EXPLOSION AND FIRE ON BOARD THE UNMANNED TANK BARGE OCEAN 80 AT CARTERET, NEW JERSEY ON 25 OCTOBER 1972 WITHOUT LOSS OF LIFE

Coast Guard
Washington, D. C.

2 May 1975

DEPARTMENT OF TRANSPORTATION

COAST GUARD

MARINE CASUALTY REPORT

EXPLOSION AND FIRE ON BOARD THE UNMANNED TANK BARGE OCEAN 80 AT CARTERET, NEW JERSEY ON 25 OCTOBER 1972 WITHOUT LOSS OF LIFE

U.S. COAST GUARD
MARINE BOARD OF INVESTIGATION REPORT
AND COMMANDANT'S ACTION

ACTION BY
NATIONAL TRANSPORTATION SAFETY BOARD

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16. Abstract

On October 25, 1972, the tank barge OCEAN 80 was loading gasoline and fuel oil at the General American Transportation Corporation Terminal, Arthur Kill, Carteret, New Jersey. About 0600, a fire and several explosions occurred on the barge. Before the resultant fires were extinguished, the barge was destroyed and the terminal and nearby facilities were damaged substantially.

This report contains the action taken by the National Transportation Safety Board in determining the probable cause of the casualty and in making recommendations to prevent its recurrence. The report also contains the Marine Board of Investigation report and the action taken by the Commandant, U. S. Coast Guard.

The National Transportation Safety Board determines that the probable cause of the casualty was the ignition, by an unidentified source, of gasoline which spilled from overflowing cargo tanks on the OCEAN 80. A major contributing factor was the failure of the barge tankerman and the terminal dockman to adhere to prescribed cargo transfer procedures.

The National Transportation Safety Board's recommendations listed in this report are addressed to the U. S. Coast Guard.

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ON 25 OCTOBER 1972 WITHOUT LOSS OF LIFE

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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D. C. 20594

TANK BARGE OCEAN 80
EXPLOSIONS AND FIRE
CARTERET, NEW JERSEY
25 OCTOBER 1972

ACTION BY THE NATIONAL TRANSPORTATION SAFETY BOARD

This casualty was investigated by a U. S. Coast Guard Marine Board of Investigation convened at New York, N. Y., on October 30, 1972. A representative of the National Transportation Safety Board observed the proceedings. The National Transportation Safety Board has considered only those facts in the investigative record which are pertinent to the Safety Board's statutory responsibility to determine the cause or probable cause of the casualty and to make recommendations. The Safety Board's analysis of the casualty is based on the testimony and evidence presented at the Marine Board of Investigation, and should be read in conjunction with the Marine Board's Findings of Fact.

SYNOPSIS

On October 25, 1972, the tank barge OCEAN 80 was loading gasoline and fuel oil at the General American Transportation Corporation terminal, Arthur Kill, Carteret, N. J.

About 0600, a fire and several explosions occurred on the barge. Before the resultant fires were extinguished, the barge was destroyed and the terminal and nearby facilities were damaged substantially.

The National Transportation Safety Board determines that the probable cause of the casualty was the ignition, by an unidentified source, of gasoline which spilled from overflowing cargo tanks on the OCEAN 80.

Contributing to the casualty was the failure of the barge tankerman and the terminal dockman to adhere to prescribed cargo transfer procedures.

ANALYSIS

Gasoline Spill

Rate of loading -- The gravity loading of gasoline began at 0215 and continued until shortly after 0300, when the pumping system was energized. The highest estimate of gravitation input was 2,500 barrels per hour. The pump was not secured until about 0610. At the same time, the valves of the terminal tank were closed which prevented any additional flow from the tank.

The amount of gasoline removed from the terminal tank between 0215 and 0610 was reported to be 17,916.79 barrels -- a pumping rate of about 5,000 barrels per hour.

Loading calculations -- There was no metering device available at the terminal to aid the tankerman in determining the gasoline pumping rate. Interstate Oil Transport Company gave no guidelines to aid the tankerman in making calculations. The tankerman, who felt the difference in the vented vapor exhaust pressure between the gravitation flow and the pump flow, estimated a pumping rate of between 5,000 and 3,200 barrels per hour. The dockman stated that the loading rate should have been 4,000 barrels per hour. The terminal manager testified that gasoline can be pumped at a rate of 5,000 barrels per hour.

Since tankermen are permitted to be in charge of oil transfer operations on more than one vessel at a time, a loading rate for the various commodities must be reasonably accurate. The wide variations of estimates given by responsible personnel show that accurate rate calculations should be made. Realistic loading rates can be determined by using actual pumping pressures, tank sounding tables, flow measuring equipment, or other means to assist in calculations.

Cargo tank overflow --The capacity of the barge tanks being loaded with gasoline was 16,000 barrels. At a rate of 5,000 barrels per hour, 833 barrels would have been discharged from the terminal tank during the 10 minutes after the casualty before the flow was secured. The remaining 1,084 barrels of cargo (45,500 gallons) which had been expended from the terminal tank would have spilled from the barge cargo tanks before the initial ignition. Even if the barge tanks had approached their fill levels at the same rate, the overflow could have started 13 minutes before the casualty.

The trim of the OCEAN 80 permitted the overflowing gasoline to travel aft and spill into the water. The direction of the current and wind caused the gasoline and resultant vapors to travel in a southerly direction toward the chemical ship ALCHEMIST, which was moored about 200 feet from the barge. Although the ignition source could not be determined, the immediate presence of fire in the vicinity of the ALCHEMIST, the travel of the initial flames moving forward from the stern area of the barge, and the fact that the initial tremor which was felt on the ALCHEMIST was not noticed by persons on a towing vessel moored only 40 feet north of the barge, lends credence to the possibility that gasoline might have been ignited by sources external to the OCEAN 80.

Loading Procedures

Personnel complacency -- The two tankermen and the dockman did not follow procedures prescribed by Interstate Oil Transport Company and General American Transportation Corporation management. The barge was

not properly inspected before loading operations began, one tankerman signed the Declaration of Inspection with the other tankerman's name, a seal was removed from the discharge end of the gasoline loading pipeline without authority, the loading rates of No. 2 oil and gasoline were not determined, and the loading area was left unattended for extended periods of time. This complacent attitude was further demonstrated by the fact that the dockman permitted the tankerman to remain in the dock office for at least 30 minutes before the casualty, during which time the dockman neglected to make a thorough examination of the loading area. Even though the tankerman did not determine the gasoline loading rate and, therefore, did not know when the tanks should have been filled, a timely closing of the valves at the dock when the overflow began would have prevented the massive spill that followed. Therefore, the possibility of ignition would have been minimized. However, neither the tankerman nor the dockman followed the prescribed procedures of management regarding attendance at the loading area. As a result, their absence precluded any attempt to take desired action.

High-level management has an inherent responsibility to eliminate actions such as those described above. Effective supervision by vessel and terminal management can greatly reduce unsafe acts and conditions which may exist during cargo transfer operations. The resulting reduction in the number and amounts of combustible and inflammable liquid cargo spills would lessen the possibility of a similar accident. There is a need to insure that effective supervision is maintained.

Inadequate operational guidelines --The tankerman and the dockman were not required to be continually at the loading area. While the tankerman could leave the barge to make telephone calls, the dockman was authorized to remain in the dock office for periods of up to 15 minutes. Neither was directed to insure that his area of responsibility was continually attended. A loading system failure could have caused cargo spillage of 3,500 gallons per minute. Even if the procedures were followed, an incapacitation of the tankerman during the authorized absence of the dockman would have allowed more than 50,000 gallons of a product to be released. These procedures, therefore, could permit a catastrophe brought about by a single human error or failure.

Many industries provide backup systems to prevent such a catastrophe. A redundant system of monitoring the cargo transfer is one method which could drastically reduce the possibility of similar occurrences. In this case, the lack of mechanical equipment such as flow metering devices, automatic shutoff valves, tank level control systems, and leveling indicating systems in the tank barge increased the need for continual monitoring by both the tankerman and the dockman. Under such conditions, any absence by either would have been logical only if an additional human or mechanical monitor were available.

Cargo Spill Prevention

On July 1, 1974, the U. S. Coast Guard issued regulations for the loading and discharging of oil cargoes. 1/ The regulations contain vessel design requirements, terminal equipment requirements, and certain cargo transfer procedural requirements. Precargo transfer meetings between the tankerman and dockman, the determination of the cargo transfer rate, and the presence of two persons when the cargo is being transferred are also required. The regulations, although extensive, do not require that vessel and terminal operators follow standardized Coast Guard procedures, but permit the operators to promulgate their own specific oil transfer procedures. The procedures are then reviewed by local Coast Guard authorities.

The effectiveness of the regulations is not presently known. However, if the number and volume of future accidental spills are drastically reduced, the probability of similar casualties will be minimized. Therefore, it is necessary to insure that the regulations and the oil transfer procedures required by the regulations are adequate.

Fire Containment

Firefighting personnel -- The absence of qualified firefighting personnel at the terminal delayed initial firefighting efforts. Although the effects of the delay were not noted in the Coast Guard investigation, more immediate firefighting efforts might have prevented some of the extensive damage.

Valve shutoff -- The fire and explosions of the barge prevented the tankerman or dockman from securing the loading valves at the dock area. When the loading hoses burned through, gasoline and No. 2 oil poured onto the dock and into the water. The continuing fire caused other dockside pipelines to rupture, permitting unknown quantities of other products to enter the water. The last valve was secured about 45 minutes after the initial fire.

There was no valve status checkoff list kept at the terminal nor was any required. Further, the position of the various valves could be determined only by manual manipulation. Therefore, to insure that all valves were secured, each one had to be individually manipulated. Personnel of the 0600 shift, who were arriving at the terminal when the casualty occurred, assisted in securing the valves. Without their assistance, additional quantities of combustible products would have flowed into the water, thereby endangering the two loaded oil barges moored at the Consolidated Edison facility.

Terminal firefighting capabilities -- The potential for catastrophic damage is always present in high accident risk areas such as major marine

1/ 33 CFR 154 to 156.

terminals. Terminal fires, even though they may not involve the waterfront areas, can rapidly engulf the port facilities. Insufficient firefighting capabilities may permit extensive damage to other properties, marine craft and other transportation vehicles loaded with hazardous materials, and the environment. An effective terminal firefighting capability should include a sufficient number of trained personnel and adequate methods to constrain products capable of intensifying an existing fire.

All large oil transfer facilities are required to maintain an operations manual which must contain emergency procedures. The manual is reviewed by the Coast Guard Captain of the Port who may require that changes be made by the terminal management. A critical review by fire prevention professionals might disclose shortcomings in the firefighting procedures. Any deficiency noted could be made known to terminal management who would then make desired changes to improve the efficiency of the firefighting operations.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the casualty was the ignition, by an unidentified source, of gasoline which spilled from the overflowing cargo tanks on the OCEAN 80.

Contributing to the casualty was the failure of the barge tankerman and the terminal dockman to adhere to prescribed cargo transfer procedures.

RECOMMENDATIONS

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

1. Issue regulations to require adequate vessel and terminal management supervision of safety assurance procedures during cargo transfer operations. (Recommendation M-75-9)

2. With the assistance of local fire departments, evaluate the effectiveness of terminal firefighting capabilities and require such changes as necessary to reduce hazards to other properties, marine craft, and the environment. (Recommendation M-75-10)

3. For at least 1 year, thoroughly investigate all oil pollution incidents involving cargo transfer spills to evaluate the adequacy of 33 CFR 154 through 156. (Recommendation M-75-11)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

Adopted this 2nd day of May 1975:

John H. Reed, Chairman

Francis H. McAdams, Member

Louis M. Thayer, Member

Isabel A. Burgess, Member

William R. Haley, Member

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

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5943/OCEAN 80
C-3 Bd

11 SEP 1974

Commandant's Action

on

The Marine Board of Investigation convened to investigate circumstances surrounding the explosion and fire on board the unmanned Tank Barge OCEAN 80 at Carteret, New Jersey on 25 October 1972 without loss of life

1. The record of the Marine Board of Investigation convened to investigate subject casualty has been reviewed; and the record, including the Findings of Fact, Conclusions and Recommendations, is approved subject to the following comments and the final determination of the cause by the National Transportation Safety Board.

REMARKS

1. Concurring with the Marine Board of Investigation, it is considered that the cause of the casualty was the ignition of gasoline spilled on the deck of the barge in the vicinity of number 5 tanks. The ignition source was unidentified, but, most likely it was one of several non-explosion proof electrical fixtures on the barge.

2. The conclusion that the absence of the tankerman precluded any action on his part to prevent the overflow is considered important and a major contributing cause of the casualty.

3. Captain Charles Wilson who was in charge of New York City Fire Department Marine Company 9 was presented the Distinguished Public Service Award for the outstanding heroic performance of duty during this casualty. Recommendations for other commendations are under consideration.

ACTION CONCERNING THE RECOMMENDATIONS

1. Recommendation: That action under R.S. 4450 (46 USC 239) be initiated against Alton B. Joyner, Z-1198091, for failing to properly supervise the loading of cargo aboard the tank barge OCEAN 80 on 25 October 1972, thereby contributing to the cause of the casualty.

Action: The Commandant concurs with this recommendation. Action is being taken by the Officer in Charge, Marine Inspection, New York.

2. Recommendation: That action under R.S. 4450 (46 USC 239) be initiated against Curtis R. Gautier, Z-1290259, for failing to display a red warning light while loading bulk cargo on the tank barge OCEAN 80 on the night of 24 October 1972, in violation of 46 CFR 35.30-1(a).

Action: The Commandant concurs with this recommendation. Action is being taken by the Officer in Charge, Marine Inspection, Norfolk.

3. Recommendation: That action under Section 311 of the Federal Water Pollution Control Act, as amended, be initiated against the operator of the tank barge OCEAN 80 for discharging oil in harmful quantities onto the navigable waters of the United States on 25 October 1972.

Action: The Commandant concurs with this recommendation. A hearing was held in New York, New York on 13 February 1973 and the incident is being processed independently in accordance with administrative civil penalty regulations in 46 CFR 2.50.

4. Recommendation: That action under Section 311 of the Federal Water Pollution Control Act, as amended, be initiated against the General American Transportation Corporation, Carteret, New Jersey, for discharging oil in harmful quantities onto the navigable waters of the United States on 25 October 1972.

Action: The Commander, Third Coast Guard District has made a determination in this case that the operator of the tank barge OCEAN 80 would be the only party held responsible in this discharge of oil onto the navigable waters. There will be no further action for the discharge of 25 October 1972 against the General American Transportation Corporation, Carteret, New Jersey.

5. Recommendation: That the regulation pertaining to alterations on tank vessels, namely Section 31.10-25, Subchapter D, Title 46 U. S. Code of Federal Regulations, be amended to require that all alterations be reported to the Officer in Charge, Marine Inspection, not just those which may be characterized as "extensive" as in the present regulation.

Action: The Commandant does not concur with this recommendation. Extensive alterations involving safety of a tank vessel regarding either hull or machinery receive approval from the Commandant via the plan approval process. To attempt to require all repairs or alterations to be reported would most certainly overload the system. A Navigation and Vessel Inspection Circular has been promulgated alerting owners and operators of tank barges to proper maintenance requirements and the resultant hazards that can be created by the introduction of unapproved appliances and other miscellaneous items for personnel convenience and comfort. The Navigation

and Vessel Inspection Circular also directs Coast Guard Marine Inspectors to be vigilant of any unauthorized modifications or repairs, jury rigs, the installation of unapproved equipment and unsafe housekeeping practices which must be corrected to insure the continued safety of personnel, vessels and the environment.

6. Recommendation: That the regulations permitting electrical fittings and fixtures, namely Section 32.45-1 Subchapter D of 46 United States Code of Federal Regulations, which are not explosion-proof on weather decks and deck houses of tank barges engaged in carriage of flammable or hazardous material, be amended to make the entire weather deck subject to the highest degree of electrical standards.

Action: The Commandant does not concur with this recommendation. The substance of this recommendation was published as a Notice of Proposed Rule-Making in Federal Register Vol. 36, No. 37, dated 24 February 1971; however, in view of the comments received as a result of public hearing it was determined that the requirement should only be made applicable to tankships.

An essential element of these comments was that compliance by tank barges regarding removal of all electrical fixtures that are not explosion-proof would also encompass the removal of cargo pump diesel engines from barges. Removal of pumping engines from barges would require major changes in current design and off loading procedures. Relocation of installed pumping engines to a void or a rake end is considered to be more hazardous than weather deck installations. These comments also point out that non explosion-proof portable electrical equipment could no longer be used anywhere on deck even where chance of vapor emissions from tank openings or vents is slight.

A computerized search of casualty records involving explosion and fires aboard tank barges for the past five fiscal years was conducted in conjunction with this recommendation. This search disclosed forty eight such casualties. Only one of these casualties could be identified as being caused by a non explosion-proof electrical device outside of the existing ten foot hazardous area set forth in 46 CFR 32.45-1(f)(4). The explosive mixture in this case, however, was not due to the cargo but to the presence of cleaning fluid within the electric fixture; and, therefore, the explosion could have occurred aboard any class of vessel.

The Coast Guard does not believe that establishing design requirements to compensate for an isolated case of serious inattention to duty as is alleged in this casualty is warranted.

7. Recommendation: That the Commandant promulgate a Navigation and Vessel Inspection Circular directing Coast Guard marine inspectors and recommending vessel operators to exercise closer attention to the elimination of unsafe practices on tank vessels in such areas as the stowage of paints and combustibles, jury-rigged wiring, unapproved installations, and the use of unauthorized electrical equipment.

Action: The Commandant concurs with this recommendation. A Navigation and Vessel Inspection Circular which is addressed in the action to Recommendation 5 has been promulgated.

E. L. PERRY
Acting

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

Address reply to:
U.S. COAST GUARD
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590

5 OCTOBER 1973

From: Marine Board of Investigation
To: Commandant (GMVI)

Subj: TB OCEAN 80, o.n. 506357; explosion and fire at Carteret, New Jersey on 25 October 1972 with no loss of life

FINDINGS OF FACT

1. At approximately 0600 EDST, 25 October 1972, an explosion occurred aboard the tankbarge OCEAN 80, moored at the General American Transportation Corporation terminal, Arthur Kill, Carteret, New Jersey. At the time of the casualty the vessel was loading gasoline and fuel oil. The explosion and subsequent fire destroyed the barge and caused substantial damage to the terminal and nearby facilities. The shock of the explosion broke windows in businesses and homes as far as one mile from the scene of the casualty. There was no loss of life and only minor injuries as a result of the casualty.

2. Vessel Data:

Name:	OCEAN 80
Official Number:	506357
Service:	Tankbarge
Built:	1966, Port Arthur, Texas
Gross Tons:	4864
Net Tons:	4864
Length:	348.6'
Breadth:	66.1'
Depth:	25.6'
Construction:	Steel
Propulsion:	None
Manning:	Unmanned
Homeport:	Philadelphia, Pennsylvania
Owner:	Ocean 80 Company 6 Penn Center Plaza Philadelphia, Pennsylvania
Operator (Bareboat Charter):	Interstate Oil Transport Company 6 Penn Center Plaza Philadelphia, Pennsylvania
Certificated:	
Date:	6 June 1972
Port:	New York, New York
Last Inspection:	
Date:	19 October 1972
Port:	New York, New York

3. Weather data at the scene at 0600 EDST, 25 October 1972:

Wind:	330°T, 6.0 Kts.

Barometer:	29.99", Rising slowly
Temperature (D):	49°F
Temperature (W):	45°F
Dew Point:	39°F
Relative Humidity:	67%
Ceiling:	7000'
Atmosphere:	Scattered altocumulus clouds
Visibility:	15 Miles
River Surface:	Calm
Tides:	
High Water:	2226 EDST, 24 October 1972
Low Water:	0440 EDST, 25 October 1972
High Water:	1048 EDST, 25 October 1972
Tidal Range:	5.9'
Currents:	
Maximum Ebb:	0231 EDST, 25 October 1972
Slack Water:	0612 EDST, 25 October 1972
Maximum Flood:	0836 EDST, 25 October 1972
Current Direction and Velocity:	
Maximum Flood:	015°T, 1.1 Kts.
Maximum Ebb:	175°T, 1.3 Kts.

4. There was no loss of life as a result of the casualty. The following person sustained injuries which caused him to be incapacitated for over 72 hours:

Alton B. JOYNER, Z-1198091, tankerman
Address: Sea Level, North Carolina

5. The OCEAN 80 was a steel tank barge certificated for the carriage of grade "A" cargo having a Reid vapor pressure of not more than 25 PSIA, and was capable of loading or discharging two different products simultaneously. The barge had a sloping bow rake and a sloping stern rake fitted with skegs, port and starboard. There was a notch in the stern for pushing. The barge was divided into compartments by six transverse bulkheads and one longitudinal centerline bulkhead. The longitudinal bulkhead did not extend into the rake end compartments. There were ten cargo tanks, numbered 1 port and starboard through 5 port and starboard. Each cargo tank had an expansion trunk fitted with a hinged cover. Each cover was fitted with an approved pressure vacuum relief valve and a sighting hole. In addition, each tank had one ullage opening on a standpipe and two butterworth openings. The ullage openings and sighting holes were fitted with covers and portable flame screens. The barge was equipped with two deep well cargo pumps located in tanks 4 starboard and 5 port. These were directly geared to two General Motors model 1071 diesel engines mounted on deck. The cargo piping consisted of a loop system running through all cargo tanks at the bottom of the barge. The cargo valves were operated remotely from the main deck by means of reach rods. There was a loading/discharging manifold, port and starboard, above the No. 3 cargo tanks. This was connected by piping on deck to the discharges of the deep well pumps. Also, it was

connected by risers to the cargo piping system in the bottom of the barge.

6. There were three deck houses on the barge. Two of these contained the diesel engines driving the deep well pumps and were part of the original construction of the barge. The third deck house was added in 1968. It contained two compartments. One of these housed a 110 volt generator driven by a Lister model SR-2-Z diesel engine. The generator provided power for receptacles and lights in this deck house and for flood lights on deck. The diesel was electrically started by automobile-type batteries stored in a battery box located in the same compartment. The other compartment, which was referred to by the tankermen as the "log office", contained a table, a desk, a cot, storage space for files and tools, and miscellaneous conveniences for the tankermen.

7. Three permanently installed navigation lights were provided on the barge. Red and green side lights were mounted on pipe standards, port and starboard, approximately 34 feet aft of the bow and about 5 feet inboard of the side. The standards were four feet high and supported the side lights, suitably screened, directly above metallic battery boxes. A white stern light was mounted on a similar pipe standard six feet high, located on the barge centerline approximately 24 feet from the stern. All three lights, except for the color of the lens, were the same. Namely, Penwalt model FA-249 lanterns fitted with a bulb-changing mechanism to automatically replace burned-out lamps and, also, a light-actuated sensor to automatically turn the light on during darkness. The lantern was not fitted with a manually-operated switch. Each light was powered by its own pair of carbon-air, non-rechargeable batteries which were contained in the metallic box directly beneath the lantern. The lights were not connected to any other power source. The light-actuated sensors on the side lights were inoperative so, in order to turn the lights off, it was necessary to disconnect the power leads from the batteries. The permanently installed side lights were intended for use when the barge was being towed or pushed in the conventional manner. Because the barge was sometimes moved stern-first, two additional side lights were located, port and starboard, at the after end of the barge. These were portable lights powered from self-contained size "B" dry cells and were actuated by a toggle switch. Although portable, they were left in place when not in use.

8. The OCEAN 80 completed Inspection for Certification on 6 June 1972. One requirement remained outstanding: To effect permanent repairs to five distorted web frames on the portside of the forward rake. Previously made temporary repairs to the web frames were examined during the course of the Inspection for Certification and were found to be satisfactory. Permanent repairs were deferred to May 1973 or the next regular drydocking, whichever occurred first. On 11 October 1972 the OCEAN 80 was placed in a New York shipyard for repairs to a cracked weld in way of the transverse bulkhead between tanks 3 and 4 port. Repairs were examined and found satisfactory by a Coast Guard marine inspector. At the same time a new battery operated lighting system was installed in the log shack. While

this constituted an alteration affecting the safety of the vessel, it was not an 'extensive' alteration under 46 CFR 31.10-25. Plan approval was not, therefore, required. When the installation was completed it was not inspected by a representative of the Coast Guard because notice of the installation had not been provided. Nor did the owner's representative inspect the installation because he believed a Coast Guard marine inspector had done so. The barge departed the shipyard on 13 October 1972. Only the requirement to make permanent repairs to the distorted web frames noted above remained outstanding.

9. The General American Transportation Corporation facility at Carteret, New Jersey is a bulk liquid warehouse. There are approximately 300 tanks at the terminal, ranging in size from 500 to 4,000,000 gallons. General American does not own any product at the terminal but stores and processes it for the owners. The fuel oil and gasoline being loaded aboard the OCEAN 80 at the time of the casualty was owned by the Atlantic-Richfield Refining Company. The terminal receives and ships product by pipeline, truck, railroad, tankbarge and vessel. There are three berths for vessels alongside the facility on the west bank of the Arthur Kill. The southernmost berth, referred to as Dock No. 2 and the northernmost, referred to as Dock No. 3, are constructed of four sheet steel cylinders capped with concrete. The cylinders are connected to each other by a steel platform. A steel walkway and numerous pipelines connect the docks to the shore. Vessels are approximately 200-feet offshore when moored at Dock No. 2 and 700 feet offshore when moored at Dock No. 3. Dock No. 1, where the OCEAN 80 was moored at the time of the casualty, was between Docks No. 2 and 3. It was a timber pile, timber decked offshore wharf with timber approaches and pipeline racks. A 5-foot wide timber walkway extended along the face of the wharf and a 25-foot wide pipeline rack extended along the inner face. Forty-four pipelines ranging from four to ten inches in diameter ran from the wharf to storage tanks ashore. Timber mooring dolphins with walkways were located north and south of the wharf. The wharf was 610 feet in length. Usable berthing space was 810 feet including the dolphins and vessels drawing up to twenty feet could be accommodated. Dock No. 1 had two loading stations where connection could be made between the facility pipelines and a vessel's cargo transfer piping. Each station was equipped with a bonding or grounding cable bolted at one end to a cargo pipeline on the wharf which served as a ground. The other end of the cable had an alligator-type clip, which was attached to a vessel. A permanently mounted switch isolates the two ends of the cable when connections are being made. The wharf was illuminated at night by three mercury vapor lights mounted on lamp posts approximately 25 feet tall and located so as to illuminate the face of the pier. These lights were in operation at the time of the casualty.

10. At the time of the casualty the OCEAN 80 was moored at the southernmost loading station at Dock No. 1. The MV ALCHEMIST, a chemical tankship of Liberian registry was moored at Dock No. 2, approximately 200 feet away from the OCEAN 80. The MV DEFENDER, a U. S. documented tug, was moored at Dock No. 1, directly north of the OCEAN 80.

11. All times shown in this report are Eastern Daylight Saving Time.

12. At 1715, 23 October 1972, the OCEAN 80 in tow of the MV DEFENDER departed the Humble Oil and Refining Company facility at Harkness Point, Philadelphia, Pennsylvania, having discharged a cargo of gasoline. The tow proceeded to the Interstate Oil Transport Company repair dock on the Schuylkill River in Philadelphia, arriving there at 1730. While at the Interstate dock the OCEAN 80 received the following repairs:

(a) An "O" ring seal was replaced on the port deep well cargo pump. This seal, which was on the upper end of the shaft of the pump, prevents the product being pumped from leaking around the shaft and onto the deck. It had been installed, apparently improperly, at a shipyard two weeks before and had begun to leak. After the replacement was installed, the seal could not be tested by pressurizing the pump since there was no product on board. It was tested by turning the pump impeller by hand to insure that it was free to rotate.

(b) The clearance on the impellers of the starboard deep well pump was changed by adjusting the vertical position of the pump shaft. This was deemed necessary since the pump had not been delivering its rated capacity. After adjustment the pump was rotated by hand to test for freedom of movement but a test under load could not be made because there was no cargo in the barge.

(c) A new starter motor was installed on the diesel generator, replacing the old starter which was inoperative. The new motor was tested after installation and found to be functioning satisfactorily.

At 0130, 24 October 1972, the OCEAN 80 departed Philadelphia enroute Carteret, New Jersey in tow of the MV DEFENDER. The barge was empty but not gas free. Alton B. Joyner, Z-1196091, and Curtis Gautier, Z-1290259, the two tankermen assigned rode the tug for the duration of the voyage, which was uneventful.

13. The tow arrived at the entrance to New York harbor at 1835 on October 24 1972. Before proceeding up Arthur Kill, the tug shifted position and was tied up to the starboard side of the barge with the bow of the tug towards the stern of the barge. This was the normal, close-in makeup of the tug and the barge when the barge was in the light condition and the arrangement was intended to provide maximum visibility for the tug. At this time both tankermen boarded the OCEAN 80 to prepare for mooring. Because the barge was now to be moved stern-first, it was necessary for the tankermen to extinguish the forward side lights and to turn on the portable side lights mounted near the stern. Since the forward side lights were not equipped with switches, the circuit connections had to be broken at the battery terminals in order to extinguish these lights. The after side lights were operated by toggle switches. As the tow approached the General American terminal at Carteret, the mate and additional crew members from the DEFENDER boarded the barge to assist in mooring. They remained aboard,

assisting the tankerman, until the OCEAN 80 was made fast to the dock and the tug cast off. The OCEAN 80 was moored portside to the dock, with the DEFENDER moored starboard side to the same dock and immediately north of the barge. The tug and barge were moored at 2120. During the mooring and hook-up operations both cargo pump engines were in operation to provide hydraulic power for the capstans and cargo hose winches. The engines were secured when the barge was ready to receive cargo. One of the tankermen testified that the diesel generator was in operation during the mooring process, while the other tankermen testified it was not running. Both tankermen testified that the other secured the after running lights after the barge was moored.

14. After the barge was moored the senior tankerman, Curtis Gautier, received the static ground cable from the dockman and connected it to a stanchion approximately amidships on the port side of the barge. He then lowered the barge's port outboard cargo hose to the dockman, who connected it to the number 2 fuel oil valve on the dock. Gautier then adjusted the various transfer valves to permit the number 2 fuel oil to be loaded into tanks 2, 3 and 4 port and starboard by way of the starboard transfer piping. Loading commenced by gravity at approximately 2200. At approximately 2315 the facility began pumping the number 2 oil to the OCEAN 80. At approximately 2345 Curtis Gautier was relieved by Alton Joyner as tankerman in charge of the barge. Gautier left the barge and went to the tug DEFENDER to sleep. On taking over the watch Joyner examined the various tanks and found loading proceeding normally. The peepholes on each of the expansion trunks were open but the flame screens were in place. Joyner noticed that the red warning light was not being displayed so he lighted a battery-operated red lantern mounted amidships. By approximately 0200, 25 October 1972, a combination of loading and a falling tide had lowered the barge sufficiently that the gasoline cargo hose could be lowered over the side and secured to the proper connection on the dock. The connection was made with the aid of the dockman at 0210. Loading of regular gasoline by gravity commenced at 0215 from storage tank 100-1-F at an estimated rate of 2500 barrels per hour. The gasoline was loaded through the port transfer line into tanks 5 port and starboard. All gasoline was flowing into tanks 5 port and starboard as desired. Tanks 1 port and starboard remained empty except for the residue from the previous cargo of gasoline. At approximately 0315, when it was considered that the suction bells were submerged, the facility began pumping the gasoline aboard the barge. The rate of pumping was estimated at amounts varying from 3000 to in excess of 4500 barrels per hour. Throughout this period the tankerman and the dockman conducted regular examinations of their respective areas and found nothing out of the ordinary. Both later described the loading as entirely routine. Between 0200 and 0600 tank 100-1-f supplied only the OCEAN 80.

15. At approximately 0530, William H. Newburn Z-1183549, The Chief Engineer of the tug DEFENDER, boarded the barge to bring the tankerman a cup of coffee. The two men entered the deckhouse and talked for a few minutes while Joyner drank the coffee. As he finished his coffee, Joyner thought he heard the

sound of a passing vessel. He, thereupon, went on deck to check the barge's mooring lines. Although he saw no vessel moving in the vicinity, he made some slight adjustments to the mooring lines by hand and then he checked the tanks. During this time the Chief Engineer departed the barge and returned to the DEFENDER, unseen by Joyner. Joyner then left the barge for the stated purpose of going to the dockhouse for more coffee. Testimony as to the exact movements of Joyner during the 30 minutes immediately prior to the casualty is contradictory and unclear. Joyner stated he never entered the dockhouse between 0530 and 0600, while the dockman, Joseph Chmielewski, stated Joyner spent at least that entire period seated in the dockhouse, possibly asleep.

16. At approximately 0558, Mr. Louis Toth, a truckloader employed by General American was walking, on shore, in the vicinity of the dock where the OCEAN 80 was loading. He observed what he described as a "pocket of steam" hanging over the barge in the vicinity of tank 5. Approximately 1 minute later his attention was redirected to the barge upon hearing what he thought was a diesel engine running. He turned toward the barge and observed a flash originate in the area where he had previously observed "steam." A fire then spread rapidly forward along the deck, rising in height and intensity. The fire was immediately followed by an explosion. Because of the intervening structures the truckloader was unable to see the point where the explosion originated. Subsequent explosions occurred aboard the barge in the next few minutes. The combined effect of these explosions was directed upward, rupturing tanks 1 through 4 port and starboard. Tanks 5 port and starboard remained essentially intact, though the product contained within them was involved in the fire. The fire spread rapidly to the dock adjacent to the OCEAN 80 and to the combination office and drumming building located partially on land and partially on the dock. In addition burning waterborne oil spread along and across the Arthur Kill causing fire at the nearby American Oil Company facility's dock and at a Consolidated Edison generating station across the waterway and threatened to engulf two loaded oil barges moored at the Consolidated Edison facility.

17. Immediately on hearing the explosion the master of the DEFENDER ordered his vessel away from the dock. When clear of the OCEAN 80, he advised Coast Guard Group New York of the fire by radio. Also, he called his Company dispatcher and notified him of the casualty. In response to a question from the dispatcher, he stated that the crew of the tug and the barge were safe with the exception of the tankerman Alton Joyner who was unaccounted for. While making these calls, he conned his vessel to the bow of the MV ALCHEMIST, moored directly south of the burning barge. With the assistance of the MV MARGARET MCALLISTER, the DEFENDER moved the ALCHEMIST away from the dock and downstream until the vessel was safely clear of the fire. Neither the ALCHEMIST nor the MARGARET MCALLISTER sustained damage as a result of the casualty. The DEFENDER sustained a broken pilothouse window as a result of flying debris during the initial explosion. Because of the limited firefighting capability of the DEFENDER and the presence of New York City fireboats and Coast Guard units, the tug was unable to contribute further to the firefighting efforts, when

it returned to the scene.

18. On hearing the explosion the boilerhouse watchman at the General American facility sounded the plant fire whistle. The whistle is sufficiently loud that it can be heard in many parts of Carteret and brought the response of the General American fire brigade. The fire brigade is composed of employees of the facility, who are normally assigned other duties and, most of whom, are assigned to the day shift. There is no permanent plant fire department and an insufficient number of brigade members to fully man the equipment during the night shift. After hearing the explosion and the fire whistle the shift supervisor alerted the Carteret Fire Department, then directed plant employees to secure all tanks and pipeline valves and energize the saltwater fire fighting pump located on a cell at pier No. 3. Teams of plant employees walked through the facility checking and, if necessary, closing all valves. Because there was no valve status check-off list or mechanical device to determine the position of the various valves and because of the failure of employees to report back to a specific location and report the status of valves, no determination can be made as to the time it took to isolate the various lines and tanks from the scene of the fire. Initial land-based firefighting units commenced firefighting efforts between 0615 and 0620. The first waterborne firefighting unit, the New York City fireboat MV ALFRED E. SMITH, arrived on scene at approximately 0645. Ultimately, the firefighting efforts involved twelve Coast Guard vessels, two New York City fireboats and fire equipment and personnel from five nearby industries and six communities.

19. At approximately 0715 the OCEAN 80, totally engulfed in flames, drifted away from its berth after its mooring lines burned. The fireboat, ALFRED E. SMITH, which was on scene by this time, attempted to keep the barge from drifting so as not to cause damage to other vessels or to shore facilities. Captain Charles E. Wilson of the New York City Fire Department, at great personal risk, boarded the OCEAN 80 during this period to secure a tow line and also to search for the crew member who had been reported missing by the Captain of the tug DEFENDER. At approximately 0815, while the fireboat was attempting to tow the OCEAN 80 to a location where it could be safely beached, the OCEAN 80 sank. Its position was near the center of the navigable channel in Arthur Kill, in the vicinity of buoy 30 (LLNR 1766). The channel in the area was closed to navigation except for medium draft vessels with a maximum of 40 foot beam until 6 December 1972, when the barge was refloated and removed. The closure did not significantly affect access to waterside facilities, since the Arthur Kill can be approached from either of two routes.

20. The shoreside fire was considered under control at approximately 1500, although it smouldered for an additional eighteen hours. The greater portion of the berth at which the OCEAN 80 had been lying was destroyed, as was the combination office and drumming building, a shed and a storage tank. There was additional substantial damage to various pipelines and a tankcar loading rack. The American Oil Company facility sustained substantial damage to its dock. The Consolidated Edison generating station sustained damage to a cooling water intake and

pumping system. These fires were extinguished by units of the Coast Guard operating under the Captain of the Port.

21. An examination of the OCEAN 80 conducted subsequent to the explosion revealed:

(a) The forward and after rake compartments and tanks 5 port and starboard were intact. All other tanks were ruptured, with the majority of the deck above the tanks missing. The deckhouse and the port cargo pump and pumping engine were intact. The starboard cargo pump and pumping engine were missing. The majority of the missing sections of the barge have not been located.

(b) The operational status of either of the pumping engines or of the diesel generator at the time of the casualty could not be determined, nor could the operational status of the electrical system be determined.

(c) There were a number of electrical appliances found in the log shack with questionable approval for marine use, such as an open element space heater, a hydraulic system portable booster pump, a battery charger, cooking appliances and an electric fan.

(d) There were approximately twelve to fifteen cans of paints and thinners stored in the deck house for the port deep well pump engine.

(e) A discharge valve normally closed during loading operations was found frozen in the open position. The valve was located at the discharge end of the port cargo pump and, if the pump were operating or the pump were presurized, could have permitted product to flow through the on deck discharge piping to the discharge valve located amidships.

(f) The barge and its various fittings and appurtenances showed extensive damage due to fire, explosion and submersion. This precluded assignment of the degree of involvement of each part in the casualty.

22. The OCEAN 80 had a total tank capacity of 80,000 barrels having approximately 8000 barrels in each of ten tanks. The barge was to have loaded 48,000 bbl. of number 2 fuel oil, 16,000 bbl. of regular gasoline and 16,000 bbl. of premium gasoline. Gaugings taken at the General American facility subsequent to the casualty showed the following product pumped into the barge and/or lost as a result of ruptured loading hoses: 27,812.12 bbl. number 2 fuel oil, 17,916.79 bbl. regular gasoline. Premium gasoline was not guaged since the loading of that product into the barge had not commenced by the time of the casualty.

23. The following conditions were found to exist at the General American facility at the time of the casualty:

(a) There was no guard or other security system in operation

during nighttime hours. Individual employees during the course of their routine employment are expected to observe and challenge any person unfamiliar to them.

(b) There was no fire or safety patrol at the facility. Supervisors and individual employees were expected to maintain a fire watch as part of their employment.

(c) There was no means by which a supervisor could be constantly informed as to the status of valves or equipment or the movement of product at all locations in the facility. This situation resulted in teams of employees being repeatedly sent through the facility after the explosion to make certain the flow of all product had been secured.

(d) The facility's fire brigade was manned by company employees acting as a volunteer force who performed fire fighting functions, when necessary, in addition to their normal duties. The majority of the brigade worked on the day shift so that when the casualty occurred neither they nor their key leaders were at the facility. Consequently, the initial fire fighting efforts were delayed until they arrived from their homes.

24. During the course of the night preceeding the casualty GATX personnel were making repairs to the floor of storage tank number 41, located approximately 500 feet from the OCEAN 80. The repairs consisted of electrically welding plates over deteriorated portions of the floor. The welding was done in accordance with company hot work procedures and all work was done within the completely enclosed tank. The pipelines leading from the tank to the waterfront had previously been blanked. The last product contained in tank number 41 was napthalene. Because the tank was not part of the waterfront facility no Coast Guard issued hot work permit was required. All welding was completed at approximately 0530, 30 minutes prior to the casualty. No other reported repairs were being carried out at the facility during the night prior to the casualty.

25. Fires, such as the one in the instant casualty, in the Carteret, New Jersey area are fought by the mutual aid concept, whereby surrounding communities provide equipment and personnel on request. While the various community fire departments have the capability of communicating directly with each other by common radio frequency, neither the New York City fireboats nor the Coast Guard had that capability, nor did the New York City fireboats and the Coast Guard have the capability of communicating directly with each other on one radio frequency. This problem was alleviated by the exchange of portable radio equipment between the fire boats, the Coast Guard units, and the shore units.

26. Testimony of several witnesses responsible for the safety, repair, maintenance and operation of the OCEAN 80 indicates a general lack of understanding as to what constitutes Coast Guard "approval". Many of the repairs and alterations were believed "approved" because

a Coast Guard inspector had sighted them or been aboard the barge subsequent to their installation.

27. The investigation was hampered to some degree by the absence of plans showing the OCEAN 80 as it was at the time of the casualty. The plans which were available did not include several modifications and additions which had been made subsequent to the original construction. These plans were not available from Coast Guard files because, in some cases, they were never submitted. In other cases, they had been destroyed in accordance with the plan disposal schedules in effect.

CONCLUSIONS

1. That the proximate cause of the explosion and subsequent fire aboard the tankbarge OCEAN 80 on 25 October 1972 was the ignition of a sizable gasoline spill on the deck of the barge in the vicinity of number 5 tanks.

2. That the gasoline spill resulted when number 5 port and starboard tanks filled and overflowed onto the deck through the ullage openings, manhole cover sighting ports and the port cargo pump packing gland.

3. That the gasoline was being loaded into number 5 tanks from about 0215 to 0515 at a rate of about 2500 bbls. per hour and at a rate in excess of 4,500 barrels per hour from approximately 0315 until ignition at approximately 0600. This was a rate well in excess of that expected by tankerman Joyner.

4. That the simultaneous loading of gasoline into number 5 tanks and number 2 fuel oil into numbers 2, 3 and 4 tanks did not contribute to the cause of the casualty. The presence of the large quantity of fuel oil aboard the barge did, however, contribute to the magnitude of the fire.

5. That the source of ignition of the gasoline cannot be positively identified. The gasoline probably flowed aft along the deck of the barge as it overflowed, because of the trim of the vessel. Therefore, any sources of heat or electricity in the vicinity of or aft of number 5 tanks are suspect. The most likely sources are:

(a) The battery operated side lights located near the outboard after corners of the barge and the battery operated stern light. These lights were on during the last part of the voyage, when the barge was in Arthur Kill; and there is no positive evidence that they were secured after mooring. Sparking could have occurred in either of the side lights due to an electrical fault such as an insecure connection of a power lead to a battery terminal. A similar mischance could have occurred in the stern light. Additionally, in that light the bulb changing mechanism could have actuated and caused a spark.

(b) The recently installed 12-volt lighting system within the log shack. The system was energized and the lamp was lighted immediately prior to the casualty.

(c) The discharge of a spark by electrostatically charged atomized gasoline. The pressurization of number 5 tanks after they were filled also caused the port deep well pump and fittings to become pressurized, which included the recently installed but untested "O" ring seal. This seal, if it failed, would permit a pressurized stream of gasoline to pass around the pump drive shaft, strike the underside of the angle drive housing and become atomized. This could possibly account for the "pocket of steam" observed by Mr. Louis Toth. The atomized cloud of gasoline could have become electrostatically charged and could have then discharged to a portion of the barge structure.

(d) Engines, motors, and appliances in the vicinity of number 5 tanks and the log shack, including the cargo pump engines, diesel generator and the various electric appliances in the log shack. It is probable that the cargo pump engines were not operating at the time of the casualty but there is no positive evidence that the diesel generator and the various electric appliances were not operating or in use.

(e) Although forward of number 5 tanks, the red warning light above number 3 tanks must also be considered suspect. This lamp was lighted at the time of the casualty.

6. That Alton B. Joyner, Z-1198091, was not aboard the barge at the time of the casualty, as he was required to be, nor had he been aboard the barge for some period of time prior to the casualty. In failing to be aboard the barge supervising the loading operation, he contributed to the cause of the casualty by failing to note that number 5 tanks were filled and in danger of overflowing. His absence precluded any action to prevent the overflow.

7. That the absence of Alton B. Joyner, Z-1198091, the senior tankerman on duty, from the barge for an extended period of time was in direct violation of 46 CFR 35.35-35(e), in that he was unable to "observe rate of loading for the purpose of avoiding overflow of tanks".

8. That Curtis Gautier, while serving as tankerman, loaded petroleum products on the tank barge OCEAN 80 prior to 2345 on October 24, 1972, without displaying a red warning light as required by 46 CFR 35.30-1(a).

9. That the initial explosion of gasoline vapor caused an intense gasoline fire on the deck of the OCEAN 80, heating the number 2 fuel oil in tanks 2, 3 and 4 and the residual gasoline in tanks 1. The vapors within these tanks ultimately exploded, rupturing the tank boundaries, the deck and the side shell plating of the barge, and permitted the spread of burning fuel oil on the water. Since tanks 5 port and starboard were filled to overflowing with gasoline, there was no vapor present within them. Therefore, they did not explode.

10. That the burning oil spread with the wind and current first toward the moored MV ALCHEMIST, then with a change in current toward the American Oil and Consolidated Edison facilities. The magnitude of the waterborne fire was a combination of oil from the OCEAN 80 and gasoline and oil draining from the GATX facility pipelines, released when the loading hoses connecting the barge to the pipelines burned through.

11. That neither the MV ALCHEMIST nor the MV DEFENDER, the only other vessels moored at the GATX facility, contributed to the casualty. Further, neither vessel sustained any significant damage as a result of the casualty.

12. That the prompt action of the captain of the MV DEFENDER in ordering his vessel away from the dock and proceeding into the waterway clear of the OCEAN 80 directly resulted in saving the tug and its crew. The

immediate radio call from the MV DEFENDER to the Captain of the Port, New York materially assisted in alerting rescue and assistance forces and warning approaching river traffic of the disaster.

13. That the actions of the MV DEFENDER, assisted by the MV MARGARET MCALLISTER, in removing the MV ALCHEMIST from her berth to a place of safety well away from the scene of the casualty, were judicious in that they insured the safety of the MV ALCHEMIST and prevented possible further escalation of the disaster.

14. That the weather did not contribute to the cause of the casualty. The light offshore winds were a significant factor in limiting the spread of fire shoreward and assisted firemen in their efforts to contain and extinguish the fires at the GATX and American Oil facilities. The change of current approximately 15 minutes after the initial explosion contributed in limiting the travel and extent of the waterborne fire towards the MV ALCHEMIST and afforded time in which to move that vessel from the danger area.

15. That the timely marshalling and effectiveness of shoreside fire-fighting efforts by GATX, the Carteret Fire Department and nearby community and industrial fire departments materially contributed to minimizing the effects of the fire.

16. That the presence of New York City Fire Department fireboats was a major factor in preventing the spread of waterborne fire to facilities on Staten Island and along the New Jersey waterfront. The taking in tow of the burning OCEAN 80 by the fireboat SMITH as it drifted away from the dock until it sank materially contributed to reducing the effects of the casualty.

17. That although the communications between the fire fighting units ashore and afloat had to be set up by exchange of portable radio equipment after the fire fighting effort had already been commenced; the coordination was, nevertheless, satisfactory in this casualty. However, it is to be noted that the radio equipment which is now required by the Vessel Bridge to Bridge Radio-telephone Act will materially assist coordination between floating units in similar casualties in the future.

18. That the cooperation of the City of New York in providing their fireboats on request from officials in the State of New Jersey reflects the highest degree of civic responsibility. The prior arrangements for providing the only available fireboats to assist in an incident involving an adjoining state constitutes prudent disaster control planning.

19. That the personnel of New York City Fire Department Marine Company 9 and particularly Captain Charles Wilson, who at considerable personal risk boarded the burning OCEAN 80 to locate a reportedly missing crewman, are worthy of special mention.

20. That the firefighting assistance provided by the Captain of the Port, New York was effective but limited to control and extinguishment of outlying pier fires at the American Oil facility, due to the nature of the firefighting equipment aboard the Coast Guard vessels.

21. That the welding done in storage tank 41 at the GATX facility did not contribute to the cause of the casualty. Although no Coast Guard issued hot work permit was required or issued, adequate safety precautions were taken in accordance with GATX policy.

22. That no employee of the Coast Guard or any other Government agency contributed to the casualty. Although the recently installed battery operated lighting system in the log shack was not inspected by a Coast Guard Marine Inspector, there is no evidence that it was improperly installed or that an inspection by Coast Guard personnel would have prevented the casualty.

23. That there were on the weather deck and in the log shack several electrical devices which could have acted as sources of vapor ignition. These devices were located in accordance with the current regulation for tank barges, i.e., they were more than ten feet from any opening into a cargo tank. However, in this casualty, because of the overflow and the trim of the barge, this regulation did not provide the protection intended.

24. That although the OCEAN 80 was certificated as an unmanned tankbarge, many appliances were installed solely for crew convenience. The installation and use of many of these items, such as electric refrigerator, coffee pot, portable heater and fan, could pose hazardous or unsafe conditions.

25. That the oil spill into the waters of Arthur Kill on the morning of October 25, 1972, was in violation of the Federal Water Pollution Control Act of 1972, and was caused by release of oil from the tankbarge OCEAN 80 and the General American Transportation Corporation facility.

RECOMMENDATIONS

1. That action under R.S. 4450 (46 USC 239) be initiated against Alton B. Joyner, Z-1198091, for failing to properly supervise the loading of cargo aboard the tankbarge OCEAN 80 on 25 October 1972, thereby contributing to the cause of the casualty.

2. That action under R.S. 4450 (46 USC 239) be initiated against Curtis R. Gautier, Z-1290259, for failing to display a red warning light while loading bulk cargo on the tankbarge OCEAN 80 on the night of 24 October 1972, in violation of 46 CFR 35.30-1(a).

3. That action under Section 311 of the Federal Water Pollution Control Act, as amended, be initiated against the operator of the tankbarge OCEAN 80 for discharging oil in harmful quantities onto the navigable waters of the United States on 25 October 1972.

4. That action under Section 311 of the Federal Water Pollution Control Act, as amended, be initiated against the General American Transportation Corporation, Carteret, New Jersey, for discharging oil in harmful quantities onto the navigable waters of the United States on 25 October 1972.

5. That the regulation pertaining to alterations on tank vessels, namely Section 31.10-25, Subchapter D, Title 46 U. S. Code of Federal Regulations, be amended to require that all alterations be reported to the Officer in Charge, Marine Inspection; not just those which may be characterized as 'extensive' as in the present regulation.

6. That the regulations permitting electrical fittings and fixtures, namely Section 32.45-1 Subchapter D of 46 United States Code of Federal Regulations, which are not explosion proof on weather decks and deck houses of tankbarges engaged in carriage of flamable or hazardous material, be amended to make the entire weather deck subject to the highest degree of electrical standards.

7. That the Commandant promulgate a Navigation and Vessel Inspection Circular directing Coast Guard marine inspectors and recommending vessel operators to exercise closer attention to the elimination of unsafe practices on tank vessels in such areas as the stowage of paints and combustibles, jury-rigged wiring, unapproved installations, and the use of unauthorized electrical equipment.

W. G. RODEN
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