including a fatality, to the NRC “at the earliest practicable moment.” In the October 1969 proposed rulemaking on accident reporting requirements, the Research and Special Programs Administration (RSPA) stated:

The immediate report would cover the essential items of information necessary for the operating administrations of the Department and the National Transportation Safety Board to determine what immediate action should be taken by them, if any.³¹

In March 1999, RSPA published an Advance Notice of Proposed Rulemaking (ANPRM) to determine the need for regulatory changes to the reporting requirements of the hazardous materials contained in 49 CFR Part 171.

In its June 1999 response to RSPA’s ANPRM, the Safety Board cited three accidents involving transportation-related unloading operations that demonstrated deficiencies in the existing telephonic notification and incident requirements contained in 49 CFR Part 171. The Safety Board included the August 9, 1998, Biloxi accident as an example, stating:

Although the accident occurred about 1:00 a.m. on August 9, 1998, the motor carrier did not notify the NRC until nearly 24 hours after the accident. The delayed notification precluded the Safety Board and other Federal agencies...from responding promptly and initiating the accident investigation.

The Safety Board further noted:

Under reporting criteria at 49 CFR 171.15, a carrier who transports hazardous materials is required to provide telephonic notification ‘at the earliest practicable moment.’ However, during its investigation of the Biloxi accident, the Safety Board has noted that the term ‘the earliest practicable moment’ is not defined in the Hazardous Materials Regulations, nor has RSPA issued an interpretation that provides any time constraints on the reporting time frame. The Safety Board itself requires railroads under 49 CFR 840.3 to provide telephonic notification through the NRC not later than 2 hours after an accident resulting in a fatality, the release of hazardous materials, or evacuation of the public and not later than 4 hours after an accident resulting only in damages exceeding specified thresholds. The Safety Board believes that the effectiveness of the requirements for telephonic notification should be strengthened and a specific time frame given for providing telephonic notifications.

In related matters, the Occupational Health and Safety Administration (OSHA), requires notification within 8 hours of the death or in-patient treatment of any employee following a work-related accident.³²

³¹ *Federal Register*, Vol. 34, No. 208. Published October 29, 1969. Page 17450.

³² 29 CFR 1904.8

Analysis

General

This analysis is divided into three main sections. In the first part, the Safety Board identifies factors that can be readily excluded as causal or contributory to the accident. In the second section, the Board provides a synopsis of events directly leading to the accident. In the final section, the Board discusses deficiencies in three major areas that were identified as issues during this investigation:

- Premium's management oversight;
- Morrison's procedures for accepting petroleum product deliveries to underground storage tanks; and
- Federal requirements and oversight.

The issue of Federal requirements and oversight includes regulatory requirements relating to written procedures for loading and unloading cargo tanks transporting hazardous materials, the regulatory requirements for notifying Federal agencies of a hazardous materials incident, and the EPA's enforcement of the regulatory requirements contained in 40 CFR 280.30 (a) for preventing overfills.

Exclusions

The toxicological test results of blood samples taken from the truckdriver were negative for alcohol and drugs. The driver's work-rest schedule did not require alternate night and day sleeping, which probably neutralized the effect of his working early morning hours. In the 4 days before the accident, he reportedly obtained his normal amount of rest. Based on these findings, the Safety Board concludes that the Premium truckdriver was not impaired by drugs, alcohol, or fatigue on the morning of the Biloxi accident.

Accident Analysis

On the eve of the accident, the truckdriver telephoned the Premium dispatcher to obtain the assigned deliveries for his shift. The safety director, who was serving as dispatcher, orally provided the driver with a list of three delivery locations and the number of gallons to be delivered to each site. He said that he told the driver to make deliveries to Fast Lane station Nos. 742, 743, and 736. The driver said that he wrote down the delivery sites that the safety director had given him. His notes matched all of the dispatch line numbers and two of the station numbers (742 and 743). However, station number No. 741 is listed rather than station No. 736. The dispatcher did not ask the driver to read the list to him to verify that he had understood and correctly recorded the delivery assignments. The dispatcher also did not provide a fax or written dispatch record to the driver.

After picking up his load of gasoline, the truckdriver went to Fast Lane station No. 741, which was not scheduled to receive a delivery. When the cargo tank truck arrived at the station, the Fast Lane station employees did not compare the amount of gasoline scheduled for delivery to the amount that the Red Jacket™ monitoring system indicated was in the underground tanks. Morrison, the station owner-operator, did not train and require its employees to monitor the volume of gasoline in underground tanks or to confer with cargo tank drivers to ensure the accuracy of deliveries; such a comparison, in this case, would have shown that the driver was in error and could have prevented the overfill.

Once at the station, the driver made a number of operating errors. He did not determine the quantity of gasoline in the underground storage tanks, and he did not calculate the amount of gasoline that could safely be transferred from the cargo tank to the station storage tanks. After sticking the underground storage tanks through the direct fill ports, he failed to use the measurement that he obtained to calculate the available space for gasoline in the storage tank. He then failed to close the lids of the direct fill ports before beginning the gasoline transfer through the remote fill ports. Having both the remote and the direct port fill lids open rendered the tank system's pressure-controlled safety device ineffective and resulted in gas overflowing the direct fill port of the regular unleaded gasoline storage tank.

Finally, the truckdriver did not properly monitor the gasoline transfer. The Red Jacket™ printout and the convenience store video tapes indicate that he left the cargo tank truck while gasoline was being transferred into the underground tanks, which was contrary to company procedures. When he was standing by the cargo tank, he did not notice the gasoline overflowing from the storage tank and streaming across the station lot. A customer at the station observed him gazing across the road, seemingly unaware of the gasoline near him.

The stream of gasoline ran along the side of the road and across the intersection, which, at the time, was occupied by three passenger vehicles. A fire erupted under one of the vehicles and immediately engulfed all three. Five of the occupants in the vehicles sustained fatal injuries, and one occupant suffered serious injuries.

Adequacy of Premium's Management Oversight

Hiring Practices

The Safety Board examined the truckdriver's performance in the context of information obtained from his past personnel and medical files and from observations by OJT personnel and noted some factors that should have prompted greater scrutiny during the hiring process. The Safety Board then looked at Premium's screening process for new applicants and noted some deficiencies.

Medical Condition of the Truckdriver. Navy records indicate that the truckdriver was referred for medical evaluation and that several of his military-issued equipment operating licenses had been suspended after he had a series of equipment-related accidents. His Navy medical records indicate that military physicians diagnosed him as

having ADD. His records show that after he was prescribed Ritalin, his condition improved and his licenses were restored.

The truckdriver's actions during his civilian jobs were consistent with a medical condition such as ADD. During his training at Fayard and Premium, his driver-trainers complained that he frequently seemed preoccupied, was inattentive during instruction, and was easily distracted.

The neurological condition described in the truckdriver's Navy medical records may explain his reaction to the Biloxi gasoline overfill. According to a witness, the overfill was in clear view of the truckdriver as he stood near his vehicle. However, the truckdriver was observed staring over the overfill and did not respond until the witness spoke to him. A more thorough assessment of the truckdriver's behavior cannot be offered without current neurological tests of the subject.

The truckdriver failed to report background information related to his neurological disorder to physicians who performed his DOT physicals. Two physicians, lacking pertinent information, found the truckdriver to be medically qualified. The Safety Board concludes that the physicians who performed the truckdriver's DOT physical could not adequately evaluate the truckdriver's medical fitness because he did not report background information related to his neurological condition.

The Safety Board has addressed the issue of improperly reported medical information in earlier accident reports.³³ Physicians cannot adequately evaluate the medical fitness of drivers unless truthful information about previous medical conditions is provided. Similarly, once information is given, physicians have no way to verify the truthfulness and completeness of answers.

As part of the Safety Board's truck and bus safety initiative, in January 1999, the Board approved a series of public hearings to be conducted by its Office of Highway Safety. The first hearing, which took place in April 1999, focused on commercial vehicle oversight and crash data. As a result of the April hearing, additional Congressional interest, and its investigation of the May 9, 1999, crash of a motorcoach in New Orleans, Louisiana, that fatally injured 22 passengers, the Safety Board identified a group of issues that warrant additional examination:

³³ See, for example, the following reports: (Publisher and place of publication for all works cited is National Transportation Safety Board, Washington, D.C.) *Greyhound Bus Collision with Concrete Overpass Support Column on I-880, San Juan Overpass, Sacramento, California, November 3, 1973*, Highway Accident Report NTSB/HAR-74/05 (1974); *Collision of Humboldt County Dump Truck and Klamath-Trinity Unified District Schoolbus, State Route 96 near Willow Creek, California, February 24, 1983*, Highway Accident Report NTSB/HAR-83/05 (1983); *Academy Lines, Inc., Intercity Bus Run-off Roadway and Overturn, Middletown, New Jersey, September 6, 1987*, Highway Accident Report NTSB/HAR-88/03 (1988); *Greyhound Bus Lines, Inc., Intercity Bus Loss of Control and Overturn, Interstate Highway 65 in Nashville, Tennessee, November 19, 1988*, Highway Accident Report NTSB/HAR-89/03 (1989); *Factors that Affect Fatigue in Heavy Truck Accidents*, Safety Study NTSB/SS-95/01 (1995).

- The safety implications of the North America Free Trade Agreement;
- The adequacy of the OMCHS's oversight of medical fitness and drug issues as they relate to the commercial vehicle driver;
- The adequacy of the CDL program; and
- The lack of a national CDL database accessible to motor carriers for driver selection and hiring purposes.

The April hearing revealed that although commercial vehicle drivers are required to possess a CDL and a medical certificate, often there is no verification program for the driver's medical fitness and drivers submit falsified certifications or, as in the case of the Biloxi accident, fail to inform examining physicians or the motor carriers of significant medical issues. Additionally, Safety Board investigations have found that examining physicians frequently do not understand the nature of the activities they are certifying drivers to perform, and no program is available to educate physicians how to conduct their examinations. Furthermore, medication impairment appears to be increasing among commercial drivers, especially in connection with combinations of prescribed and over-the-counter medication. Based on these findings, the Safety Board's Office of Highway Safety has proposed that a hearing addressing CDL and medical fitness issues be conducted in FY 2000.

Applicant Screening. Despite the truckdriver's failure to report pertinent information on his application to Premium, the carrier's officials might have been able to determine his fitness for duty had they conducted the 3-year background check required by Federal regulations (49 CFR 391.23). The safety director verified the truckdriver's employment only with Fayard. The safety director told the Safety Board that he did not think that he would be able to obtain background information from the Navy.

What is disturbing to the Safety Board in this case is that Premium officials did not even attempt to obtain Navy records. Had Premium made the information request, it may have obtained documents showing the truckdriver's medical history before the accident occurred, which may have alerted company officials that the truckdriver had a medical condition that could affect his skills and abilities. The Safety Board concludes that although a significant factor in Premium's hiring the truckdriver was his military background, the safety director did not attempt to check or to request the driver's military records, which contained useful information for determining his medical fitness and ability to operate heavy equipment.

The driver also did not report his previous employment with Werner. Had he done so, Premium officials may have been able to question why the driver's employment with Werner had been terminated. The Safety Board concludes that, because the truckdriver failed to report on his job application his employment with a carrier that had dismissed him, useful information from that carrier was not available to Premium to help company officials evaluate the truckdriver's ability to perform his duties.

At the Safety Board's April 1999 hearing, associations and motor carriers testified that one of their primary concerns is their ability to select competent drivers. They stated that drivers' records often do not transfer with them from State to State, nor do their records reflect all traffic violations. Motor carriers must rely on driver self-reporting to review prior work experience; so carriers are often unable to obtain a true picture of the driver's history. The Safety Board's Office of Highway Safety has therefore recommended that the failure of applicants to accurately report prior work history be addressed in the Safety Board's proposed FY 2000 public hearing.

Employee Training

Because of the dangers that hazardous materials pose, the drivers transporting them must be among the most skilled operators. In addition to having a high degree of general truck driving skill and experience, drivers transporting hazardous materials need specialized knowledge, which makes training related to specific job functions especially important. Drivers must not only be well-versed in the properties of their cargo and the rules of the road concerning the transportation of those materials but also in all proper handling procedures if they are to be responsible for loading and unloading.

Premium's training program had two main phases: a 1-day orientation that provided new hires with a general overview of the company, the products transported, employee benefits, and pertinent Federal regulations, and an OJT period that focused on operational procedures. The OJT phase varied from 1 to 2 weeks, depending on the proficiency demonstrated by the new hire. In addition to the preliminary training, the safety director conducted quarterly safety briefings on subjects that he determined needed additional emphasis.

Interviews with experienced Premium drivers and the truckdriver involved in the Biloxi accident revealed that the employees' knowledge of company policies and procedures concerning loading and unloading gasoline varied widely. The Safety Board therefore looked at the reference materials and instructions Premium provided to its new hires concerning gasoline transfers.

The driver's manual given to Premium's new hires and the trainer's manual and the checksheet used by its driver-trainers were very general in nature and addressed few safety topics other than those concerning over-the-road transport. The manuals contained minimal instructions addressing gasoline transfers; the checksheet lacked detailed items under the category "Loading and Unloading." Although the driver-trainer said that he explained and demonstrated specific unloading procedures to the truckdriver, the truckdriver's personal notes taken during training list only very general steps and contain few safety considerations.

When addressing operational considerations with serious safety implications, oral instructions are not sufficient. Oral instructions can be misinterpreted. Even when driver-trainers follow up their oral instructions by watching the drivers perform a function, there is no guarantee that the drivers understand the safety implications of the procedures they are following. Further, over time many trainees will forget instructions on procedures that

they are not required to perform frequently. All drivers of cargo tank trucks therefore need specific written job procedures if they are to operate safely. In the case of new employees, in particular, well written loading and unloading procedures can establish desired work patterns before bad habits are learned.

Because his operating manual lacked detailed operating instructions addressing cargo unloading, the truckdriver had no thorough written source to reference if he could not recall his driver-trainer's instructions or could not make sense of his own cryptic and inaccurate notes. This deficiency of information and training negatively affected the truckdriver's gasoline transfer activities in several ways.

First, Premium's delivery loads to the Fast Lane stations were based on conservative estimates of daily gasoline sales. Consequently, circumstances such as unusually slow sales, shutdowns for maintenance, and miscalculations could result in the driver arriving with too much gasoline for the underground storage tank. Both the employee manual and the driver-trainer manual indicated that the driver should present the bill of lading to the station operator before making a transfer, but neither manual explains why this should be done first or identifies any potential safety benefits arising from this sequence. The manuals could have shown that by first obtaining the operator's approval of the bill of lading, the driver could determine whether he was delivering the gasoline to the correct location and, at facilities having tank-volume monitoring systems, could ascertain the actual amount of gasoline in the underground tanks before beginning the transfer.

By failing to discuss the rationale for first obtaining the bill of lading signature, Premium lost an opportunity to emphasize to its truckdrivers the safety consequences of this action. Lacking this explanation, the truckdrivers apparently did not absorb the importance of the procedural sequence. Fast Lane personnel told the Safety Board that the cargo tank truckdrivers rarely, if ever, showed or discussed the bill of lading with them before initiating a gasoline transfer.

Additionally, as the previous overfills at the Biloxi and the Bay St. Louis stations demonstrate, the gasoline cargo amounts dispatched by Premium to a location are sometimes greater than the available space in the underground tanks. Consequently, it is essential that cargo tank truckdrivers correctly determine the ullage in the underground storage tanks and whether the intended amount of gasoline will fit into the tank before beginning a gasoline transfer. Nevertheless, neither the driver nor trainer manual advised truckdrivers that this determination is vital to safety or provided an example showing how to calculate available underground storage tank space. Omission of such safety-significant information illustrates the inadequacy of Premium's reference manuals.

As a safeguard against overfills, it is incumbent upon Premium to ensure that all its truckdrivers know the specific steps for unloading gasoline, including the various methods for calculating ullage in underground tanks and how to use tank charts. The truckdriver who overfilled Fast Lane station No. 741 in 1996 stated that he was unaware of any specific procedures for dealing with tanks with remote fills. Although Premium's management officials were aware of both this overfill and the overfill at the Bay St. Louis

Fast Lane station, they still did not develop specific written procedures stressing the importance of calculating available space and replacing fill caps before beginning the transfer. Moreover, the safety director did not discuss potential procedural problems at stations with remote fill ports during his quarterly safety meetings.

How a carrier manages the training of its new employees has a tremendous impact on their attitude toward their work and their ability to do their job effectively and efficiently. Inadequate instruction can leave new hires confused and uncertain of how to do the jobs for which they were hired. Inadequate training materials and vague procedural directions concerning cargo unloading procedures permit drivers to pick up bad habits and follow incomplete and potentially dangerous practices.

The Safety Board concludes that Premium's operating manuals for its new employees and its driver-trainers lacked the specificity that employees need to ensure that they practice correct and safe cargo unloading procedures. The Safety Board believes that Premium should revise its driver and driver-trainer manuals to include specific written instructions on loading and unloading cargo and on the use of tools, such as storage tank capacity charts, necessary to deliver gasoline safely.

But the Safety Board emphasizes that, while Premium did not provide sufficient training or adequate reference materials to its drivers concerning gasoline loading and unloading, Premium's deficiencies are symptomatic of a much larger problem in this area—the nationwide lack of Federal regulations addressing these significant safety issues. Although Federal regulations currently require that drivers be trained in loading and unloading procedures, the regulations do not require that motor carriers of bulk hazardous materials maintain specific written loading and unloading procedures. The Safety Board concludes that, to help drivers follow safe loading and unloading procedures, Federal regulations should require carriers that transport hazardous materials in cargo tanks to have specific written procedures for loading and unloading. The Safety Board therefore believes that RSPA should promulgate regulations requiring motor carriers that transport hazardous materials in cargo tanks to develop and maintain specific written cargo loading and unloading procedures for their drivers. Once regulations are promulgated, the FHWA should ensure that the motor carriers are in compliance with the regulations.

The Biloxi accident presents issues relevant to all carriers involved in the transport of gasoline and petroleum products. The Safety Board therefore believes that the National Tank Truck Carriers Association and the American Petroleum Institute should inform their members of the facts and circumstances of the Biloxi accident and urge them to review the adequacy of their procedures for hiring and training truckdrivers and their written procedures for loading and unloading hazardous materials.

Adherence to Policy

The Safety Board is also concerned by the failure of Premium management to adhere to its own clearly stated policies and procedures. The record of the truckdriver involved in the accident showed a regular pattern of Federal hours-of-service violations.

Although the Premium driver's manual states that suspension is the consequence of failing to comply with these Federal regulations, company officials merely continued to issue the truckdriver written warnings as a disciplinary measure rather than suspending him.

Additionally, carrier officials failed to follow their own written procedures when they retained the truckdriver after the driver-trainer recommended termination. According to the Premium driver-trainer manual, the driver-trainer with whom a new employee is teamed has the final determination on the length of the driver's initial training and on whether the new hire should be advanced to the status of qualified driver or terminated. In this case, the truckdriver's trainer had determined the truckdriver's unsuitability by their fourth day of working together. Instead of terminating the truckdriver as recommended by the driver-trainer, the safety director told the driver-trainer to take the truckdriver out again. The driver-trainer spent one more day of training with the truckdriver but believed that the truckdriver was not ready to work by himself. The driver-trainer had anticipated having two or three additional days to work with the truckdriver; however, while the driver-trainer was off-duty, company officials allowed the ill-prepared driver to make a delivery alone. The Safety Board concludes that the Premium safety director failed to adhere to company procedures for hiring and training the truckdriver and for disciplining him when he failed to comply with the hours-of-service requirements. The Safety Board believes that Premium should establish procedures to ensure that company officials adhere to written policies relating to hiring, training, and disciplining of company truckdrivers.

Dispatch Procedures

On the evening of August 8, 1998, during the telephone conversation between the safety director, who was serving as dispatcher, and the truckdriver, a miscommunication occurred that resulted in the truckdriver erroneously making a delivery to station No. 741. A review of the dispatch sheet and of statements made by the safety director indicated that the delivery was intended for a station in Long Beach, Mississippi.

The safety director claimed to have correctly dispatched the truckdriver, and the truckdriver claimed to have accurately recorded the dispatches he was given. The miscommunication demonstrated that Premium's dispatching procedures lack safeguards against errors. Both the safety director and the operations manager stated that they and other dispatchers had sometimes made errors in relaying information to truckers. Despite the fact that all company dispatches were given over the telephone and truckdrivers never saw the written assignments before delivery, the company dispatch procedures lacked safeguards for ensuring that truckdrivers received the correct information about the type, amount, and destination of the gasoline to be delivered. The Safety Board concludes that Premium's lack of adequate procedures for verifying the accuracy of dispatch orders resulted in the truckdriver delivering gasoline to the wrong location. The Safety Board is pleased to learn that, since this accident, Premium has revised its dispatch procedures to include methods by which the dispatcher may verify that the driver has received the correct delivery information.

Adequacy of Fast Lane Employee Training

The Fast Lane employees at station No. 741 interviewed after the accident indicated that they were busy with various routine activities during their work shift on the night of the overfill. They also indicated that they had become accustomed to hearing the overfill alarm and no longer responded to it.

The EPA not only requires facility owners and operators to verify before transfer operations begin that the amount of gasoline being delivered will fit into underground gasoline storage tanks, it also requires that owners and operators monitor the transfer. The EPA allows owners and operators the option of using monitoring equipment, such as the Red Jacket™ system, to satisfy this Federal requirement.

According to Morrison, the owner of Fast Lane station No. 741, its employees are not trained to monitor the Red Jacket™ system during transfer nor are they trained to respond to the Red Jacket™ overfill alarm. Morrison officials stated that, because of their agreement with Premium, they considered the carrier responsible for determining that the volume of cargo being delivered would fit in the underground tanks.

The Safety Board is concerned by this attitude. The EPA requires that station owners and operators ensure that underground storage tanks have available space for the gasoline being delivered and that the transfer operation is monitored. The safest and most effective way to accomplish this is for station employees to work with truckdrivers to ensure the safe execution of gasoline deliveries. The Safety Board concludes that Fast Lane employees lacked adequate procedures and training to prevent overfills of the underground storage tanks. Morrison did not require its Fast Lane employees either to determine whether the amount of gasoline intended for delivery would fit in the underground storage tanks or to monitor alarms warning that the tanks were nearing maximum fill levels during cargo transfers. The Safety Board believes that Morrison should establish procedures and provide training to ensure that its employees verify that underground storage tanks have sufficient capacity for the gasoline or other petroleum products offered for delivery and monitor such transfer so that overfills do not occur.

The Safety Board doubts that the failure to require station employees to monitor the gasoline transfer process is limited to Morrison. Accordingly, other station owners need to be made aware of the potential problems of relying on the hazardous materials carrier to safely load and unload gasoline. The Safety Board is convinced that industry associations should promote improved safety at service stations by publicizing the problems identified in the Biloxi accident. The Safety Board therefore believes that the National Association of Convenience Stores, the National Association of Truck Stop Operators, the Petroleum Marketers of America, the Service Station Dealers of America, and the Society of Independent Gasoline Marketers of America should inform their members of the facts and circumstances of the Biloxi accident and urge them to review their procedures and, if necessary, to revise them to require that station employees verify that underground storage tanks have sufficient capacity for gasoline or other petroleum products offered for delivery and to monitor such transfers so that overfills do not occur.

Adequacy of EPA Enforcement

The EPA has very clear requirements stipulating that facility owners and their operators should ensure that the amount of gasoline delivered will fit into underground storage tanks. In December 1997, the Mississippi DEQ conducted an inspection at Fast Lane station No. 741 and noted no significant violations at that time. However, the inspectors did not check to determine whether the facility owner had trained or was requiring his employees to monitor transfers to the underground storage tanks. Following the 1998 overfill and fire, DEQ inspectors visually inspected the site to determine whether the top of the tank had loose fittings that may have caused or contributed to the release from the underground storage system. They found that all the fittings appeared to be tight.

From interviews with Federal EPA officials and Mississippi DEQ staff, the Safety Board determined that neither the Federal nor the State agency has enforced the requirement that facility owners or operators determine the available underground storage space and monitor transfer procedures as required by 40 CFR 280.30. The EPA's programs have focused on equipment safeguards and preventing underground storage tank leaks. The Safety Board concludes that the EPA's program for preventing underground storage tank releases has not adequately addressed the requirements in 40 CFR 280.30 for preventing overfills of the type that occurred in Biloxi.

Had the owner of Fast Lane station No. 741 required his employees to determine whether the amount of gasoline intended for delivery would fit into the underground tanks, the Biloxi accident probably would not have occurred. The Safety Board believes that the EPA should take action to improve compliance with and enforcement of 40 CFR 280.30, which requires that owners and operators of underground storage tanks prevent their overfilling.

Accident Notification Requirements

Premium did not notify the NRC until nearly 24 hours after the accident. The delayed notification precluded the Safety Board and other Federal agencies from responding promptly and initiating the accident investigation.

Under reporting criteria at 49 CFR 171.15, a carrier that transports hazardous materials is required to provide telephonic notification "at the earliest practical moment." However, the phrase "the earliest practical moment" is not defined in the hazardous materials regulations, nor has RSPA issued an interpretation that provides any time constraints on the reporting time frame. The Safety Board itself requires railroads under 49 CFR 840.3 to provide telephonic notification through the NRC not later than 2 hours after an accident resulting in a fatality, the release of hazardous materials, or an evacuation of the public and not later than 4 hours after an accident resulting in damages exceeding specified thresholds. Similarly, OSHA requires notification within 8 hours of the death or in-patient treatment of any employee following a work-related accident. The Safety Board concludes that the effectiveness of requirements for telephonic notification of certain hazardous materials accidents would be strengthened if the requirements contained a

specified time frame. The Safety Board believes that RSPA should require that a hazardous materials incident meeting the immediate notification requirements in 49 CFR 171.15 be reported within a specified time period to Federal authorities.

Conclusions

Findings

1. The Premium Tank Lines, Inc., truckdriver was not impaired by drugs, alcohol, or fatigue on the morning of the Biloxi, Mississippi, accident.
2. The physicians who performed the truckdriver's U.S. Department of Transportation physical could not adequately evaluate the truckdriver's medical fitness because he did not report background information related to his neurological condition.
3. Although a significant factor in Premium Tank Lines, Inc.'s hiring the truckdriver was his military background, the safety director did not attempt to check or to request the driver's military records, which contained useful information for determining his medical fitness and ability to operate heavy equipment.
4. Because the truckdriver failed to report on his job application his employment with a carrier that had dismissed him, useful information from that carrier was not available to Premium Tank Lines, Inc., to help company officials evaluate the truckdriver's ability to perform his duties.
5. The Premium Tank Lines, Inc.'s safety director failed to adhere to company procedures for hiring and training the truckdriver and for disciplining him when he failed to comply with the hours-of-service requirements.
6. The Premium Tank Lines, Inc.'s operating manuals for its new employees and its driver-trainers lacked the specificity that employees need to ensure that they practice correct and safe cargo unloading procedures.
7. To help drivers follow safe loading and unloading procedures, Federal regulations should require carriers that transport hazardous materials in cargo tanks to have specific written procedures for loading and unloading.
8. Premium Tank Lines, Inc.'s lack of adequate procedures for verifying the accuracy of dispatch orders resulted in the truckdriver delivering gasoline to the wrong location.
9. Fast Lane employees lacked adequate procedures and training to prevent overfills of the underground storage tanks. R. R. Morrison and Son, Inc., did not require its Fast Lane employees either to determine whether the amount of gasoline intended for delivery would fit in the underground storage tanks or to monitor alarms warning that the tanks were nearing maximum fill levels during cargo transfers.

10. The Environmental Protection Agency's program for preventing underground storage tank releases has not adequately addressed the requirements in 40 *Code of Federal Regulations* 280.30 for preventing overfills of the type that occurred in the August 9, 1998, accident in Biloxi, Mississippi.
11. The effectiveness of requirements for telephonic notification of certain hazardous materials accidents would be strengthened if the requirements contained a specified time frame.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the accident was the failure of Premium Tank Line, Inc.'s officials to follow established company procedures in hiring and training new drivers, the company's lack of adequate procedures for dispatching drivers and delivering cargo to customer facilities, and the failure of R.R. Morrison and Son, Inc., to have adequate safety procedures for accepting product offered for delivery at its Fast Lane stations. Contributing to the accident was the truckdriver's various and numerous operating errors during the gasoline transfer process that led to the underground storage tank overfill.

Recommendations

As a result of its investigation, the Safety Board makes the following safety recommendations:

To the Research and Special Programs Administration:

Promulgate regulations requiring motor carriers that transport hazardous materials in cargo tanks to develop and maintain specific written cargo loading and unloading procedures for their drivers. (H-99-57)

Require that a hazardous materials incident meeting the immediate notification requirements in 49 Code of Federal Regulations 171.15 be reported within a specified time period to Federal authorities. (H-99-58)

To the Federal Highway Administration:

Once the Federal regulations requiring motor carriers that transport hazardous materials in cargo tanks to provide written cargo loading and unloading procedures are promulgated, ensure that the motor carriers are in compliance with the regulations. (H-99-59)

To the Environmental Protection Agency:

Take action necessary to improve compliance with and enforcement of 40 *Code of Federal Regulations* 280.30, which requires that owners and operators of underground storage tanks prevent their overfilling. (H-99-60)

To Premium Tank Lines, Inc.:

Revise your driver and driver-trainer manuals to include specific written instructions on loading and unloading cargo and on the use of tools, such as storage tank capacity charts, necessary to deliver gasoline safely. (H-99-61)

Establish procedures to ensure that company officials adhere to written policies relating to hiring, training, and discipline of company truckdrivers. (H-99-62)

To R.R. Morrison and Son, Inc.:

Establish procedures and provide training to ensure that your employees verify that underground storage tanks have sufficient capacity for the

gasoline or other petroleum products offered for delivery and monitor such transfers so that overfills do not occur. (H-99-63)

To the National Association of Convenience Stores, the National Association of Truck Stop Operators, the Petroleum Marketers of America, the Service Station Dealers of America, and the Society of Independent Gasoline Marketers of America:

Inform your members of the facts and circumstances of the August 9, 1998, accident in Biloxi, Mississippi, and urge them to review their procedures and, if necessary, to revise them to require that station employees verify that underground storage tanks have sufficient capacity for gasoline or other petroleum products offered for delivery and to monitor such transfers so that overfills do not occur. (H-99-64 through -68)

To the National Tank Truck Carriers Association:

Inform your members of the facts and circumstances of the August 9, 1998, accident in Biloxi, Mississippi, and urge them to review the adequacy of their procedures for hiring and training truckdrivers and their written procedures for loading and unloading hazardous materials. (H-99-69)

To the American Petroleum Institute:

Inform your members having cargo tank motor carrier operations of the facts and circumstances of the August 9, 1998, accident in Biloxi, Mississippi, and urge them to review the adequacy of their procedures for hiring and training truckdrivers and their written procedures for loading and unloading hazardous materials. (H-99-70)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

JAMES E. HALL

Chairman

JOHN A. HAMMERSCHMIDT

Member

ROBERT T. FRANCIS II

Vice Chairman

JOHN J. GOGLIA

Member

GEORGE W. BLACK, JR.

Member

Adopted: September 21, 1999

Appendix A

Investigation

The National Transportation Safety Board was notified about 12:30 a.m. eastern daylight time on August 10, 1998, of an overfill and fire at a gasoline station-convenience store in Biloxi, Mississippi. The investigator-in-charge and other members of the Safety Board investigative team were dispatched from the Washington, D.C., headquarters office. Upon arriving on scene, the Board established investigative groups to study hazardous material factors, vehicle factors, carrier operations, human performance, emergency response, and survival factors.

The Safety Board was assisted in the investigation by the Federal Highway Administration, the Mississippi Public Service Commission, the City of Biloxi, Premium Tank Lines, Inc., and R.R. Morrison and Son, Inc.

Appendix B

Driver-Trainer's Checksheet

The following pages show photocopies of the two-page checklist used by Premium's driver-trainers during a new hire's OJT.

DRIVER TRAINER'S CHECK LIST

Terminal _____ Date _____ Products _____

Driver _____ Trainer _____ Tractor/Trailer No. _____

Driver Trainer's Remarks

TRACTOR	Items Explained	TRAILER	Items Explained
1. How to check Brake System for air leaks.....	_____	1. Remote Control for closing emergency valve.....	_____
2. How to release Park Brake when a loss of air occurs.....	_____	2. Where Calibration charts are carried and how to use them.....	_____
3. How to use clutch Brake.....	_____	3. Check unloading line valve before moving cap to be sure it is closed....	_____
4. How to manually operate Fan Clutch.....	_____	4. Fusible links and what they are.....	_____
5. How to bleed air from pump when air block causes pump not to unload.....	_____	5. How to placard trailer.....	_____

I. PRE-TRIP INSPECTION	Check Items NOT Performed Satisfactorily	IV. CLUTCHING AND SHIFTING	Check Items NOT Performed Satisfactorily
A. Uses standard truck check procedure.		A. Doesn't ride clutch.....	_____
(1) Checks water. (2) Checks oil. (3) Checks fuel, leaves hood up. Starts engine, idles 550 RPMs while oil pressure builds up. Increases to 900 RPMs while checking unit. (4) Turns on lights. Checks lights. Cleans lights and reflectors. (5) Checks tires. (6) Checks wheels and tugs. (7) Checks springs & frame for cracks. (8) Checks unloading hose. (9) Checks landing gear. (10) Checks Fifth Wheel Latch, Brake Hose, Light Cord, and Connections. (11) Checks tool box. (12) Checks & cleans mirrors, windows, & windshield. (13) Checks horn & panel gauges. (14) Checks windshield wipers. (15) Checks steering for looseness. (16) Checks brakes, service & park. (17) Checks emergency equipment, fire extinguishers and reflective triangles. (18) Checks fusible nuts or links in line to the internal valves. (19) Checks placards and Holders.	_____	B. Doesn't stay in low gears too long.....	_____
	_____	C. Doesn't stay in high gears too long, doesn't lug engine.....	_____
	_____	D. Attains proper speed before shifting up.....	_____
	_____	E. Doesn't over speed engine when shifting up.....	_____
	_____	F. Shifts gears skillfully (double clutch and doesn't clash them)....	_____
	_____	G. Doesn't slip clutch to keep unit from rolling back on a grade....	_____
	_____	H. Selects proper gears — upgrade, downgrade, on level.....	_____
	_____	I. Doesn't coast down grade or to a stop.....	_____
II. STARTING ENGINE		V. STEERING AND POSITIONING	
A. Depresses clutch pedal before starting engine.....	_____	A. Places hands in stable position on wheel, uses both hands....	_____
B. Releases starter button as soon as engine starts.....	_____	B. Steers smoothly, not abruptly.....	_____
C. Checks air pressure and other instruments.....	_____	C. Doesn't ride center line.....	_____
D. Builds up 60 lbs. air pressure before moving vehicle.....	_____	D. Doesn't weave off onto shoulder.....	_____
III. STARTING VEHICLE		E. Stays in proper lane on hills & curves.....	_____
A. Observes pedestrians and checks traffic conditions before starting out.....	_____	F. Stays well to the right when being passed.....	_____
B. Selects proper gear (low gear when loaded).....	_____	G. Doesn't use turning signals to get other vehicles to pass.....	_____
C. Doesn't race engine.....	_____	H. Stays in proper lane at traffic lights and stop signs.....	_____
D. Starts smoothly from standstill, doesn't allow unit to roll back on hills.....	_____	VI. SPEED CONTROL	
E. Doesn't stall engine.....	_____	A. Varies speed to meet conditions safely, especially when approaching schools, curves, and blind intersections.....	_____
		B. Maintains safe distance when following other vehicles, one unit length for over 10 MPH.....	_____
		C. Uses time interval to check distance.....	_____
		D. Is alert to narrow tunnels and bridges; permits other vehicles to pass through.....	_____
		E. Is alert to people and livestock on or near roadway.....	_____
		F. Observes posted speed limit.....	_____

Time Training: Start _____ a.m. Finish _____ p.m.
 _____ p.m. _____ p.m.

- | | Check Items
NOT Performed
Satisfactorily |
|---|--|
| VII. PASSING OTHER VEHICLES | |
| A. Checks to make sure road is clear ahead and behind before pulling out..... | _____ |
| B. Doesn't pass on hills, curves, bridges, intersections, or in congested areas..... | _____ |
| C. Uses good judgement in deciding when to pass..... | _____ |
| D. Sounds horn well in advance; at night flashes lights..... | _____ |
| E. Cuts back into line soon after passing without cutting in on vehicle being passed..... | _____ |
| F. Doesn't follow too close before passing..... | _____ |
| G. Does not pass by weaving through traffic..... | _____ |
| H. Uses turning signals for moving from lane to lane..... | _____ |
| I. Is alert to vehicles parked on or near the roadway that may pull out..... | _____ |
| VIII. MAKING TURNS | |
| A. Pulls gradually and safely into proper lane, well in advance of turn..... | _____ |
| B. Gives proper signal at least 100 feet in advance of turn..... | _____ |
| C. Is alert for cars to come between vehicle and curb when making turns..... | _____ |
| D. Makes certain way is clear before entering intersection..... | _____ |
| E. Makes turn at proper speed (not too fast or too slow)..... | _____ |
| F. Doesn't scrape tires against curb..... | _____ |
| IX. RAILROAD CROSSINGS | |
| A. Comes to a full stop at crossing — uses 4-way flashers..... | _____ |
| B. Looks in all directions before crossing..... | _____ |
| C. Shifts to proper gear before getting to crossing and does not shift gears on crossing..... | _____ |
| X. DRIVING AT NIGHT | |
| A. Doesn't overdrive headlights..... | _____ |
| B. Guides off right side of road when approaching traffic with bright lights..... | _____ |
| C. Dims lights for approaching traffic..... | _____ |
| D. Dims lights after being passed and when following other vehicles..... | _____ |
| E. Does not drive too fast in fog or smoke at night or day..... | _____ |
| XI. STOP STREET AND TRAFFIC LIGHTS | |
| A. Comes to a full stop..... | _____ |
| B. Doesn't over run cross walk..... | _____ |
| C. Stops in position to see roadway to right and left..... | _____ |
| D. Doesn't crowd pedestrians or other vehicles (doesn't blow horn at others)..... | _____ |
| E. Doesn't go through traffic light on red..... | _____ |
| F. Doesn't race motor while waiting at traffic light or stop sign.... | _____ |

(16)

- | | Check Items
NOT Performed
Satisfactorily |
|---|--|
| XII. UNCONTROLLED INTERSECTIONS OR THRU STREETS | |
| A. Slows down; stops if necessary..... | _____ |
| B. Looks in all directions..... | _____ |
| C. Yields right-of-way whenever there is any question..... | _____ |
| XIII. STOPPING VEHICLE | |
| A. Anticipates stops, allows motor to slow vehicle down..... | _____ |
| B. Brakes equipment smoothly (doesn't make quick stops except in emergency)..... | _____ |
| C. Doesn't stop too close to other vehicles in traffic..... | _____ |
| XIV. PARKING VEHICLE | |
| A. Gets clear of roadway..... | _____ |
| B. Puts unit in low gear (leaves stop out) & sets parking brake; chocks wheels, if necessary..... | _____ |
| C. Turns wheels toward curb on downgrades and away from curbs on upgrades..... | _____ |
| D. Doesn't leave motor running..... | _____ |
| E. Doesn't park with trailer brake or tractor protection valve..... | _____ |
| XV. BACKING | |
| A. Stops in correct position to back..... | _____ |
| B. Goes to rear of vehicle before backing..... | _____ |
| C. Backs smoothly..... | _____ |
| XVI. LOADING AND UNLOADING | |
| A. Doesn't unload before checking address of customer with address on bill of lading..... | _____ |
| B. Doesn't break seals or unload until customer has initialed bill of lading & inspected load..... | _____ |
| C. Hooks up ground wire (if required)..... | _____ |
| D. Unloads at proper engine RPS (pump or turbo conveyor)..... | _____ |
| E. Stays with unit; stands by product control valve. (Driver controlled loading and unloading)..... | _____ |
| F. Depresses clutch pedal when engaging or disengaging power take off..... | _____ |
| G. Drains into bucket before leaving customer premises (when required)..... | _____ |
| H. After unloading, checks from top to see that tank is empty and fastens dome covers..... | _____ |
| I. Wears long sleeve shirt and safety clothing, when required..... | _____ |
| XVII. MISCELLANEOUS | |
| A. Maintains neat appearance..... | _____ |
| B. Maintains courteous conduct in terminals and on customer's premises..... | _____ |
| C. Checks tires before trip and at each stop. Tires must be checked at least every 2 hrs. or 100 miles..... | _____ |
| D. After changing tire, checks lugs after traveling no more than 20 miles..... | _____ |

Abbreviations and Acronyms

ADD	attention deficit disorder
ANPRM	Advance Notice of Proposed Rulemaking
API	American Petroleum Institute
CDI	Commercial Driver Institute, Inc.
CDL	commercial drivers license
CFR	<i>Code of Federal Regulations</i>
CVSA	Commercial Vehicle Safety Alliance
DOT	U.S. Department of Transportation
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
hazmat	hazardous materials
MPSC	Mississippi Public Service Commission
MVR	motor vehicle record
OJT	on-the-job training
OMCHS	Office of Motor Carrier and Highway Safety
OSHA	Occupational Health and Safety Administration
NRC	National Response Center
RSPA	Research and Special Programs Administration
UST	underground storage tank