

MVI

17 September, 1951

(SS SINCLAIR H C -
a-7 Bd)

From: Chief, Merchant Vessel Inspection
To: Commandant
Via: Chief, Office of Merchant Marine Safety

Subj: Marine Board of Investigation; SS SINCLAIR H C, Pump room explosion
resulting in loss of life on 28 December, 1950

1. Pursuant to the provisions of Title 46 C.F.R., Part 136, the record of the Marine Board convened to investigate subject casualty, together with its Findings of Fact, Conclusions and Recommendations, has been reviewed and is forwarded herewith.

2. On 28 December, 1950, the SS SINCLAIR H C, a tank vessel of 7,874 g.t., built in 1941, was en route from Houston, Texas to Wilmington, N. C. After supper the two pumpmen requested and received permission from the Chief Engineer to complete repair of the H. P. Valve-chest-liner and valve in the after pump room. While effecting this repair a strong explosion occurred at about 1812, approximately 12-1/2 miles off Tennessee Reef Light. A second explosion followed. The fire, confined to the after pump room, was brought under control about 45 minutes after the first explosion. Both pumpmen lost their lives as a result of this casualty.

3. The Board made the following Findings of Fact:

"1. Two explosions occurred at sea in the after pump room of the SINCLAIR H C on 28 December, 1950. The vessel sustained structural damage and two crew members were so severely burned they died shortly thereafter.

"2. The SINCLAIR H C is a steam screw tank vessel, Official No. 241274, built at Quincy, Mass., in 1941. She is owned and operated by the Sinclair Refining Company, 430 Fifth Avenue, New York 20, N.Y., and has the following dimensions: 452.6 feet long, 63.6 feet beam, 34.3 feet depth, 7,874 gross tons and 4,596 net tons. She had been inspected at the port of Philadelphia on 21 March, 1950, and had sailed from Houston, Texas on 26 December, 1950, with a full cargo of motor gasoline.

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"3. On 28 December, 1950, at 1757 Eastern Standard Time, the SINCLAIR H C was abeam of Tennessee Reef Light, 12-1/2 miles distant, proceeding on her passage to Wilmington, N.C. The weather at the time was partly cloudy, light easterly breeze, temperature 76 degrees Fahrenheit, and the Barometer 29.97. A small easterly sea was running.

"4. At 1812, Donald Vincent Ayers of 138 Glendale Drive, Houston 11, Texas, 2nd Mate, the officer of the deck, felt and heard a violent explosion. He looked aft and saw smoke and flame issuing from the after pump room skylights and ventilators, and immediately sounded the general alarm. The explosion was heard or felt all over the vessel, and from the testimony it appears that all hands promptly manned their emergency stations. Three hoses, one of which had a fog nozzle, were directed into the pump room, and these were augmented by three more shortly after. About 10 minutes after the first explosion an attempt was made to use the CO2 system, but due to a personal error the gas was never released. A second explosion followed in the pump room, and the steam smothering system was opened into all the cargo spaces. Approximately 45 minutes after the first explosion the master estimated the fire to be under control.

"5. Two crew members, Ernest Strickland, Chief Pumpman, Z-104768-D1, and Cecil Everett De Moss, Second Pumpman, Z-225213-D1, were working in the pump room at the time of the first explosion, and each of these men suffered 2nd and 3rd degree burns which proved to be mortal injuries inasmuch as De Moss succumbed at 2305 that night and Strickland the following morning while en route to the hospital at Miami, Florida. No other personnel suffered injuries.

"6. The damage to the vessel was confined to the after pump room, and since it did not affect her seaworthiness she proceeded to her port of destination. The two pumpmen were the only witnesses to the actual explosion, and since both died without giving any reason for it the surviving crew members were closely and comprehensively questioned in order to develop some reason or circumstance which would afford an explanation of the disaster.

"7. The SINCLAIR H C was constructed with two pump rooms, one forward of the bridge deck house and the other aft of it. All cargo handling for tanks #5, 6, 7, and 8 is done by means of cargo valves located in

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the after pump room of which there are 28 in all. This pump room is divided into three parts by means of a fore and aft bulkhead on each side. Access to the wing sections is afforded by 7' by 30" openings in the bulkheads at the lower grating level, and there are also limber holes at the bottom, and a hole in each bulkhead under the floorplates to receive an air duct from the gas ejector. At the forward corner near the top of each bulkhead there is an opening for a right-angle take-off from a natural draft ventilator. The center section of the pump room contains three vertical steerable compound steam cargo pumps, and the cargo valves. The wing sections contain the bilge and sea suction. The ventilation consists of two fixed installations of natural and forced draft. The natural draft is afforded by four 34" x 34" skylights and by a door 26" x 60" at the main deck, also three fixed cowl ventilators 24" in diameter. Two of these ventilators extend down to within six feet of the lower pump room grating and they have a right-angle take-off near the main deck, through the wing bulkheads, opening into the wing spaces. A third cowl ventilator extends below the floorplates for a distance of about four feet. A permanently installed gas ejector under the floorplates takes suction from the center section only. The wing bulkheads have openings for extended ducts from the ejector, but none were fitted. In addition, a portable blower was rigged through the upper pump room casing, discharging fresh air upon the center cargo pump which was being repaired. The floorplates are so arranged that the bilges are at all times visible and accessible without removing any of the plates, which are held down by countersunk screws.

"8. Upon sailing from Houston the Chief Engineer, Mr. James J. Morris, decided to work on the center cargo pump of the after pump room. The steam had been blowing by the valves of a number of the cargo pumps and this job was part of a plan to overhaul the pumps. The work consisted of renewing the H. P. valve-chest-liner and valve. Mr. Morris and the two pumpmen worked together during the days of the 27th and 28th of December. As the job was nearing completion the pumpmen asked for, and received, permission to work after supper on the 28th in order that they might complete this work and start on another job the next morning. They were in the pump room after their evening meal to connect up the valve linkage of the pump, when at 1812 a severe explosion occurred and a repercussion was felt throughout the vessel.

"9. The testimony reveals that prior to the last drydocking of the vessel (Sept. 1950), when the liquid ends of all the cargo pumps were renewed, they were corroded in such manner as to necessitate plugging the castings at various times to prevent loss of cargo into the bilges.

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A procedure was followed whereby the pump room bilges were washed and pumped out each trip before entering and after leaving port. It was testified that no one ever was supposed to go down into the pump room unless another man stood by on deck. Before any work was attempted all ventilators were trimmed to the wind, the gas ejector was started up, and in this case an additional portable blower was installed in the upper casing, blowing air on the workmen.

"10. When the first explosion occurred, most of the officers off watch were in the after recreation room on the port side of the poop deck. Even before the general alarm sounded they headed to their various emergency stations. Smoke, mixed with some flame, issued from the after pump room. One pumpman, De Moss, was first seen on deck, his clothes afire, and evidently suffering from severe burns. He was covered with a blanket and taken to the officers' quarters for treatment. Shortly after, the Chief Pumpman, Ernest Strickland, was seen in the after section of the ship and given first-aid treatment.

"11. Water was immediately turned into the pump room by means of several hoses and a fog nozzle, and eventually six hoses were playing into the space. The Mate and Chief Engineer, together, went to the CO2 valve manifold located at the side of the flying bridge aft of the pump room, to release the gas. Upon operating the valve pull, a white cloud was observed in the smoke and it was thought this was caused by the CO2 gas. However, it was later learned, upon weighing the bottles, that the gas was not released, and that the valve pull for the bank of bottles was not operated. The CO2 alarm bell in the pump room was not heard, but this was attributed to its probable damage by the explosion. It was later found to be undamaged. About 12 minutes after the first explosion a second explosion took place in the same pump room, which sounded louder than the first and appeared to be higher up, as compared to the first explosion which sounded as though it were in the bilges. About 10 minutes later the smoke subsided. The master estimated approximately 45 minutes from the first explosion to the time the fire was under control. The smothering steam was turned into the cargo tanks shortly after the first explosion.

"12. When the master reached the bridge he discovered the ship-to-shore telephone antennae was carried away. He ordered an S.O.S. and the tanker SS EULKCRUDE, proceeding on his port quarter, stood by. Communications were established with the Coast Guard at Miami and two Coast Guard vessels were dispatched for assistance. The ship's way was taken off as she was maneuvered, to place the fire to leeward.

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When the fire was under control, the master so informed all concerned and proceeded to intercept the Coast Guard Cutter heading towards him with medical aid.

"13. Contact was made with the USCGC ANDROSCOGGIN near Carysfort Light. At 2326 Dr. Claude G. Eccles, Senior Surgeon, U.S.P.H.S., and Chief Hospital Corpsman, D. W. Weeks, U.S.C.G., were transferred to the SINCLAIR H C. Mr. Cecil E. De Mess, Second Pumpman, was declared dead when Dr. Eccles saw him. Mr. Strickland was considered too dangerously injured to be moved in the then choppy sea. The vessel proceeded to the Miami anchorage where Strickland could be sent ashore under better sea conditions. This transfer took place about 0100 of the 29th of December, and the vessel was permitted to proceed on her voyage. When leaving the Miami anchorage the master was informed by radio that Mr. Strickland had died on the way to the hospital. According to Dr. Eccles' report, both men had suffered second and third degree burns, covering nearly their entire bodies. He was quoted as saying that the first-aid treatment given by the crew was proper in all respects.

"14. Upon examination of the pump room later, the following damage was noted: The floorplates were either bent back with some of the screws holding, or blown off their settings completely without bending; the handrail of the ladder leading to the lower platform was broken off; the natural draft ventilator leading to the bilges was broken off, and other ventilator ducts collapsed, but no damage was caused to the gas ejector. The assembly of the valve gear to the center cargo pump was not completed. The light fixtures were of approved manufacture and undamaged, as was the electric wiring, the installation of which was in accordance with Coast Guard regulations. The forward and after bulkheads in each wing section, forming the boundaries of #5 and #6 wing tanks, port and starboard, were bulged, fractured and leaking, from about the middle section to the deck head. The Chief Engineer found a Ronson lighter lying on the base of the center cargo pump, just below the floorplate level, a point directly under where the men were working. This lighter was found to be inoperative during the investigation, but a similar lighter was produced for the Board, and it was demonstrated that when struck at a certain angle the lighter ignited. It was testified that non-sparking tools were kept in a box in the upper pump room and none other were used. The stuffing box packing of the cargo valves required no work, it was said, as there was no leakage. However, about four months previous to this casualty, cargo liquid was seen to issue from the stuffing boxes of two of the valves and they were then repacked."

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4. The Board made the following Conclusions:

"1. Although the testimony is not conclusive, it is considered that the precautions taken to ventilate the pump room and to wash the bilges were indicative of a knowledge of the existence of a dangerous accumulation of ignitable gases. The Chief Engineer and the pumpmen had been with the vessel prior to the renewal of the liquid ends of the pumps. During that time it was necessary to stop leakage of the pumps by plugging defective parts of the castings. This condition must have been quite prevalent, as complete renewal was finally effected. It is feasible to assume that these men had become accustomed to the smell of gas, and felt that the condition was not serious so long as they continued frequent washing and pumping of the bilges and used all possible means of ventilation.

"2. After the liquid ends were renewed another source of leakage remained. The 28 cargo valves in the after pump room, through their stuffing boxes, could leak a dangerous amount of liquid into the bilges. The Chief Engineer stated he renewed the packing of two of the valves when liquid was seen to issue from the stuffing boxes. At no other time did he try the packing glands for tightness, and leakage could have taken place even though it was not readily visible when he looked at the valves.

"3. All testimony is to the effect that there was no leakage nor smell of gases. It is to be noted at this point that the bilges were washed before entering and after leaving port on every trip. This would indicate an accumulation of cargo liquids in the bilges. An additional portable ventilator was used, together with the fixed natural and forced draft ventilation in this pump room. Knowledge of a gaseous condition must have existed, but they thought they were coping with it safely. The proper procedure, of course, was to eliminate the cause of the leakage. Perhaps it was accepted as a normal condition, and that the measures taken were safe enough.

"4. Two violent explosions occurred, and undoubtedly the explosive gases were present in the pump room. The men smelled nothing but fresh air, since the portable blower was directing its blast directly on them. It would appear, that when the Ronson lighter dropped to the base of the pump below the floorplates the ignition of the gases took place in the bilges of the center section of the pump room. The ventilation for the wing spaces was inadequate for the amount of gas accumulated, and as the heat of the burning gasoline in the bilges progressed, it set off

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the second explosion, which took place at a higher altitude in the wing sections.

"5. The Board is of the opinion that the Chief Engineer should have been aware of a gas concentration, and that he should have taken more positive action to ascertain if such a condition existed. However, the Board also considers that the Chief Engineer's failure to fully carry out these precautions is not probative negligence.

"6. The failure to properly discharge the CO2 gas in the system may or may not have been a factor in the second explosion. However, the performance of duty of the Chief Mate and Chief Engineer in this emergency lends credence to the opinion that the omission was an honest error. Both reached for the release valves, and neither attempted to read the nameplate, since it was dark. Their attention was drawn to the white vapor which immediately issued from the pump room. The Station Bill assigned De Moss, the then injured pumpman, to the CO2 controls, and the exact knowledge of the valves and nameplates could probably not be expected of any of the rest of the crew.

"7. The assistance rendered by the Coast Guard and U. S. Public Health Service was prompt and efficient, and, with the exception of the handling of the CO2 system, the crew performed satisfactorily in the emergency. No faulty material contributed to the casualty, and there is no provable evidence of negligence or misconduct on the part of the personnel."

8. The Board made the following Recommendations:

"1. (1) The present system of ventilation of the after pump room wing spaces is inadequate, and the gas ejector ducts should be extended to cover said spaces.

(2) The permanent installation of fog nozzles in the pump rooms was suggested by the Chief Mate and the Chief Engineer.

(3) Installation of gas analyzer in upper pump rooms.

"2. In view of the above, it is recommended that no further action be taken and that the case be closed."

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REMARKS

6. Recommendation 1 states the present system of ventilation in the after pump room wing space is inadequate and suggests that the gas ejector ducts be extended to cover such spaces. Steam or air actuated gas ejectors are fitted as alternatives or complements to the normal or required ventilation system. In this casualty the ventilation system as installed would have been adequate had the necessary precautions been taken, particularly with respect to the prevention of the leakage of inflammable cargo.
7. Since the CO2 system installed onboard was not used for the extinguishment of fire in the pump room, the record does not sustain the necessity for added fog nozzles in the pump room as indicated in Recommendation 2.
8. The necessity for the installation of gas analyzers in upper pump rooms, as recommended by the Board, is not sustained by the record as a means of effectively preventing explosions in such spaces, nor has it been demonstrated that such a device would have prevented the occurrence of subject casualty.
9. Subject to the foregoing remarks, it is recommended that the Findings of Fact, Conclusions and Recommendations of the Marine Board of Investigation be approved.

/s/P. A. OVENDEN
P. A. OVENDEN
Acting

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21 September, 1951

From: Chief, Office of Merchant Marine Safety
To: Commandant

Forwarded, recommending approval.

/s/H. C. SHEPHEARD
H. C. SHEPHEARD

APPROVED:

24 September, 1951

/s/ MERLIN O'NEILL
MERLIN O'NEILL

Vice Admiral, U. S. Coast Guard
Commandant