

WVI

17 December 1953

(PAN MASSACHUSETTS -
PHOENIX - a-3 Bd)

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

Subj: Marine Board of Investigation; SS PAN MASSACHUSETTS - SS PHOENIX,
tank vessels; collision Delaware River, 5 June 1953, with loss of life

1. On 5 June 1953 on the Delaware River the SS PHOENIX, a tanker of 14,179 g.t., without cargo, was outbound to sea and the SS PAN MASSACHUSETTS, a tanker of 11,081 g.t. fully loaded, was inbound for Philadelphia. The night was clear and dark and the tide was at maximum ebb about 2½ knots. Both vessels were in an approaching situation at the intersection of Reedy Island and New Castle Ranges and exchanged whistle signals for a normal port to port passing. The PHOENIX in making her turn at the intersection was affected by the maximum ebb tide and was set over to the left side of the channel across the bow of the PAN MASSACHUSETTS. Although collision-avoiding action followed, the vessels collided at about 2316 in the vicinity of Elsinboro Point, New Jersey. Several violent explosions followed on the PHOENIX causing her to sink and become a total loss. The PAN MASSACHUSETTS burned and has been considered a constructive total loss. Four crew members from the PHOENIX lost their lives. There was no loss of life from the PAN MASSACHUSETTS.

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

REMARKS

3. The Findings of Fact, paragraphs 21 and 22, Conclusions, paragraphs 10, 11, 12 and 13, and Recommendations, paragraph 4, of the Board's report in effect state that the experience of a survivor or survivors in the water indicates that the kapok life jacket approved by the U. S. Coast Guard was deficient. It is in effect stated that the upper tie tape is located so high on the life preserver that when the wearer is in the water, this tie tape causes considerable discomfort to the throat and that when this tape is untied, the life preserver has a tendency to ride up on the body of the wearer and thus cause the wearer to sink lower in the water.

4. The upper tie tape was properly located on the life preservers used by the survivors of the PHOENIX and the PAN MASSACHUSETTS. This tie tape was located in conformance with the cutting pattern and arrangement print furnished to the manufacturers of life preservers.

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5. The location of the upper tie tape on the approved life preserver was arrived at after most exhaustive experience of survivors in war action and other casualties had been studied and exhaustive tests conducted. The life preserver with the upper tie tape is so designed that when a wearer enters the water he will float in an upright and in a slightly tilted backward position, the upper tie tape preventing the face from being immersed in the water. When it is realized that in the abandonment of a vessel many persons enter the water in a shocked, unconscious or semi-conscious condition, as well as under other psychological and physiological conditions where they do not have command of their faculties, it is most important that the upper tie tape be located in its present position so as to keep the wearer's head out of the water until he has regained consciousness and his rational faculties.

6. The approved life preserver has a body strap and a lower drawstring tape for adjusting and securing the life preserver to the body. The body strap and drawstring tape can be easily adjusted by the wearer in the water so as to relieve any and all discomfort to the throat that may be caused by the upper tie tape. The body strap and the drawstring tape are so designed that they when properly adjusted will prevent the life preserver from riding up on the body of the wearer.

7. The difficulties in the use of the approved life preservers indicated in the record were not due to any defect in the design or other deficiencies in the life preserver. A careful analysis of the complaints clearly indicates that the difficulty was due to lack of confidence, knowledge of the characteristics of a life preserver, and experience and training in the use of a life preserver while in the water. It is significant to note that practically the entire crews of the PHOENIX and PAN MASSACHUSETTS were saved by the use of the approved life preservers. In connection with the location of the upper tie tape, attention is invited to the following testimony, page 396, question 273:

"Q. But you still retained the life preserver?"

"A. It must have thrown me on my back with my face up because I don't remember anything until I got down by the anchor chain. I don't remember hitting the water. I opened my eyes and I remember seeing a round circle of light reflected on the water. It looked like about that big. (Witness indicates) I'll never forget that. That is the last I remember I was by the anchor chain."

8. Subject to the foregoing Remarks it is recommended that the Findings of Fact, Conclusions and Recommendations of the Marine Board of Investigation convened to investigate subject casualty be approved.

(signed) [REDACTED]

F. A. OWENSON

FIRST ENCLOSURE OF LCI memorandum of 17 December 1953

From: Chief, Merchant Vessel Inspection Division
To: Commandant

Subj: Marine Board of Investigation; SS FAN MASSACHUSETTS - SS PHOENIX,
tank vessels; collision Delaware River, 5 June 1953, with loss of
life

Forwarded, recommending approval.

(signed) [REDACTED]
H. C. SHEPHEARD

APPROVED: 31 DEC 1953

(signed) [REDACTED]
MERLIN O'NEILL
Vice Admiral, U. S. Coast Guard
Commandant

REPORT OF A

MARINE BOARD OF INVESTIGATION

convened at the

Marine Inspection Office, United States Coast Guard

Third Coast Guard District

Room 803 Custom House, Philadelphia, Pa.

on

9, 10, 11 & 16 June; 1, 2 & 7 July, 1953

To Inquire Into and Investigate the Circumstances Surrounding The

Collision between the SS FSN MASSACHUSETTS and SS PHOENIX

With loss of Life in the Delaware River

on 5 June, 1953

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SS PHOENIX:

[redacted] Master, [redacted]
[redacted] Pilot, Lic. [redacted]
[redacted] 2nd Mate, [redacted]
[redacted] 3rd Asst. [redacted]
[redacted] O.S., [redacted]
[redacted] Mess. [redacted]
[redacted], P-WT, [redacted]

SS PAN MASSACHUSETTS:

[redacted] Pilot, Lic. [redacted]
[redacted] 3rd Asst, [redacted]

2. At the time of the casualty the night was clear and dark, wind estimated southwest, force 3 and the tide was at maximum ebb with a current of about 2 1/2 knots running.

3. The SS PAN MASSACHUSETTS, Official Number 243208, is a steam driven tank vessel of 11,081 gross tons, 501.9 feet long, built of steel materials in Norfolk, Va. in 1943 and develops 9,000 horsepower. She is owned and operated by the National Bulk Carriers, Inc., 600 Fifth Avenue, New York, N.Y. and at the time of the collision was under the command of [redacted] (License No. [redacted]) of [redacted] and had [redacted] (Lic No. [redacted]) of [redacted] on board as pilot acting under authority of his federal license.

4. The SS PHOENIX, Official number 246756 is a steam driven tank vessel of 14,179 gross tons, 542.6 feet long, built of steel materials in Norfolk, Va. in 1944 and develops 12,000 H.P. She is also owned by the National Bulk Carriers, Inc. and at the time of the casualty was under the command of [redacted] of [redacted] and had [redacted] (License No. [redacted]) of [redacted] on board as pilot acting under authority of his federal license.

5. Neither vessel was equipped with radar.

6. Both vessels were certificated for the carriage of Grade B and all lower grades of liquid cargo. Cargo tanks on both vessels were fitted with individual pressure-vacuum relief valves on pipes extending approximately

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four feet above the deck.

7. Due to the conflicting versions of signals, maneuvers and navigation, the description of events leading up to the collision is given with no attempt at reconciliation.

8. The PAN MASSACHUSETTS, fully loaded with House Brand and Amoco gasoline, sailed from Texas City, Texas on 31 May 1953, bound for Philadelphia, Pa. An uneventful passage ensued during which all her navigation gear was in constant use and functioned satisfactorily. At about 1835, 5 June 1953 Pilot [redacted] boarded the PAN MASSACHUSETTS at the mouth of Delaware Bay. The draft at that time was estimated at 31.1 ft forward and 31.1 ft aft. Under the con of Pilot [redacted], the PAN MASSACHUSETTS proceeded up the Delaware River and, after slowing to pass Reedy Island Wreck Lighted Buoy WR 1-A (L.L. 1726), steadied up in the center of the Reedy Island Range Channel on course 015 degrees true at full ahead. In the vicinity of Buoy 5R (L.L. 1730) the lights of the vessel later identified as the PHOENIX were sighted downbound on the New Castle Range between Pea Patch Island and Buoy 1-N (L. L. 1733). The master, who was in the chart room at the time, joined the pilot on the bridge as the vessels continued to close. The PAN MASSACHUSETTS was approximately 3/4 of a mile below Buoy 1-N when the PHOENIX began her turn at 1-N and simultaneously sounded a one blast signal. The PAN MASSACHUSETTS answered with a one blast and the pilot ordered the helm right followed by hard right to haul quickly over to the righthand side of the channel. This helm order was followed shortly by the order to steady and the heading at that time was estimated to be 022 deg. true. The PHOENIX in the meantime was observed to swing wide to the eastward in the turn but by the time the PAN MASSACHUSETTS was steady on 022° the PHOENIX was showing a full red light and it appeared they would pass clear port to port. The PHOENIX continued to swing to her right slowly until she closed to 250 yards 6 degrees on the port bow. But apparently, without actually steadying down, she suddenly began coming left and blew a two blast signal as she did so. Those aboard the PAN MASSACHUSETTS were stunned as they saw the PHOENIX swing rapidly across their bow. A second and very short two blast signal was heard from the PHOENIX as the pilot ordered full left rudder and the master rang the engines full astern. Neither had time to take effect and within seconds the collision occurred as the bow of the PAN MASSACHUSETTS struck and entered the PHOENIX on her starboard side aft, in way of No. 8 tank, at about an 80 degree angle. The time was noted as 2316 EST and the speed just before impact was estimated between 9 1/2 and 12 knots over the ground.

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The Board arrived at the following Findings, Conclusions and Recommendations:

DETAILS OF FACT

1. The tankers PHOENIX and PAN MASSACHUSETTS collided in the Delaware River on the Reedy Island Range in the vicinity of Eleinboro Point, N. J. at about 2316 EST on 5 June 1953. Fire broke out immediately on both vessels. The PHOENIX was racked by several violent explosions during the hour following the collision and finally sank in 40 feet of water 2900 yards, 097 degrees true from Baker Range Rear Light (L.L. 1722). The fire on the PHOENIX was extinguished at 0700 EST 7 June but continued to burn on the PAN MASSACHUSETTS until 1730 EST, 9 June. The PHOENIX was a total loss and has since been sold for junk. The PAN MASSACHUSETTS after survey, was considered a constructive total loss, but, approximately 93 percent of her cargo was reported to have been recovered. There were no lives lost aboard the PAN MASSACHUSETTS, however, four crew members of the PHOENIX were unaccounted for after the disaster and of these, three bodies have been recovered and one is still missing and presumed dead. The known dead with their next of kin as shown on the crew list are:

August B. Cartrell, Chief Mate, License No. [REDACTED]

Next of kin: Wife, [REDACTED]

Dale H. Smith, A.B., [REDACTED]

Next of kin: Father, [REDACTED]

Joseph Donnelly, P-NT, [REDACTED]

Next of kin: Wife, [REDACTED]

Missing and presumed dead is:

[REDACTED] Pumpman [REDACTED]

Next of kin: Wife, [REDACTED]

Several crew members of both vessels sustained injuries of varying extent. Those reported to have been incapacitated for a period in excess of 72 hours are as follows:

9. At the time of impact an explosion occurred on the PHOENIX at the point of penetration and flames covered the bow of the PAN MASSACHUSETTS and the entire deck area of the PHOENIX between the midship house and the after deck house.

10. On the PAN MASSACHUSETTS the engines were immediately rung emergency astern in an attempt to back clear but the PHOENIX was securely impaled. The master rang the general alarm and called for steam to the steam smothering system and water on deck but both had already been accomplished by the engineering personnel. All fire hydrants were immediately opened on deck and within minutes a second explosion occurred aboard the PHOENIX aft of the midship house severely jarring the PAN MASSACHUSETTS. Fire on the water extended the length of the PAN MASSACHUSETTS on the starboard side between the two vessels and was beginning to spread down the port side when the master ordered No. 4 boat swung out. Two lengths of hose were led forward from the midship house under the direction of the chief mate. The fire, initially confined to the bow area and presumed to be fed by bunkers in the forepeak and paint in the forecastle, spread to No. 1 and No. 2 cargo tanks after the second explosion. Vapors could be seen burning above the individual pressure vacuum relief valves and cargo appeared to be burning on deck. Some crew members were preparing to jump over the side and the pilot went to the main deck momentarily to warn them the engines were still turning over. In the meantime efforts to swing out the No. 4 lifeboat were hampered by a disconnected davit crank. Although the crank was lying on deck the adapter which provided the means of fastening the crank to the worm gear was missing. Roughly ten minutes after the second explosion a third and even more violent explosion occurred on the PHOENIX just aft of the midship house again jarring the PAN MASSACHUSETTS severely and filling the air with flying debris. The men cooling the fore deck with the hose were forced aft by flames spreading back to the midship house and efforts to bring another hose into play were abandoned. The pilot, who had been attempting to dislodge the bow from the PHOENIX by maneuvering on the engines, rang up stop and the master passed the word for the engine room to secure. The majority of the crew members jumped off the after end of the vessel following the third explosion with the exception of the engineers and the men attempting to launch the lifeboat. With the use of a wrench the after davit of No. 4 lifeboat was finally swung out and the boat lowered. When the engineering personnel completed securing they boarded the lifeboat and the boat cast off. The master in the meantime went forward to sound the abandon ship signal in the event any others remained, but there was insufficient steam to blow the whistle. Getting a life jacket from his cabin he returned aft and, finding the boat gone and the vessel completely

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abandoned, he jumped over the stern.

11. The PHOENIX, on the evening of 5 June, after discharging a full cargo of crude oil at the Sinclair Refinery, Marcus Hook, Pa. made preparations for getting under way for Houston, Texas. Ballasting of cargo tanks No. 2 across and No. 6 across was begun at 2100 EST, with the intention of ballasting No. 8 wings when 2 and 6 were full. All navigation and steering was tested and found satisfactory. Departure draft was approximately 21 feet aft with the bow about four feet out of the water. At 2145 with Pilot [redacted] aboard, the master undocked the vessel and maneuvered her into the channel heading down river before turning the con over to the pilot at about 2150. The master then went to his office on the deck below the bridge in order to complete the sign-on of the crew and take care of other ship's business.

12. According to Pilot [redacted] the PHOENIX proceeded down the Delaware without incident and when approximately 300 yards above Buoy 1-N on the New Castle Range the lights of a vessel later identified as the PAN MASSACHUSETTS were sighted on the Roedy Island Range about two miles distant. The PHOENIX was navigating the center of the channel steaming full ahead at an estimated 15 knots over the ground. When the bow of the PHOENIX was even with Buoy 1-N the helm was ordered 20 degrees to the right. As the vessel rounded the buoy and approached the downbound heading of the Roedy Island Range, the helm was steadied on 195° true. At that time the PHOENIX was estimated to be 50 feet to the eastward of the center line of the channel, and 300 yards below Buoy 1-N. The PAN MASSACHUSETTS was then about one point on the starboard bow 3/4 of a mile away and appeared to be well on her own lefthand side of the channel. Under the circumstances, a starboard to starboard passing seemed indicated and a two blast signal was sounded by the PHOENIX. After twenty seconds elapsed without hearing a reply a second two blast signal was sounded. No answering signal was heard but there was still no apprehension on the part of the pilot since it appeared both vessels would easily pass clear starboard to starboard. About 40 seconds after the second two blast signal, with the distance between the two vessels then about 400 yards, a one blast signal was heard from the PAN MASSACHUSETTS and simultaneously she was observed swinging to her own right. After a change of course of about 10 degrees, she appeared to steady down and was heading directly towards the starboard bow of the PHOENIX. Having been thrust into the jaws of collision with so little time remaining, the pilot ordered hard right and blew a one blast signal in a frantic

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attempt to comply with the one blast from the PAN MASSACHUSETTS even though it was doubtful that collision could be avoided. The PHOENIX did not appear to respond, however, and when the pilot asked if the wheel was hard right the helmsman replied he could not make it. Glancing towards him the pilot saw the third mate apparently assisting at the wheel. The PAN MASSACHUSETTS was then six points on the starboard bow showing a red light and still heading directly towards the PHOENIX. Since collision was inevitable if the PHOENIX would not answer to the right, the pilot ordered full left in a last moment hope to clear the oncoming vessel. The helmsman experienced no difficulty in getting the wheel over and the vessel responded quickly, but the maneuver was not successful and five seconds before the collision the pilot stopped the engines. The PAN MASSACHUSETTS collided with the starboard side of the PHOENIX at No. 8 or 9 tank at an angle of about 30 degrees and the heading of the PHOENIX at the time was estimated to be 170 degrees true.

13. The testimony of the PHOENIX' watch officer, Third Mate [REDACTED] was at variance with that of Pilot [REDACTED]. According to [REDACTED], the PHOENIX was almost abeam of Pea Patch Island on the New Castle Range when he first observed the lights of the PAN MASSACHUSETTS about 5 miles down river. The PHOENIX was proceeding full ahead on the center line of the channel and the speed was estimated at 16 knots over the ground. When Buoy 1-N was abeam to starboard or nearly so, a one blast signal was sounded by the pilot and the helm ordered to the right. The one blast signal was promptly answered by one blast from the PAN MASSACHUSETTS as the PHOENIX went into the turn. The PHOENIX appeared to be swinging wide to the eastward and slow in coming to the right, and as she neared the downbound course the two vessels were lined up nearly head and head with the PAN MASSACHUSETTS slightly on the starboard bow apparently swinging slowly to her right. The pilot then ordered full right rudder and Andrade seeing the helmsman laboring at the wheel said: "Get her over otherwise we'll never make it." The helmsman had just finished putting the wheel hard right when the pilot ordered two short blasts and hard left rudder. The PAN MASSACHUSETTS was then about 6 degrees on the starboard bow less than a quarter of a mile away and heading directly towards the PHOENIX just forward of amidships. [REDACTED] sounded the two blast signal and the PHOENIX began swinging rapidly to port. The pilot repeated the words "Keep her left" and [REDACTED] on his own motion again sounded two short blasts. The master suddenly appeared on

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the bridge and seeing the situation cried: "Mr. [REDACTED], what have you done, why don't you stop her?" Within seconds the bow of the PAN MASSACHUSETTS struck the starboard side of the PHOENIX at about a 30 degree angle.

14. The master of the PHOENIX testified that with minor exceptions he was in his office under the bridge continually from the time he turned the con over to the pilot after undocking. Some time after 2300 while typing in his office the master heard a two blast whistle signal from the PHOENIX which he dismissed as a routine overtaking situation. He continued with his typing and soon heard what he described as a hastily sounded two blast signal from the PHOENIX. Curious as to the reason for this second signal the master went up to the bridge and as he stepped into the pilot house observed a vessel bearing down on the PHOENIX a point and a half on the starboard bow about a shiplength away. He immediately rang up "stop" on the telegraph and within 5 or 6 seconds the collision occurred.

15. The impact was followed immediately by an explosion in either No. 8 or 9 cargo tank and flames extended across the vessel between the midships and after houses. The midship house was completely blacked out and all communications to the after part of the vessel were cut off. A second explosion occurred shortly after the first and the helmsman [REDACTED] was observed as he jumped over the side from the bridge. The Third Mate was then ordered forward to drop the anchor. Shortly thereafter on the advice of the master, the chief mate started forward to supervise the anchoring and was not seen alive again. A third explosion occurred about ten minutes later and was believed to be in No. 7 tanks directly under the bridge. Flames enveloped the midship house as the master jumped overboard from the bridge. The pilot was in the spare stateroom at the time getting a life jacket and sustained a knee injury as a result of the third explosion. He reached the chart room by himself and was assisted to the wing of the bridge by the second mate who helped him over the side. The second mate remained a few more minutes then followed.

16. The third mate and the bow lookout succeeded in dropping the port anchor as ordered and it was noted that the vessel was motionless at that time. Upon reflection the third mate recalled that the two vessels had appeared to stop dead in the water at the time of impact. After dropping the anchor the flames around the midship house prevented return to the bridge. Realizing that nothing further could be done the third mate waited a short time then jumped over the side together

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with the lookout with whom he shared his life jacket.

17. In the engine room of the PHOENIX a stop order immediately preceded the collision but was not answered until after the impact. Simultaneously an explosion was heard, flames were seen over the skylight and the bulkhead between the engine room and the cofferdam sustained a two foot fracture on the port side and water poured into the engine room. All engineering officers reported immediately to the engine room. The plant had blacked out on impact and efforts were made to cut the power back in, but were only partially successful since the circuit breakers continued to trip out. All communication systems to the bridge were found inoperative. Ballasting had been in progress up until the time of collision and steam to the cargo pumps was secured immediately. At the same time the steam smothering system was turned on and efforts were centered on maintaining steam. A second explosion occurred shortly after the first and the boiler fires were secured. No effort had been made to start the fire pump since it was considered useless. After securing the boiler fires the chief engineer decided to relight the fires in order to maintain steam on the steam smothering system and was so engaged when the third explosion occurred. Deeming it unwise to remain any longer, the engine and fire rooms were secured and all hands ordered topside. Reaching the fantail, flames were observed across the width of the vessel from the stack forward. Launching of the after lifeboats had been prevented first by heat then by the spreading flames. Some crew members had already jumped overboard although approximately 25 still remained. Since no small boats were seen in the vicinity the chief engineer considered it best to remain aboard the vessel as long as possible however, the deck soon became too hot to stand on and the chief gave the order to abandon.

18. At approximately 0010 EST, 6 June after both vessels had been abandoned, the fourth and most violent explosion occurred in No. 3 cargo tanks of the PHOENIX folding the main deck back against the midship house. With the exception of the bow of the PHOENIX both vessels were then burning from stem to stern. Shortly thereafter the PAN MASSACHUSETTS became disengaged from the PHOENIX and drifted in the immediate vicinity until after the fire was extinguished four days later.

19. The collision and explosions were heard throughout the area and were reported immediately from many sources. The Army Engineers had vessels nearby and were among the first to arrive at the scene, together with boats from the Salem, N.J. Rescue Squad. All survivors were recovered and transported to waiting ambulances on both sides.

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of the river before the arrival of rescue and fire fighting units.

20. Testimony of witnesses from both vessels indicated that a U.S. Lines freight vessel passed the scene of the collision after the third explosion. Investigation disclosed the vessel to be the SS AMERICAN RANGER en route from Baltimore to New York via the Chesapeake and Delaware Canal under the command of [REDACTED] and with [REDACTED] of the Pilots' Association for the Bay and River Delaware at the con. The AMERICAN RANGER was in the vicinity of the Reedy Point bridge in the C. and D. Canal when explosions and fire were first observed in the Delaware River just below the canal entrance. Clearing the canal at 2332 EST the burning vessels were observed to be well to the eastward of the channel. Extra lookouts were ordered and the word was passed to prepare the starboard lifeboat for lowering. The AMERICAN RANGER proceeded cautiously down the western side of the channel, rounded to and anchored approximately 3 miles below the burning ships at 0004 where survivors could be heard in the water. On preparing to launch the starboard lifeboat the motor would not start. Several small craft arrived in the vicinity in the meantime and were directed to the survivors by the ship's searchlight. Since other craft including an Army Engineers launch were already in the vicinity, it was considered that any assistance that might be rendered by using the port lifeboat would be negligible, hence no attempt to launch this boat was made. When it appeared that no further assistance could be rendered, the AMERICAN RANGER proceeded on her voyage at 0047. The reported failure of the lifeboat motor was referred to the OCMI, New York who instituted suitable corrective action.

21. During the preliminary investigation [REDACTED], Chief Steward aboard the PHOENIX claimed his kapok life jacket failed to keep him afloat and was subpoenaed to testify in this regard. Leuthy, an elderly man of average size, claimed the life jacket appeared to be in a good clean condition and he had made certain all the tie tapes were properly secured before going over the side. While in the water the jacket continually rode up on his body until the top tie tapes caught him under the chin. When the chafing of the tapes on his throat became increasingly uncomfortable, he finally untied them. He alternately swam and floated on his back, at first without difficulty, but gradually the jacket seemed to lose buoyancy and increased effort was required to keep his head above water. He estimated he had been in the water about one hour and 45 minutes when he was forced to remove the jacket. The jacket continued to float partially submerged and Leuthy held on to it for such support as it might afford. About 15 minutes later [REDACTED] was picked up by a small craft but let the jacket drift away.

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22. While the investigation was in progress a letter from the U. S. Corps of Engineers setting forth recommendations for the improvement of life preservers was forwarded by the Commander, 3rd CG District for action by the Board. The recommendations were originally submitted by [REDACTED], master of the Corps of Engineers Dredge GOSTHAIS and were based on observations made while assisting in the rescue operations. When called to testify in this connection Capt. [REDACTED] explained that the search for survivors would have been greatly facilitated had the life preservers been equipped with small radar reflectors or lights. Based on a complaint made by a survivor of the PAN MASSACHUSETTS, Captain [REDACTED] recommended that the top tie tapes of the Model 2, adult kapok life preserver, approval number 160.002/5/0 manufactured by Atlantic-Pacific Mfg. Corporation be moved approximately six inches below their present position to prevent constriction at the throat of the wearer while waterborne.

CONCLUSIONS:

1. Based on the fact that there was no apparent movement of the two vessels after the collision even though the PAN MASSACHUSETTS reversed her engines almost immediately in an attempt to pull clear, it is considered that the collision occurred at or near the position in which the PHOENIX sank. In any case it is believed the collision occurred no less than $3/4$ of a mile south of Buoy 1N on, or slightly outside of, the eastern boundary of the channel. It is therefore concluded that the PAN MASSACHUSETTS was approximately $1 \frac{1}{4}$ miles below Buoy 1N at the time the PHOENIX entered her turn. With a combined speed of between 25 and 28 knots, at the most only three minutes remained until the moment of collision.
2. Finding no support for Pilot [REDACTED] testimony by the witnesses of either vessel the events leading up to the collision are reconstructed without reference thereto.
3. It is the opinion of the Board that the PHOENIX began her turn into the Reedy Island Range on a 20 degree right rudder from a position in mid-channel with buoy 1N abeam or nearly so. At that time one blast signals were exchanged with the upbound PAN MASSACHUSETTS which had been previously sighted. The PHOENIX was set to the eastward in her turn and as she neared the downbound course of the Reedy Island Range she found herself on the lefthand side of the channel. The PAN MASSACHUSETTS

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which had also been navigating the midchannel line, was swinging slowly on an easy right rudder as the two vessels lined up nearly head and head in the eastern half of the channel, each with the other slightly on the starboard bow. The PAN MASSACHUSETTS then ordered hard right rudder to get more quickly over to her own righthand side and at the same time the PHOENIX realizing her swing was slow also increased her rudder to full right. In all probability the two vessels were no more than $3/4$ of a mile apart at that moment. When the green light closed and the red light opened as a result of these maneuvers the PAN MASSACHUSETTS steadied but the PHOENIX was still lying across her bow at a slight angle. To those on the PAN MASSACHUSETTS it might have appeared that the PHOENIX would pass clear at that time, however, the PHOENIX was slow to respond to her full right rudder and it must have been obvious to those on board the PHOENIX that she was being set down on the rapidly closing PAN MASSACHUSETTS. The PHOENIX, then little more than two shiplengths away and fearing they would not clear, shifted her rudder in a frantic effort to pass starboard to starboard, sounding a two blast signal as she did so. With less than 30 seconds remaining no action on the part of either vessel could then have prevented the collision.

4. Had the PHOENIX entered the Reedy Island Range channel on her own right hand side at a moderate speed she undoubtedly would have had ample clearance to pass the upbound vessel port to port in accordance with the passing agreement and her failure in this regard is considered to be the principal cause of the collision. It is well recognized among local pilots that the ebb tide sets to the eastward in the vicinity of Buoy 1N and that extreme caution must be exercised when rounding that buoy downbound in the face of oncoming traffic in order to remain to the right of the center line upon entering the Reedy Island Range channel. It has therefore become a customary practice for lightly loaded downbound vessels to leave buoy 1N to port and pass through anchorage No. 3 on what was formerly the Finn's Point Range, whenever conditions permit. In this instance, combining the initial error of the PHOENIX with the normal turning radius of a vessel proceeding at 16 knots, the effect of the tide on the starboard bow, the wind - however slight - also on the starboard bow, the shallow draft forward, the normal delay in answering the helm and the transfer normally expected, there is little wonder that difficulty was experienced in attempting to return to the righthand side of the channel. In any case, the result of these factors should have become increasingly apparent to those on board the PHOENIX as she was set to the eastward and across the bow of the PAN MASSACHUSETTS. At that point it should have been evident to the PHOENIX that the two vessels could not pass safely port to port by her efforts alone and since she was in the better position to fully appreciate the closing speed and her own slow rate of turn, the

gravity of the developing situation should have dictated an immediate reduction of speed and a danger signal to put the PAN MASSACHUSETTS on notice. It is considered that her failure in this instance was contributory.

5. Although there is no evidence of a steering gear failure aboard the PHOENIX as alleged by the pilot, it is considered that the wheel was, in fact, stiff and had been for some time. Since the only effect of this condition was to require more effort on the part of the helmsman, in no way did it contribute to the collision.

6. The PAN MASSACHUSETTS, on the other hand, having agreed to a port to port passing made timely alteration of course to starboard to put herself in passing position and was entitled to presume that even if the PHOENIX were temporarily set to the left of her course in the turn, she would return to it as quickly as possible in accordance with the agreed upon passing, regulating her action so as to avoid danger. Upon observing the PHOENIX crowding her course, the action of the PAN MASSACHUSETTS in hauling more quickly to the right is considered reasonable and prudent under the circumstances. Had the PAN MASSACHUSETTS received any warning of the developments aboard the PHOENIX or in any way have become aware of the impending danger, avoiding action of some description would undoubtedly have been taken instinctively. In retrospect, it would appear that the PAN MASSACHUSETTS should have reduced speed in anticipation of the passing. However, had the PHOENIX returned to her intended course the speed of the PAN MASSACHUSETTS would probably have been considered normal under the circumstances. In addition, it appears that none of the witnesses aboard the PAN MASSACHUSETTS including three experienced navigators felt the slightest apprehension until the PHOENIX began to swing across the bow moments before the collision. It is therefore considered that since the PAN MASSACHUSETTS could not have known of the original fault and subsequent difficulties of the PHOENIX and in the absence of timely warning of impending danger the speed of the PAN MASSACHUSETTS in no way contributed to the collision nor was her failure in this regard considered culpable.

7. Notice was also taken of the fact that the lookout on the PAN MASSACHUSETTS was stationed on the bridge. Although this in no way contributed to the casualty it has long been recognized that, for the safety of all concerned and to meet the statutory requirements for a proper lookout, a vessel in frequented waters at night must carry the lookout on the bow where he can see and hear to best advantage.

8. Inspection of the PAN MASSACHUSETTS by the Board disclosed multiple cracks on deck and on the starboard side in way of No. 1 cargo tanks. It is considered that these cracks occurred either as a result of the initial impact or by the force of the subsequent explosions and permitted the fire to spread the length of the vessel. From the condition of the hatch covers,

pressure vacuum relief valves and ullage pipes, it is considered that the vessel was in all respects secure at the time of the collision. From the examination of the damage to the PHOENIX it was apparent that ballasting had been completed in the No. 2 cargo tanks but was still in progress in the No. 6 tanks and the No. 8 wings and in all probability those tanks were open at the time of impact.

9. The testimony concerning the disconnected davit crank on the No. 4 lifeboat of the PAN MASSACHUSETTS disclosed that the First Assistant Engineer [redacted] was responsible for its removal. [redacted] testified that at about 1500 on 5 June the Chief Pumpman [redacted] while servicing the lifeboat davits reported the crank to the after davit on No. 4 boat to be in poor condition. Upon examination, [redacted] discovered the adapter shell which connects the crank to the worm gear to be badly corroded (See Exhibit No. 29). Without advising anyone he removed the old adapter to use as a pattern. After cutting a new one and bending it to shape he marked the positions of the necessary bolt holes and turned the job back to [redacted] for completion. [redacted] claimed he fully expected [redacted] to finish the installation before 1700 and receiving no report to the contrary, assumed it was done. [redacted] on the other hand, did not complete the job and having received no orders to the contrary secured at the regular time. The davit in question was identified as: Mechanical Davit, Stewart Type, Size 3A-8-6, Manufactured by C. C. Galbraith and Son, approval number 160.032/6/0. Examination of the davit after the casualty disclosed that further repairs consisting of an additional bolt through the adapter shell rendered it impossible to turn the crank handle to the stowed position. Recognizing that [redacted] actions, while misguided, were intended to be in the best interests of the vessel, the effect of making unauthorized repairs was forcibly brought home to him and under the circumstances no further action was deemed necessary.

10. Acting on the testimony of the Chief Steward aboard the PHOENIX, four life preservers were recovered from survivors of the vessel and were forwarded to the Commander 3rd CG District for testing. All four were Model 2, Adult Kapok Life Preservers, approval number 160.002/22/0, manufactured by Seaway Manufacturing Co., Inc. The report of the examination stated that all four life preservers were submerged in water for 48 hours and then subjected to the individual buoyancy tests as outlined in Sub Chapter Q Subpart 160.002-B (B). The report showed the buoyancy of the tested life preservers to be far in excess of that required by regulation. An examination of these life preservers, however, revealed that the kapok pad inserts do not conform strictly with the applicable specification particularly as to the distribution of the kapok in the lower and upper sections. This matter will be made the subject of a separate report to Headquarters by the Commander, 3rd Coast Guard District.

11. In addition to the tests mentioned above the Board experimented with the four adult life jackets recovered to verify the complaint that the top tie tapes were placed too high. Personnel of varying builds and lightly dressed donned the jackets and in every case the top tie tapes engaged the wearer under the chin. While there was no possibility of choking, it was apparent that the upward pressure of the jacket in the water would be extremely uncomfortable. When the top tie tapes were opened, it was noted that the jacket could be pulled well up on the body before the jacket supported the wearer under the arms. In view of this, it would appear that if the life jacket were not too snugly secured about the body of the wearer he would be likely to slip down inside the jacket until the bulk of his weight would in effect be supported by his chin on the top tie tapes. Upon opening the top tie tapes he would then continue to slip down until the bottom of the arm holes engaged him under the arms. In this connection the Board is of the belief that this is what probably occurred in the case of [REDACTED], the chief steward aboard the PHOENIX, with the result that he thought his life jacket was losing buoyancy.

12. A review of the specifications for kapok life preservers discloses no provision for the exact positioning of the top tie tapes nor do the approval prints for the manufacture of these life preservers by the Atlantic and Pacific Manufacturing Corporation specify the position of these tapes. It therefore appears that the manufacturer has arbitrarily fastened the top tie tape at the terminal ends of the reinforcing tape at the neck.

13. Based on the extensive tests already conducted by HQ Merchant Marine Technical Division with regard to radar reflectors and lights on life preservers, the recommendations made by the U.S. Corps of Engineers in this connection are referred to HQ without comment.

14. Although there were only isolated references in the record, the Board took notice of the valuable services rendered by the Army Engineers, the State and local authorities in both New Jersey and Delaware, the City of Philadelphia, U.S. Navy, various disaster relief organizations, the hospitals in the area, commercial organizations and numerous private citizens. Had it not been for the timely response and concerted efforts of all these organizations and individuals the loss of life and damage to property resulting from this casualty would conceivably have been far greater.

RECOMMENDATIONS:

Based on the foregoing facts and conclusions adduced therefrom, the Board makes the following recommendations:

1. That Pilot [REDACTED] be charged with negligence for failing to navigate his vessel in a narrow channel so as to keep to his own right hand side of that channel approaching a vessel in a meeting situation.
2. That Pilot [REDACTED] be charged with negligence for failing to exercise reasonable care to effect an agreed-upon port to port passing with a meeting vessel.
3. That Pilot [REDACTED] be charged with negligence for failing to sound the danger signal when it became doubtful that the previously agreed upon port to port passing could be safely effected.
4. That additional tests be conducted by HQ Merchant Marine Technical Division on all models of kapok and fiber glass life preservers, preferably in the water, to determine the proper position for the top tie tapes and to determine whether or not modification of design is indicated to prevent jackets of this type from riding up on the wearer's body while in the water.

(signed) [REDACTED]
L. H. SHACKELFORD
Captain, U. S. Coast Guard

(signed) [REDACTED]
R. F. EDWARDS
Commander, U. S. Coast Guard

(signed) [REDACTED]
J. H. HAWLEY
Lieutenant Commander, U. S. Coast Guard

At 4:30 p.m. the Board adjourned to await the action of the Convening Authority.

(signed) [REDACTED]
L. H. SHACKELFORD
Captain, U. S. Coast Guard
Chairman

(signed) [REDACTED]
J. H. HAWLEY
Lieutenant Commander, U. S. Coast Guard
Member and Recorder