TREASURY DEPARTMENT
UNITED STATES COAST GUARD

ADDRESS REPLY TO:
COMMANDANT
U.S. COAST GUARD
HEADQUARTERS
WASHINGTON 25, D.C.

MVI-3
(NBC-883
a-8 Bd)

24 MAY 1963

Commandant's Action

on

Marine Board of Investigation; explosion and fire on board the Tank Barge NBC-883 at Carlyss, Louisiana, on 22 September 1962, with loss of life

1. The record of the Marine Board of Investigation convened to investigate the subject casualty, together with the findings of fact, conclusions and recommendations, has been reviewed.

2. At about 0900 CST on 22 September 1962, the Tank Barge NBC-883, while being gas-freed preparatory to hot work in connection with hull repairs, exploded with resultant fire. The vessel, moored starboard side to a gas-freeing pier at Carlyss, Louisiana, was being cleaned by three shipyard employees at the time of the explosion. As a consequence, the three men lost their lives and the vessel sustained extensive material damage.

3. The NBC-883, an unmanned inspected tank barge certificated for lakes, bays, and sounds, 671 gross tons, was equipped with six cargo tanks, Number 1 port and starboard, Number 2 port and starboard, and Number 3 port and starboard. Access to each tank was by means of an expansion trunk 42 inches in diameter, 24 inches above the main deck, equipped with an oval manhole cover fitted with securing bolts and wing nuts. A cylindrical diesel oil tank (30' x 5') was mounted over each of the Number 2 tanks. The last cargo transported by the vessel had been benzene.

4. Cleaning operations started at about 0115, 22 September 1962, commencing in Number 3 starboard tank with a crew of four men. Equipment utilized included a plastic garden hose for washing down, a self-priming centrifugal pump powered by an explosion-proof 220 volt electric motor mounted on a rubber tired chassis, a ventilation unit constructed of two steel drums welded end to end with an air nozzle mounted in the center, and an extension light equipped with a 100 watt bulb, vapor globe, and bronze metal guard. The pump motor was operated by shore power through a three-conductor insulated cable. The ventilating unit, receiving air

through a rubber hose from ashore, was designed to permit suspension within the access manhole. Due to the absence of eye witnesses, it could not be ascertained what tank was in process of being cleaned at the time of the explosion. Each of the original four laborers was relieved at various intervals during the early morning hours by the three men who subsequently lost their lives in this casualty. The extension light, 110 volt shore-powered, was found in Number 2 starboard tank following the casualty. However, upon examination of structural damage it was ascertained that the bulkhead separating Numbers 2 and 3 starboard tanks had been driven into Number 2 starboard tank.

REMARKS

1. In view of structural conditions found after the casualty, it is considered likely that the initial explosion occurred within the original confines of Number 3 starboard tank.

2. While a concentration of benzene vapors undoubtedly supplied the explosive mixture causing this casualty, any determination as to the source of ignition must be purely conjectural based upon the limited facts available. However, assuming the initial explosion to have occurred in Number 3 starboard tank, a source other than the extension light must be found. A probable source can be found in the makeshift ventilating device used by the repair facility. As described in the testimony, this device was hung in the tank opening by non-conducting cord or line. The air connection was made with a rubber air hose. Hence, the steel drum device was effectively insulated from any grounding means. The introduction of compressed air through a pipe nozzle set up ideal conditions for a build-up of a static charge on the case of the exhauster. Under these conditions it is a distinct possibility that a static spark may have jumped the gap between the drum and the barge structure. Alternatively, the steel drum may have struck the side of the expansion trunk when the laborers were engaged in removing it.

3. It is to be noted that the motor and pump unit, mounted on rubber tires, was not provided with a grounding connection and thus the unit was isolated from the barge. This condition, in addition to presenting another possible source of static discharge, introduced serious personnel shock hazards.

4. The use of a non-approved portable extension cable on board the subject barge constitutes evidence of a violation of regulations in Chapter 1 of Title 46, Code of Federal Regulations prescribed pursuant to R. S. 4417a, as amended (46 USC 391a)(Tanker Act). However, since it is

unlikely that this extension cable caused the casualty, no useful purpose would be served by referring this case to the U. S. Attorney for criminal prosecution for a technical violation of regulations.

5. Regardless of whether or not the aforementioned unauthorized light may have been a contributing factor, this casualty points to the possible need for additional precautionary measures to be exercised during preliminary cleaning operations incident to gas-freeing. In this connection, the adequacy of existing Coast Guard regulations governing the safe operation and repair of tank vessels is currently being studied. If found indicated, appropriate action will be initiated.

6. With regard to the Board's recommendation that the information in this investigation be referred to the U. S. Department of Labor pointing toward a possible violation of regulations within the purview of that agency, it is considered that Coast Guard regulations are paramount on inspected vessels. However, recognizing their interest in casualties of this nature, the Commander, Eighth Coast Guard District is directed to furnish a copy of the record in this case, together with a copy of the Commandant's Action, to the local representative, U. S. Department of Labor for his information.

7. Where not in conflict with the foregoing, the record of the Marine Board of Investigation is approved.

D McG Morrison

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A17-6/P6/200-202 (02856)
21 November 1962

Commander
Eighth Coast Guard District
New Orleans, Louisiana

From: Marine Board of Investigation
To: Commandant (MVI)
Via: Commander, 8th Coast Guard District

Subj: Explosion(s) and fire, Tank Barge NBC-883, at Carlyss, Louisiana, on 22 September 1962, with loss of life

Findings of Fact:

1. On 22 September 1962, at or about 0900 Central Standard Time, the inspected Tank Barge, NBC-883, Official Number 278573, while in the process of being gas-freed at Calship, Inc. Shipyard, Carlyss, Louisiana, exploded with resulting fire. As a consequence, three men died and the barge was extensively damaged.

2. Particulars of Tank Barge NBC-883:

Name	NBC-883
Official Number	278573
Registered dimensions	131.3' x 50' x 10.3'
Gross Tons	671
Net Tons	671
Owner	Joseph M. Jones
Operator	Canal Barge Company
Both	226 Carondelet Street New Orleans 12, Louisiana
Built	1948 by Nashville Bridge Company, Nashville, Tennessee - Hull No. 883
Type "B"-195 Box (square) end barge	Capacity 11364 Bbls. Rakes 5 feet in length at each end of barge

Entry to each tank by expansion trunk 42" diameter, 24" high above main deck, each fitted with oval manhole (hinged), fitted with securing bolts and wing nuts.
Mounted on deck over #2 Tanks are two (2) cylindrical (oval) Diesel oil tanks, each 5' diameter by 30 feet (length). Used for fueling tugboats.

Last Biennial Inspection	20 January 1961, at Port Arthur, Texas
Mid-Period Inspection	14 March 1962, at Port Arthur, Texas
Last drydocking	4 December 1961, at New Orleans, La.

3. Persons who lost their lives in explosion:

a. Saul J. Delcambre, Foreman
Ruth Street, Sulphur, Louisiana
Date of birth: 6 April 1928

b. Wallace A. Kinney, Barge Cleaner
Mail Route "H", Box 582, Sulphur, Louisiana
Date of birth: 1 December 1939

c. Billy J. Smith
Route 1, Box 474, Westlake, Louisiana
Date of birth: 22 February 1941

4. Weather at the time of casualty: clear, southeast breeze, 5 miles per hour, unlimited visibility, air temperature 75°F, atmosphere clear and dry.

5. On 21 September 1962, at or about 1600 CST, the Tank Barge NBC-883 and the Tank Barge CBC-135 tied up to the gas-freeing dock area at Calship, Inc. Shipyard at Carlyss, Louisiana. The following personnel of Calship, Inc. first went to work soon after the barges tied up on barge CBC-135: A. D. Broussard, foreman; Arthur Wright, Wilson J. Racca and Lewis Zigler. These four (4) men pumped out the residue of benzene left in the barge and checked the tightness by air test of the after-rake compartment. They completed their work at or about 0100 CST on 22 September 1962, at which time this barge was towed away to another dock at Lake Charles, Louisiana. The men then shifted their activities to the Tank Barge NBC-883, commencing work aboard at or about 0115 CST. A portable stripping pump was placed on board and gas-freeing operations commenced. The barge was to be drydocked later at the floating drydock at Calship, Inc., and repairs to a fracture in the side shell plate to No. 2 Port Tank were to be made.

6. The men used a small green-colored plastic garden hose to wash down the inside of the barge with fresh water. Starboard No. 3 Tank was washed down first, finished at 0200 CST. Work shifted to Port No. 3, at which time the pump well was also washed down. As each tank was completed, the washdown and cleaning process moved to Port No. 2 Tank, then to Starboard No. 2 Tank. At or about 0421, CST, Wallace A. Kinney reported for work and relieved Lewis Zigler. At about 0430 CST, Wilson J. Racca was sent home. About 0510 to 0530, the Foreman, A. D. Broussard, was relieved by Saul J. Delcambre and left the shipyard about 0745. At or about 0755, Billy J. Smith relieved Arthur Wright, who left the yard at or about 0800.

7. With the shift now reduced to three men, work continued on the barge. Apparently, with all three men working on the barge, at or about 0900 to 0915 of 22 September 1962, NBC-883 exploded. There were no other persons on board the barge or in the shipyard at the time.

8. With the explosion, a fire broke out in the No. 1 Starboard Tank as well as on the shore alongside the barge; this was quickly extinguished upon the arrival of members of the Sulphur, Louisiana, Fire Department. Cameron Parish Sheriff's Department and State Troopers reported to the scene and they were followed by Coast Guard personnel. The Labor Department representative was cognizant of the Coast Guard investigation; an invitation was extended to attend as an interested party.

9. Inspection of the barge indicated that the explosion had most likely centered in No. 3 Starboard Tank. The main deck and starboard side of No. 2 and No. 3 Tanks were ripped apart. No. 1 Starboard showed evidence of fire, but no explosion. No. 1 Port Tank was found full of explosive fumes, but had not caught fire nor exploded. The 5 foot by 30 foot starboard diesel oil deck tank was hurled into the river and was later recovered. Estimate of damages to the barge is $70,000 with an additional $8,000 to various equipment of the shipyard.

10. The body of Saul J. Delcambre, Jr. was found on 23 September 1962, floating in the water about 1/4 to 1/2 mile from the barge; that of Wallace A. Kinney was found on shore nearby, and the body of Billy Jo Smith was found in the water near the barge on 24 September 1962; all were mangled and/or dismembered.

11. The investigation revealed that the electric cable to the stripping pump being used aboard the barge was a 3 conductor, rubber-covered cable plugged into a 220 volt outlet on a nearby work shack on shore with a 3 prong plug. The pump was a Model 32HEL-9 Marlow self-priming centifugal pump fitted with a 7½ horsepower, 3500 RPM 220/440, 60 cycle, Three Phase, Class I, Group D, Explosion-Proof Fram 215 Motor. The stop-start magnetic switch at the pump was also explosion proof. The motor was a Class I, Group D, Newman Motor approved by Underwriters Laboratories as being explosion proof. This pump, with attached motor, was sold to Calship, Inc. on 9 November 1959 by the Automatic Pump and Equipment Company, 7600 College Street, Beaumont, Texas. The pump and motor were on a frame chassis, which was in turn mounted on four (4) rubber tires. It was lifted aboard barges by a crane-fitted truck. To this pump on deck was fitted a compressed-air line which caused an ejector action on a three inch Neoprene-suction line which was lowered into the tanks. The end of the suction line was bare hose, without any strainer or metal fitting. This pump was not found after the explosion and it is assumed that it was blown off and sank.

12. The fresh air blower used at the time to ventilate the tanks, was an improvised type made of two carbide cans without heads joined together, end to end,by welding; fitted into one end was a pipe nipple (3/8 inch) with open end within the can; to this was attached a compressed air hose.

13. The procedure was for the man in the tank to use a portable extension light. Such a light was found lying at the bottom of No. 2 Starboard Tank near the inboard, after end, of that tank. The globe and bulb of this light were missing; it was fitted with a bronze metal guard. It had a wooden handle into the end of which fitted a rubber covered 2 conductor extension cord. This cord led to a 2 prong plug, 110 volt electric outlet at a nearby work shack on the shore nearby. Inspection of the light indicated a homemade rubber gasket. There was no evidence of a ring-like impression on this gasket, which is usually found when the vapor proof globe is set up tight against it. Opening of the packing gland where the rubber cable entered the end of the wooden handle showed an absence of packing material. The metal guard was dented in several places, indicating that it had been dropped or knocked at some time. It was reported that the extension light was fitted with a 100 watt electric bulb. There were no other similar type extension drop lights available to the Investigation Board for further examination when it visited the Calship Shipyard.

14. Mr. Lewis Fugitte, an electrician employed at Calship, Inc., stated that he was in process of replacing the two-wire 110 volt plugs and electrical outlets at the shipyard with three-wire 110 volts system provided with a ground, but that all the material for this conversion had not been received at the yard and that he had not been able to do much about it, considering his other duties.

15. Donald R. Mayfield, a registered gas chemist, stated that he was standing by at home to test the barge and issue a gas-free certificate when the men at Calship had completed their cleaning work. He arrived at the scene a few hours after the explosion. Walter J. Binnings, President and General Manager of Calship, Inc., stated he always called a gas chemist for a gas-free certificate prior to doing any "hot" work repairs on barges.

16. Inspection of the damaged barge and the shipyard by the Board revealed homemade, rickety access step-ladders; loose or broken boards at approach-walkways to the floating drydock; a lack of self-contained battery powered explosion-proof lights available. Although workmen engaged in gas-free work were furnished rubber boots and oil slickers when working aboard barges, it is not sure that they always wore them.

17. Representatives from the New Orleans, Louisiana and Galveston, Texas offices of the U. S. Department of Labor attended the investigation proceedings. They stated that they had visited the Calship, Inc. Shipyard for safety inspections on an average of once a month.

18. The last cargo carried on Barge NBC-883 was benzene with a flash point of 12° F. The green plastic hose used for washing down barges was about 1/2 inch in diameter and was reported by some of the witnesses to have been fitted with a nozzle at its end. The nozzle was not a regular brass nozzle, similar to those used on garden hoses, but was a homemade, steel pipe fitting secured to the end of the hose by a metal band. When a visit was made to the Calship, Inc. Shipyard to inspect this hose, the nozzle was not to be found. The end of the hose appeared to have been cut or fractured.

19. Normally the workmen who washed down the tanks on barges in gas freeing operations wore a fresh-air mask; this mask was a common rubber type mask with two eye pieces which, when examined, were dirty. There was a valve to regulate the flow of air. The mask was connected by a half-inch rubber hose to a compressed-air connection on the dock. There was no evidence of any projecting metal from the mask.

20. A visit to the shipyard revealed that the flashlights used were of the rubber-plastic case type. Examination found them to be approved by the Underwriters Laboratories. There was no evidence to indicate any electric bonding (ground) of Tank Barge NBC-883 during the gas freeing operations.

Conclusions:

1. After a careful review of the evidence the Board concludes that the explosion(s) on Tank Barge NBC-883 resulted from a spark set off in one of the cargo tanks being cleaned during gas-freeing operations by personnel in the employ of Calship, Inc. Shipyard at Carlyss, Louisiana and that the three lives lost were a direct consequence of the explosion(s).

2. It is concluded by the Board that the extension drop light in use was neither explosion-proof nor vapor-safe as evidenced by the lack of an impression which is normally left on the gasket when the vapor globe is screwed tight against it; also by the absence of packing material in the gland at the entry of the electric wire cable into the light assembly.

3. It is concluded that the supervision of all personnel at Calship, Inc. Shipyard was lax in certain phases of safety. There is evidence of lack of self-contained battery powered explosion-proof lights, of poor maintenance of shipyard walkways and ladders; there was no indication of a set procedure requiring workmen to comply with minimal safety practices, with provisions for action to be taken against anyone not observing them. Generally, the maintenance of equipment was poor.

4. The Board considered that the possibility of the rubber water hose with metal nozzle, the suction or stripping pump on deck, or the fresh-air mask being responsible for or contributory to this casualty as remote.

5. The Board considered the probabilities of one of the men aboard the barge wearing composition or leather cowboy type boots, instead of rubber boots, as a source of ignition, but finally evaluated such a cause as also remote.

6. The Board considered the possibility of the compressed-air blower as a source of sparking, due to the generating of static electricity through friction. Although some evidence of this exists, it was ruled, as was the dry, warm weather prevailing at the time, as too remote a cause for the explosion, under the circumstances.

7. The Board also considered the possibilities of the clothing of the workmen having metal projections as a source of ignition, but after weighing various statements bearing on that subject, came to the conclusion that there was no evidence produced indicating such a possibility and therefore ruled it out.

8. In assessing the various possible causes for this marine casualty the Board recognizes that no positive finding can be made. This is mainly due to the absence of an eye witness and to the paucity of knowledge of details concerning the work going on immediately precedent to the explosion(s). However, it is concluded that the most proximate cause is tied in to the shoddy type of portable extension light used; it is quite conceivable that either the vapor globe was accidentally struck against an internal girder of the barge, shattered and, in turn, broke the electric bulb thereby causing a spark or that the electric bulb became loose, somehow, and its wobbling created sparks that set off an explosion within the vapor globe since it did not appear that the light assembly was vapor-proof. The first of these two conjectures seems more acceptable.

9. It is further concluded that there was no negligence on the part of any licensed or certificated personnel.

10. Finally, it is concluded that there was no failure of inspected equipment or material.

Recommendations:

1. That the attention of the U. S. Labor Department be invited to the information in this investigation pointing toward possible violations of the regulations under Title 29 CFR Subpart 8, Safety and Health Regulations for Ship Repairing.

2. That the case be closed without further action.

PAUL POLLATT
CAPT, U. S. Coast Guard
Chairman

NEWTON W. WINBERG
CAPT, U. S. Coast Guard
Member

WARREN F. STEVENSON
CDR, U. S. Coast Guard
Member and Recorder