DEPARTMENT OF TRANSPORTATION

COAST GUARD

MARINE CASUALTY REPORT

GROUNDING OF THE SS HILLYER BROWN AT COLD BAY, ALASKA ON 7 MARCH 1973 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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Abstract

On the evening of March 7, 1973, the SS HILLYER BROWN grounded while maneuvering toward the channel entrance for passage out of Cold Bay, Alaska. The vessel's bottom was breached in the grounding, and the resulting outflow of diesel oil and gasoline was declared a major polluting incident.

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 action taken by the Commandant, U.S. Coast Guard.

The National Transportation Safety Board determines that the probable cause of the grounding was (1) the pilot's failure to use effectively available aids to navigation; (2) the master's failure to monitor adequately the vessel's movements; and (3) the master's and pilot's lack of awareness that the radar-reflecting channel marking buoy was missing from its charted position. Contributing to the pollution of Cold Bay was the HILLYER BROWN's lack of a double bottom structure or other provisions to either prevent or control the outflow of cargo after the bottom was breached.

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NATIONAL TRANSPORTATION SAFETY BOARD
DEPARTMENT OF TRANSPORTATION
WASHINGTON, D.C. 20591

SS HILLYER BROWN
COLD BAY, ALASKA
7 MARCH 1973

ACTION BY THE NATIONAL TRANSPORTATION SAFETY BOARD

This casualty was investigated by a U.S. Coast Guard Marine Board of Investigation which convened at Anchorage, Alaska, on March 27, 1973. 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.

SYNOPSIS

On the evening of March 7, 1973, the SS HILLYER BROWN had completed off-loading of the consigned cargo of diesel oil and jet fuel and was proceeding across Cold Bay entrance channel. Captain Hiller, the vessel's master, had not recently been in Cold Bay and was relying entirely upon the pilot who had boarded the vessel over 30 hours earlier to navigate the vessel into and out of Cold Bay. With nighttime visibility estimated at 7 miles the pilot was using his radar presentation and his observations of lighted aids to navigation to maneuver the vessel for passage into the entrance channel. He was obtaining satisfactory helm response to his orders. Without any warning from the pilot and bridge watch that the vessel was standing into danger, the HILLYER BROWN grounded in a region of reeflike rocks east of the channel entrance. The grounding caused a breach in the vessel's bottom which ran nearly parallel to, and close to, the center vertical keel for most of the ship's length. The resulting outflow of diesel oil and gasoline constituted a major polluting incident.

The National Transportation Safety Board determines that the probable cause of the grounding of the SS HILLYER BROWN was: (1) The pilot's failure to use effectively available aids to navigation; (2) the master's failure to monitor adequately the vessel's movements in order to insure that the vessel was not in danger; and (3) the master's and the pilot's lack of awareness that the radar-reflecting, channel-marking buoy was missing from its charted position.

Contributing to the lack of awareness regarding the missing buoy were: (1) the Coast Guard's inadequate broadcast policy which does not require continuance of regular safety broadcasts so long as a navigation discrepancy exists; and (2) the Coast Guard's delay in issuing a written local notice to mariners regarding the missing buoy; and (3) the lack of a comprehensive method of monitoring safety broadcasts by the Alaska Marine Pilotage Corporation.

Contributing to the pollution of Cold Bay was the HILLYER BROWN's lack of a double-bottom structure or other provisions either to prevent or control the outflow of cargo after the bottom was breached.

ANALYSIS

This analysis is to be read in conjunction with the facts reported in the Marine Board investigative report except for the additional information identified in the Analysis section of this report.

The Grounding

The Board computed the probable track of the SS HILLYER BROWN during the final turning maneuver before the vessel grounded so that the actions of the pilot and master could be evaluated with regard to navigating the vessel and so that the significance of other causal factors could be determined. Because of the crew's inability to recount accurately pertinent events, the lack of suitable automatically recorded data, and the degree of compression of the time scale on the ship's course recorder, there was not sufficient information to determine precisely the vessel's track and the location of the grounding. Deficiencies regarding such pertinent accident information are discussed and appropriate recommendations are made in the Marine Casualty Report on

the SS AFRICAN NEPTUNE. 1/

In order to assess accurately the underlying causes of this grounding, the Board used additional information, not provided in the Findings of Fact, but contained in the evidence gathered by the Marine Board or otherwise substantiated, to estimate the vessel's probable track immediately before grounding:

-- From the starboard position inside the bridge, the mate observed the ship's mast cross Kaslokan Pt. Light, which then disappeared and reappeared just before the grounding. The Findings of Fact do not accurately relate the testimony in this matter. This information, together with an estimate of the ship's drift angle, aided in computing the ship's track.

-- The correct sequence of helm orders was: An initial 5° right-rudder order followed about 1 minute later by an order to increase right rudder to 15°, and then about 2 minutes later, an order to ease to 10° right rudder.

-- The crack and subsequent damage described on the general arrangement drawing of the HILLYER BROWN (exhibit E-2) were examined. The examination revealed an indentation in the starboard bow, several localized upsets of bottom plating, and two separate cracks. Both cracks generally paralleled the center vertical keel (CVK) for its entire length. The forward crack was a few feet to the starboard side of the CVK, began about 67 feet from the bow, and continued aft for about 97 feet. Another crack, on the port side, began about 146 feet from the bow and terminated in the forward section of center tank No. 9, about 212 feet from its origin. Although the sketch shows that the second crack has a 6-foot interruption about 80 feet from its origin as it passes between center tank No. 4 and the midship pumproom, the location of the interruption and the common direction in which both crack segments ran indicated that both segments were caused by the same grounding obstruction.

1/ SS AFRICAN NEPTUNE: Collision with the Sidney Lanier Bridge at Brunswick, Georgia, on 7 Nov. 1972 with Loss of Life, Marine Casualty Report No. USCG/NTSB-MAR-74-4, 22 July 1974.

-- Kaslokan Point Light is not obscured by its design, but is obscured by a hillside at Kelp Point. The obscuring boundary is erroneously shown on National Ocean Survey (NOS) Chart No. 8703, which indicates that the light obscures about 8° farther to the west in its northern sector than where it actually does obscure; the Coast Guard did not recognize this incorrect information in its report.

Considering that the HILLYER BROWN was down 2 feet by the stern and that the crack running farthest aft terminated within center tank No. 9, the vessel must have stopped within its own length and probably within a distance equal to the longest (portside) crack length. Also because of the vessel's trim, the portside crack was probably caused by the first significant grounding contact. A later grounding contact probably initiated the starboard crack after the portside crack had progressed about 115 feet (212 feet minus 97 feet); because it is shorter, the starboard side crack could not have been initiated before the portside crack. The bow indentation and localized area of bottom damage occurred either as the vessel stopped, or as it sheared off the grounding obstacles which caused the damage, since their localized extent indicates that the vessel did not move far while in contact with them.

The HILLYER BROWN decelerated from slightly less than its reported 14.6 kn. to a stop in about 212 feet. The deceleration forces probably increased as the starborad side crack and localized areas of damage developed. If the bow indentation and other damage had occurred earlier in the grounding, they would not have contributed significantly to the vessel's deceleration because of their short duration of contact. Based on this information, the vessel's forward motion is estimated to have been stopped within 14 to 20 seconds after the portside crack began; the difference in estimated time corresponds to probable extremes in deceleration rates.

The force created by the initial deformation and rupture of the bottom plating on the portside generated a turning moment in opposition to the moment of the rudder force. For most of the crack's progress, it moved the instantaneous center of rotation of the vessel farther aft and effectively increased the rotational moment of inertia. Both of these effects acted to reduce the vessel's turn to starboard. Since considerably

less energy would be required to check the turning motion of the vessel than would be required to check its forward motion, the HILLYER BROWN probably stopped rotating within 20 seconds after the starboard crack began.

Because of its significance in computing the vessel's track, the Board read the trace of the ship's course recording for the entire turning maneuver with a precision X-Y reader. The heading-time data were then replotted on a larger time scale so that reported events could be correlated with the vessel's movement. (See Figure 1.) The variation of angular turning rates determined from the slopes of the heading time curve correlate reasonably well with the sequence of helm orders. Considering that the vessel's turning was checked within 20 seconds, the grounding must have started after the vessel's heading had reached 250° T.

The Coast Guard, in its Findings of Fact, stated that the bottom was first contacted between 220° T. and 226° T. Figure 1 does not show a significant change in curvature near 220° T., but it does show a slight change which is consistent with the helm order to ease to 10° right rudder. Further, Figure 1 indicates that the vessel continued to turn for more than 70 seconds after reaching 226° T. If the HILLYER BROWN had grounded before 226° T, it would have had to continue rotating for more than 50 seconds after its forward motion had stopped. Consequently, this was not considered a possible sequence of grounding events.

The vessel's estimated track, from the start of the turn to the grounding, was computed by summing its heading vectors during that time. The heading vectors were determined by vessel speed, gyro heading, likely speed reduction in turn, and drift angle. Additional tracks were computed to assess the magnitude of error which was introduced by uncertainties in drift angle, speed reduction in the turn, and wind and current effect for the 4-minute trace. The accumulated error over the track length was less than 500 feet and was adequate to estimate the location at which the HILLYER BROWN began to turn.

The vessel's estimated track, properly scaled, is superimposed on an 475-percent enlargement of NOS Chart No. 8703 and is shown by the solid curved line in Figure 2. The track was located on the chart so that it would be consistent with the mast crossing the light, the obscuration changes of Kaslokan Point Light, and the probable position of grounding.

In Figure 2, the HILLYER BROWN's intended course, which was determined from the pilot's testimony and from a segment of the vessel's computed track, is shown as a dashed, curved line. The incorrectly charted bearing at which Kaslokan Point Light obscures is shown as a dotted line in Figure 2, and the correct bearing is noted as a broken line with dots bearing about 194.5° T to Kaslokan Point Light.

Figure 2 shows that the HILLYER BROWN was about 0.30 nmi east of the intended track while 1.5 nmi off Kelp Point and did not initiate the turn until about 1.0 nmi off Kelp Point. The pilot stated that he expected a leeway when he did not compensate for the southwesterly wind in setting his course. However, this leeway did not preclude or seriously hinder the ability to maintain a safe passage through the channel.

Adequacy of Aids to Navigation

Numerous charted features were available to fix reliably the HILLYER BROWN's position in the vicinity of Kelp Point. These included Kaslokan Point Light and many topographical features. Lines of position determined by a visual bearing to Kaslokan Point Light and radar range measurements to Kelp Point would have provided information on the ship's position as it approached the intended location for beginning its turn, and could have been used to monitor the adequacy of the turn maneuver. Additional radar range measurements on other chartered topographical features could have been made to increase the reliability of each position fix. Thus, there were sufficient charted objects to facilitate navigation under the conditions of visibility which existed at the time of the grounding.

NOS Chart No. 8703 was the best available chart for navigation of Cold Bay. The chart's scale is 1:80,000. NOS Chart No. 8703 has been used successfully for years to navigate the Cold Bay Channel entrance. Charts of the same scale are used commonly to safely navigate waters which pose hazards similar to those which exist near the Cold Bay Channel entrance. Contrary to the Coast Guard's conclusion, the scale of the chart could not have contributed to the grounding since it was not used by the pilot or master to determine the vessel's position.

In addition to charted objects discussed above, there were three buoys which marked the channel boundaries. Navigators are cautioned generally against relying on floating aids to navigate their charted courses.

The Coast Guard's Light List publication (CG-162) states:

> "All buoys should, therefore, be regarded as warning or guides and not as infallible navigation marks, especially those located in exposed positions. Whenever possible, a ship should be navigated by bearings or angles on fixed objects on shore and by soundings, rather than by reliance on buoys."

Such caution is necessary because changing winds and currents move buoys about their anchor points, and occasional mooring failures cause buoys to drift off-station or to become lost. The unreliability of buoys as navigation aids was demonstrated by the absence of unlighted, radar-reflecting buoy No. 4, which marked shoal water on the east side of the channel entrance for outgoing traffic. The HILLYER BROWN grounded about 600 to 1,000 feet east of this buoy's charted position. Since buoy No. 4 was a designated element of the Cold Bay navigation system, its presence on the radar display should have distinctly warned the pilot and master that the HILLYER BROWN was not following the intended trackline and was actually entering dangerous waters.

Properly used, the two lighted buoys which mark the western boundary of the channel could have aided the pilot in maneuvering the HILLYER BROWN toward and through the channel. Kaslokan Point Light and other charted features were available to fix adequately the vessel's position and, thereby, verify that these buoys remained in their charted position as the vessel approached within usable range of them.

Kaslokan Point Light remained visible farther to the east than the Coast Guard Light List and NOS Chart 8703 indicated because of an error in reporting its obscuring characteristics. As a result, the HILLYER BROWN proceeded over 0.3 nmi farther toward shoal water before entering the light's obscured region than the chart indicated. Thus, the light gave less warning of imminent danger than the chart indicated.

The important determination here is whether this incorrect charting of the obscuring region contributed to the casualty. Based on the incorrectly charted obscuring region, the vessel's apparent position would be west of its actual position when the light disappeared. Considering the vessel's distance off Kelp Point, a moderate turn to starboard--commersurate with the vessel's turning response to

the 15° right rudder order--would have avoided the danger of grounding on the east side of the channel. Actually, full right rudder was necessary. However, to take appropriate evasive action, the pilot must have a thorough knowledge of the lights' obsuring characteristics. The pilot's recent limited experience indicates that he may not have been prepared to act appropriately. Therefore, the erroneous charting probably did not contribute to the grounding.

Effectiveness of Navigation

The pilot planned to initiate his turning maneuver for entering the channel when the radar variable range ring intersected Kelp Point at a range of 1.5 nmi. Proper execution of this turn depended upon the HILLYER BROWN's following a course made good of 150° T. which started 1.5 nmi off the Delta Point Light. He intended to continue turning until the 10 cm. radar showed that the vessel would pass between buoy No. 3 and Kaslokan Point Light on a course of 185° T. 2/ Inherent weaknesses in this navigation scheme were the lack of control of the east-west attitude of the turning point because of vessel leeway and reliance upon buoy No. 3 without verifying its proper location. However, the easterly leeway did not place the vessel near dangerous waters or spoil the opportunity to follow through with the intended turning maneuver which would have placed the vessel on a course of 185° T. through the channel. Initiation of the turn 1.5 nmi from Kelp Point would have allowed more than ample opportunity to evaluate the intended maneuver and compensate as necessary.

It is evident from the probable track shown in Figure 2 that the HILLYER BROWN did not start turning until more than 0.5 nmi (or 2 minutes) beyond the proposed turning point. Further, the pilot's actions until the moment of grounding, particularly the absence of any emergency orders, indicate that he was not aware that the vessel was standing into danger; the only emergency orders were given as a result of the initial grounding and were issued too late to have any effect. In fact, no one on the bridge was even aware that the HILLYER BROWN had turned beyond 185° T. before the grounding, and only the third mate saw the brief obscuring of Kaslokan Point Light. Thus, in spite of the inherent weakness in the navigation scheme, it was the pilot's failure to carry out his chosen method of navigation and the master's failure to detect

2/ Courses of both 180° T. and 185°T. were specified in the course of testimony before the Marine Board. The pilot indicated his intended course as 185°T., which the safety Board used. However, either course could have provided a safe approach to the channel.

the pilot's deviations which lead to the grounding.

There are many possible reasons why the pilot erred, why his errors were not detected, and why appropriate corrective action action was not taken. Navigation into and through the narrow channel was a high-risk operation which placed relatively high demands on the method of navigation and skills of the navigators. The licensed personnel on the bridge of the HILLYER BROWN--the master, the pilot, and the third mate--were determined by U. S. Coast Guard examination to be capable of evaluating the navigational data. It is possible that the pilot became distracted or confused, that he was not alert, or that he experienced some abberation which affected his performance. Any backup to the pilot's navigation, which the master could have provided, failed. Even the third mate, who saw the Kaslokan Point Light disappear, did not understand its significance as a warning. In view of the overall lack of concern, it is also possible that the wrong information may have been collected and evaluated through improper use of the radar (e.g., incorrect interpretation of radar image of shoreline). There is not sufficient evidence to determine conclusively the specific factors which lead to the errors in navigation. What is evident, however, is that the navigational methods employed were inadequate.

Insufficient Notice to Mariners

The radar-reflecting buoy, which marked the east side of the channel approach, buoy No. 4 had been reported off-station since February 28, 1973, and was not reset by the Coast Guard until March 11, 1973. The HILLYER BROWN grounded east of buoy No. 4 during that time. The pilot was unaware that buoy No. 4 was missing and testified that he was looking intently for the buoy before the grounding. This wasted effort took valuable time from his other navigational duties and may have caused confusion. Had the buoy remained on station, its presence on the pilot's radar display would have been an obvious warning that the vessel's movement was being hazarded. Had the pilot been aware that the buoy was missing, he probably would have navigated his approach to the channel with greater caution.

After learning that buoy No. 4 was off station, the Coast Guard made a safety broadcast regarding the condition of the buoy. The information was then repeated as a Notice to Mariners in the next regularly scheduled broadcast. However, a written Notice to Mariners

was not issued until March 6. This method of relaying safety information is not sufficiently reliable since it assumes unrealistic vigilance on the part of recipients. The HILLYER BROWN was anchored and was not maintaining watch at the time of the broadcasts. The Alaska Marine Pilotage Corporation (AMPC) did not maintain a 24-hour watch because of seasonal reductions in its workload. The limited time of the broadcasts also would permit a vessel, which was operating beyond the area of broadcast coverage, to enter the area where the discrepancy existed after the broadcast but before the discrepancy was corrected.

The Coast Guard's system of warning of failed markers was unreliable because it did not insure that information regarding discrepancies in aids to navigation would be available to those who required it for their safety while the marker was off station.

The Coast Guard suggested that AMPC institute a more comprehensive method of monitoring safety broadcasts. Their suggestion, however, does not address all of the above-mentioned system weaknesses. The Coast Guard could disseminate safety information regarding aids to navigation by regularly broadcasting until the discrepancy had been corrected. Continued broadcasting by the Coast Guard may be the most effective approach in areas, such as Cold Bay, where vessel traffic is seasonal and irregular and the buoy navigation aids are less reliable because of the more severe wind, sea, and icing conditions and the difficulty in servicing them. In addition, the pilot's organization may have too few members to monitor effectively the broadcasts. This problem including the preparation and distribution of written Notices to Mariners warrants further study by the Coast Guard.

Proposed Rules of Tank Vessels in Domestic Trade

Improvements in Vessel Navigation. The Coast Guard has published an Advance Notice of Proposed Rulemaking intended to improve the operating practice of major vessels on the navigable waters of the United States, and, thereby, prevent maritime casualties with their resultant discharge of polluting cargoes.[3/] Two proposed requirements are relevant to the circumstances of this case--one requires that vessel operators be familiar with Notice to Mariners, and the other requires that a vessel's movement be plotted.

3/ Federal Register, Vol. 39, N. 126, June 28, 1974

Under one requirement, the master, person in charge, or pilot of a vessel would be required to be familiar with the details of each Notice to Mariners which are relevant to the vessel's intended track since the date of the corrected chart being used. The Coast Guard's current procedures do not assure that such information is readily available to transient mariners while a condition warranting notification exists. The proposed requirement cannot be effective so long as it is possible for the vessel operator to enter a broadcast area after the two prescribed safety broadcasts have been made, but before the navigation deficiency has been corrected.

The other requirement requires that a plot of the vessel's movement on the corrected chart for the area being transited be maintained by competent personnel. The person maintaining the plot would be required to lay out a trackline of intended vessel movement on the chart and to plot position fixes at sufficiently frequent intervals so that vessel movement relative to the trackline is indicated. The person actually controlling the vessel movement would obtain timely information on the vessel's movement from the person maintaining the plot. If such procedures had been followed on the HILLYER BROWN, there is little doubt that the navigational errors of the pilot would have been detected in time to avert the grounding.

Effectiveness of Double Bottoms

The HILLYER BROWN grounded at low tide and the vessel floated free on the rising tide which had a range of over 7 feet. Had this vessel been equipped with a double bottom, which would have provided the generally accepted separation of 1/15 of the vessel's beam dimension, initial penetration of the cargo tanks could have been prevented in this grounding. Loss of buoyancy would have caused the ship to settle less than 1/15 the beam, i.e., less than 4 feet, and the 7-foot tide would have floated the HILLYER BROWN free. Had the vessel grounded at high tide with equivalent bottom damage, it would have remained grounded until some cargo had been offloaded. While the vessel remained stranded, vessel movements caused by tidal fluctuations, seas, and winds might have caused some cargo tanks to be breached. Despite this fact, however, less pollution would be expected if the vessel had double bottoms.

In general, double bottoms would be effective in those incidents where the grounding damage is minor. Double bottoms can reduce the cargo outflow in cases of more severe bottom damage and can be effective in stranding incidents where the cargo can be offloaded before further damage is done. The incorporation of double bottom structure would also provide for segregated ballast and safer, more effective, tank cleaning.[4/] Except for rare situations where loss of buoyancy without inner bottom damage from double construction causes the vessel to remain stranded until it breaks up, all known technical disadvantages of double bottoms can be remedied through proper design considerations.

In its official position stated in November 1974, the Coast Guard opposed mandatorily requiring that oil tankers be constructed with double bottoms because it would deny the possibility of other combinations of construction and operating standards which may provide better protection for the marine environment. This position is reflected in its rulemaking wherein the Coast Guard decided not to require double bottoms.[5/] These new Coast Guard rules will require segregated ballast for tankships of 70,000 deadweight tons (dwt) or more. In their limitations on tank size, these rules contain incentives to place at least some of the segregated ballast space in double bottoms. Many of the tankships entering U.S. ports will be smaller than 70,000 dwt and, therefore, will not be required to segregate ballast with its incentives for double bottoms. Currently most of the oil outflow from grounding incidents is caused by these smaller tankships.

According to historical data, the greatest quantity of oil outflow from grounding incidents occurs in the vicinity of ports; about 71 percent of the outflows caused by groundings occur in harbors and entrancesways. [6/] A weakness of these new rules is that they do not assure that the best technically feasible protection will be afforded

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4/ SS V.A. FOGG, Sinking in the Gulf of Mexico on 1 February 1972 with Loss of Life, Report No. USCG/NTSB- MAR-74-8, 21 Nov 1974.

5/ Federal Register, Vol. 39, No. 126, June 28, 1974.

6/ Tankers and the U.S. Energy Situation - An Economic and Environmental Analysis, J. D. Porricelli and V. F. Keith, American Society of Mechanical Engineering, Publication No. 73-ICT-106, June 1973.

for port areas where oil pollution from tanker groundings is greatest and most damaging. In port areas, operational restrictions would be expected to reduce the severity of grounding incidents and assistance can be quickly rendered to offload stranded tankers before further damage occurs. It is under such conditions that the effectiveness of double bottoms can be fully realized. Attesting to the effectiveness of double bottoms, the Commandant noted in his remarks that double bottoms would have prevented pollution in 27 out of 30 bottom casualties which the Coast Guard reviewed.

Since only a small part of the oil delivered at U.S. ports is carried on U.S. flag tankships, foreign vessels must be included for pollution control measures to be effective. IMCO has strongly rejected mandatory requirements for double bottoms on a worldwide basis because of their added costs and uncertainties regarding their effectiveness for universal applications. Unilateral action to require double bottoms on all tankers entering U.S. ports would not be in the best interest of the United States at this time, and IMCO is unlikely to alter its position to require double bottoms for only those tankships entering U.S. ports.

Because of the frequency and damaging effects of polluting outflows from tankships groundings in port areas, additional controls should be placed on the movement of tankships without double bottoms. For grounding incidents while operating in port areas, these controls should insure that the risk of oil outflow from tankships without double bottoms is commensurate with tankships outfitted with double bottoms. Such controls would include requiring towing vessel assistance, restricting speed to limit grounding damage, restricting vessel movements to times of good visibility, and requiring on-board carriage of spill control and containment equipment by either the tanker or assisting vessels. The Coast Guard currently has authority under 46 USC 391a to adopt and enforce such measures.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the grounding of the SS HILLYER BROWN was: (1) the pilot's failure to use effectively available aids to navigation; (2) the master's failure to monitor adequately the vessel's movements in order to insure that the vessel was not in danger; and (3) the master's and pilot's lack of awareness that the radar-reflecting, channel-marking buoy was missing from its charted position.

Contributing to the lack of awareness regarding the missing buoy were: (1) the Coast Guard's inadequate broadcast policy which does not require continuance of regular safety broadcasts so long as a navigation discrepancy exists; and (2) the Coast Guard's delay in issuing a written local notice to mariners regarding the missing buoy; and (3) the lack of a comprehensive mothod of monitoring safety broadcasts by the Alaska Marine Pilotage Corporation.

Contributing to the pollution of Cold Bay was the HILLYER BROWN's lack of a double bottom structure or other provisions to either prevent or control the outflow of cargo after the bottom was breached.

RECOMMENDATIONS

The National Transportation Safety Board reiterates one of its recent recommendations and part of another made in the Marine Casualty Report on the collision of the SS AFRICAN NEPTUNE with the Sidney Lanier Bridge:

> "The Coast Guard require that every master of an ocean-going vessel inform himself of the pilot's plan to maneuver his ship in or out of a harbor and that the master determine, with the pilot's assistance, the critical aspects of the maneuver, including the pilot's plan for emergencies. The master should then be required to instruct his crew to insure that high-risk task receive priority. (Recommendation No. M-74-15.)"

> "The Maritime Administration, in developing an advance 'integrated conning system:'

> > "b. Provide an expanded scale on the course recorder for use during in-port maneuvering. (Recommendation No. M-74-18.)"

This casualty further demonstrates the need to implement these recommendations.

The Commandant in his response to the Marine Board's recommendation regarding double bottom tanks does not assure that the best available pollution protection will be provided for U.S. waters. The Safety Board, therefore, recommends that:

1. The U.S. Coast Guard require additional control of the movement of tankships without double bottoms to insure that their risk of a polluting outflow from grounding while operating in a port area is commensurate with that of tankers outfitted with double bottoms. (Recommendation No. M-75-1)

The Safety Board considers appropriate the Marine Board's recommendation that the Alaska Marine Pilotage Corporation consider instituting a more comprehensive method of monitoring safety broadcasts, but insufficient to assure that pilots will be aware of the status of aids to navigation. To assure better dissemination of safety information to pilots, the Safety Board recommends that:

2. The U.S. Coast Guard implement measures to improve the dissemination of safety information to the navigators of vessels, including continued broadcasting of the safety information until the hazard is eliminated. (Recommendation No. 75-2)

The Safety Board concurs in the Coast Guard's proposed rulemaking intended to improve operating practices aboard all major vessels on navigable waters and, in particular, the proposed rule which would require that the intended tracklines and position fixes be plotted by competent personnel.

3. In support of this measure, the Safety Board recommends adoption of the proposed regulations to prevent maritime casualties. (Recommendation No. M-75-3)

4. The U.S. Coast Guard and the National Oceanographic and Atmospheric Administration's National Ocean Survey insure that action has been initiated to correct the description of Kaslokan Point Light both in the Coast Guard Light List and on NOS Chart 8703. (Recommendation No. M-75-4)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

Adopted this 15th day of January 1975:

[redacted]
[redacted] Chairman

[redacted]
Member

[redacted]
Member

[redacted]
Member

[redacted]
Member

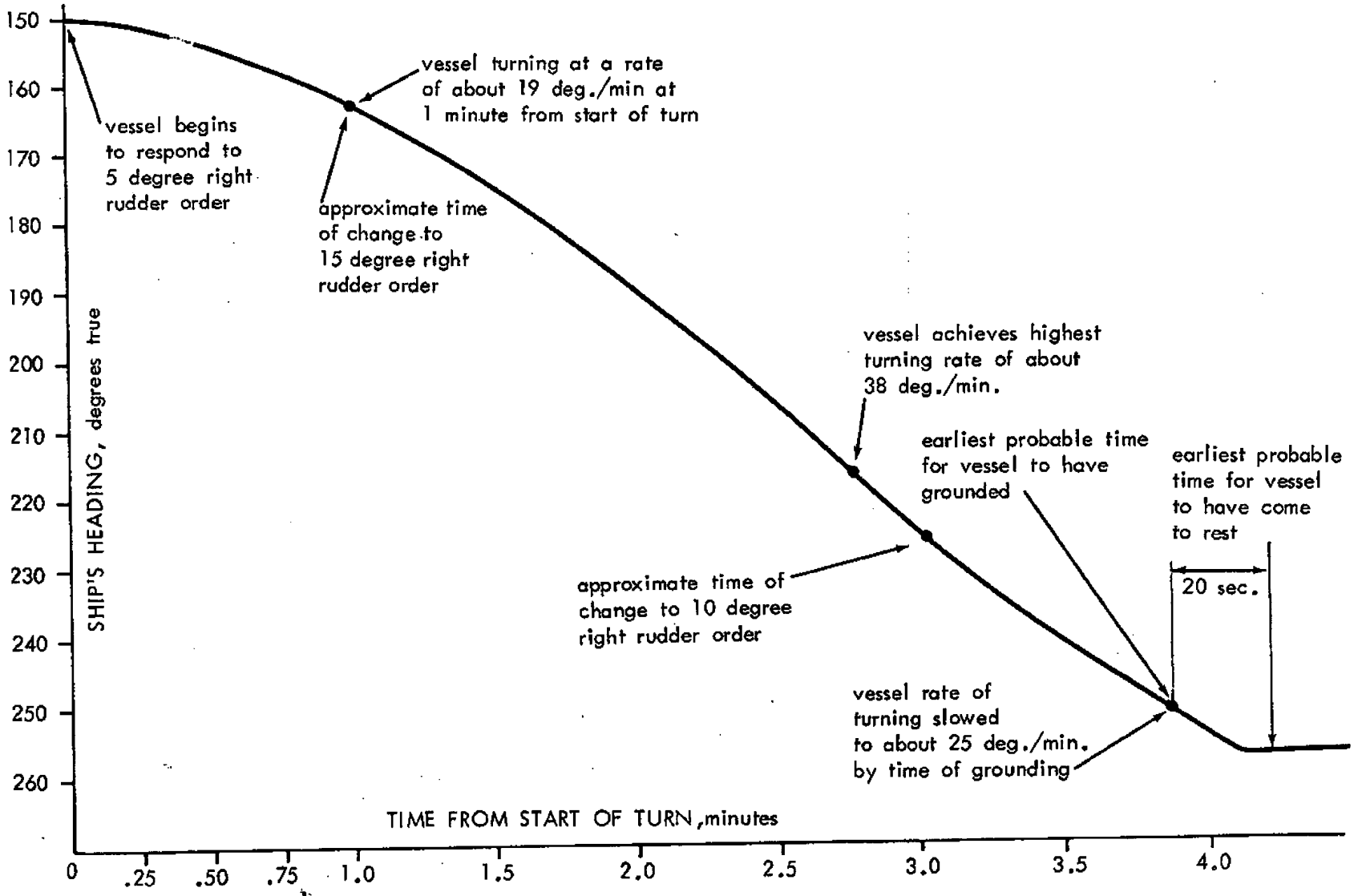


Figure 1. PLOT OF DATA FROM EXPANDED (30 Xs) READOUT OF HILLYER BROWN COURSE RECORDER.

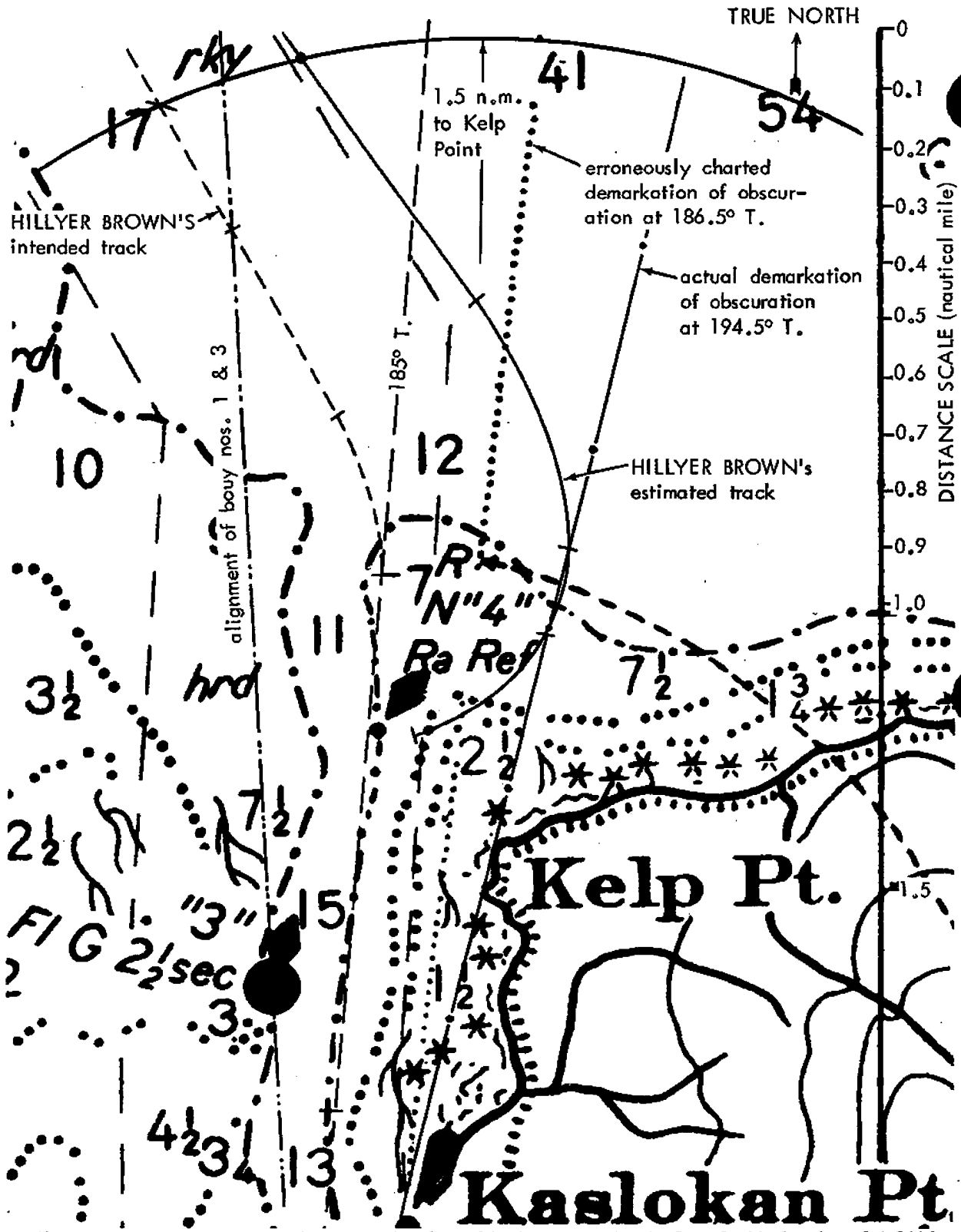


Figure 2. PLOTS OF HILLYER BROWN'S INTENDED AND ESTIMATED TRACKS SUPERIMPOSED ON ENLARGEMENT OF NOS CHART 8703

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-MVI-3/83)
400 SEVENTH STREET S.W.
WASHINGTON, D.C. 20590
PHONE:

5943/HILLYER BROWN
C-17 Bd
21 FEB 1974

Commandant's Action

on

The Marine Board of Investigation convened to investigate circumstances surrounding the grounding of the SS HILLYER BROWN at Cold Bay, Alaska on 7 March 1973 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 faulty navigation of the vessel.

2. The conclusion relative to double bottom tanks is considered valid. A separate study being conducted by the Merchant Marine Technical Division at Coast Guard Headquarters concludes that in 30 tanker bottom casualties in the past four and a half years, no oil pollution would have occurred in 27 cases (including HILLYER BROWN) if a double bottom had been installed. This study is continuing at this time.

ACTION CONCERNING THE RECOMMENDATIONS

1. Recommendation: That, the Commander, Seventeenth Coast Guard District consider restricting tank vessels from entering or leaving Cold Bay, Alaska during the period from sunset to sunrise.

Action: The Commandant does not concur with this recommendation. The existing aids to navigation are adequate for navigating the Cold Bay Entrance

Channel at night as well as during daylight hours. Daylight transit does not necessarily assure safety. Low visibility in this region occurs randomly night or day and transit in darkness with good visibility is greatly to be preferred over one in daylight with poor visibility. In addition, weather conditions in this area are violent and changeable. In the instant case it was a clear dark night, the sunset occurring at 1731 local time. To restrict operations in Alaskan ports to daylight hours could in some months of the year limit access to approximately 7 hours a day. This would be particularly true during the most inclement periods, the long winter. (mid September thru mid March) Denial of transit during a period when it could otherwise be safely made could require a vessel to remain outside when it needs shelter, or possibly force a vessel to proceed outbound into very adverse weather in order to avoid waiting through a restricted period. Prudent seamanship should be the guiding factor in navigating Cold Bay Entrance Channel during any period of adverse conditions.

2. Recommendation: That a copy of this report be forwarded to the Alaska Marine Pilotage Corporation for their consideration of conclusion 6 herein. (Conclusion 6 states: That, the relatively isolated and widespread geographic area serviced by the pilots of the Alaska Marine Pilotage Corporation suggests that this organization needs to institute a more comprehensive method of monitoring Safety Broadcast in order that pilots will be aware of the status of Aids to Navigation and other matters that affect the safety of marine navigation.)

Action. The Commandant concurs with this recommendation and a complete copy of the Marine Board Report, the Commandant's Action and the final determination of cause by the National Transportation Safety Board will be forwarded when this report is released.

3. Recommendation: That, the Commandant, U. S. Coast Guard, consider requiring that all tank vessel transiting the navigable waters of the United States be provided with double bottom tanks under all cargo tanks and contiguous pumprooms.

Action: The recommendation to consider requiring double bottoms on tank vessel transiting the U. S. navigable waters has already received considerable attention. An Advance Notice of Proposed Rulemaking published 26 January 1973 requested public comment on the concepts of constructing segregated ballast tankers incorporating the double bottom features. Double bottoms were proposed as a possible design feature because separation by barrier and/or space are physically correct strategies for reducing the significance of casualties.

Heavy response to the proposal and subsequent rejection of the concept at the 1973 International Conference for the Prevention of Pollution from Ships has caused the Coast Guard to reevaluate the proposal. A key question is whether double bottoms for new tankers would be the most effective of possible

alternatives toward achieving an overall reduction in outflows for existing and new tankers? Certain of these alternatives are improved ship and shore aids to navigation, imposition of traffic management schemes, improved personnel training and improved maneuvering ability of the ships.

While some of these alternatives may not be appropriate for a small isolated port such as Cold Bay, other alternatives are particularly apropos. The implementation of all or some of these alternatives for all vessels plying U. S. waters, both new and the large existing fleet, can be expected to yield dividends with respect to reduction of accidental oil pollution. Furthermore, they can be imposed in a shorter time frame than double bottom construction features.

The Coast Guard will be monitoring the effectiveness of the provisions of the new pollution convention. We will be invoking additional operating controls on oil tankers appropriate to the ports and waterways served. The double bottom remains a feature to be reviewed should there be, in the future, sufficient reason.

4. Recommendation: That, further investigation, under the provisions of R.S. 4450, be conducted into the actions of Captain [redacted], License No. [redacted] arising from his service as Master of the SS HILLYER BROWN on 7 March 1973.

Action: The Commandant concurs with this recommendation. Charges were issued after investigation under R.S. 4450 and Captain [redacted] was charged with negligence as a result of the grounding of the SS HILLYER BROWN. The charges were dismissed on 2 August 1973 by an Administrative Law Judge in San Francisco, California.

5. Recommendation: That, further investigation under the provisions of R.S. 4450, be conducted into the actions of Captain William A. Tingley, License No. 391549 arising out of his service as Pilot of the SS HILLYER BROWN on 7 March 1973.

Action: The Commandant concurs with this recommendation. Charges were issued after investigation under R.S. 4450 and Captain Tingley was charged with negligence as a result of the grounding of the SS HILLYER BROWN. The charges resulted in the suspension of Captain Tingley's license for three months on nine months' probation from 15 June 1973, by an Administrative Law Judge at proceedings in Anchorage, Alaska.

6. Recommendation: That, further investigation under the administrative penalty proceedings be conducted by Commander, Seventeenth Coast Guard District regarding the possible violation of the Federal Water Pollution Control Act of 1970, as amended.

Action: The Commandant concurs with this recommendation. An investigation has been completed under the administrative penalty proceedings. Standard Oil Company of California was assessed a penalty of $5000.00 and has made payment on 5 September 1973 of the full amount.

[redacted]

C. R. BENDER
Admiral, U. S. Coast Guard
Commandant

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:

5943/Marine Board
21 August 1973

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

Subj: Marine Board of Investigation; SS HILLYER BROWN, O.N. 266233; Grounding at Cold Bay, Alaska on 7 March 1973

FINDINGS OF FACT

1. At approximately 2120 Alaska Standard Time (AST) on 7 March 1973 the Tankship SS HILLYER BROWN O.N. 266233 grounded in Cold Bay, Alaska. The grounding took place near a geographic location known as Kelp Point (approximate position 55° 07.3'N 162° 31.3'W) while the vessel was outbound from Cold Bay. During this outbound transit the vessel was being piloted by an Alaska State Pilot, under authority of a Federal License, and was under the overall navigational control of its duly licensed master. As a result of underwater damage sustained incidental to the grounding, approximately 4,700 barrels of petroleum products were spilled into the Navigable Waters of the United States. There were no deaths or injuries reported to be a result of the grounding.

2. Vessel Data:

NAME:	HILLYER BROWN
O.N.:	266233
CLASS:	Tankship
G.T.:	10,648
N.T.:	6,213
LENGTH:	505.5'
BREADTH:	62.2'
DEPTH:	40.3'
YR. BUILT:	1953
PROPULSION:	Steam Screw
H.P.:	7,000
HOME PORT:	San Francisco, California, 94104
DRAFT:	20' 07" Forward, 22' 07" Aft
OWNER:	Standard Oil Company of California 225 Bush Street San Francisco, California, 94104
OPERATOR:	Chevron Shipping Company 555 Market Street San Francisco, California, 94120

MASTER:	[redacted] (Z-255566) License #[redacted]: Master, Oceans, Steam and Motor Vessels of any Gross Tons; First Class Pilot on San Francisco Bay, San Pedro and Los Angeles Harbor, Columbia River between Astoria, Oregon and sea, Puget Sound between Angeles Point and Seattle via main ship channel including the ports of Port Angeles, Port Townsend, Edmonds, Port Wells and Seattle; First Class Pilot on Cook Inlet, Alaska from the sea to port of Nikisl and Anchorage. Endorsed as Radar Observer.
PILOT:	William A. Tingley (Z-912782) License #[redacted]: Master, Oceans, Steam and Motor Vessels of any Gross Tons; First Class Pilot on Puget Sound and adjacent inland waters excluding Lake Washington and Lake Washington Canal, Waters of Southeastern and Southwestern Alaska, San Francisco Bay between the Brothers and San Francisco-Oakland Bay Bridge to sea excluding Richmond Inner Harbor. Endorsed as Radar Observer.
LAST INSPECTION:	Biennial - San Francisco, California
DATE:	14 July 1972
CARGO:	Grade "A", Grade "E" Deep Tanks
CAPACITY:	138,763 bbls

The vessel contains nine (9) main cargo tanks further divided into twenty three (23) compartments by longitudinal bulkheads. Main cargo tank #1 (foredeeps) consists of a port and starboard tank. Main cargo tanks #2 through #4 and #6 through #9 are separated into port, starboard and center tanks. Main cargo tank #5 is separated into a port tank and starboard tank with a pumproom utilizing the space that would normally be devoted to cargo as the center tank.

3. The weather conditions at the time of the grounding were generally fair with visibility estimated at seven (7) miles and marred only by a partially overcast sky. There was a slight southerly sea of not more than three (3) feet and southerly winds of twenty (20) to twenty five (25) knots with slightly higher gusts. The tide was just at the turn with a low tide predicted, on the reference and subordinate stations of Kodiak Island and Lenard Harbor respectively, at 2117 Alaska Standard Time (AST) on 7 March 1973. There was no reported current which is consistent with the Cold Bay configuration and state of the tide. The published range of the next tide (flood) was slightly over seven (7) feet.

4. a. The principal navigational equipment being utilized during the vessel's outbound transit from Cold Bay were its gyrocompass (no reported error) and two installed radars which are described below.

(1) A three (3) centimeter Decca Model 202 Radar is located on the port side of the wheelhouse. It was being used by the vessel's master as an aid in checking the navigational progress of the ship's pilot.

(2) A ten (10) centimeter Raytheon Mariner's Pathfinder Model 1402 A-S Radar is also installed on the port side of the wheelhouse. This unit was being utilized during the outbound transit by the pilot on the four (4) mile scale. Specifications for this radar indicate that range resolution on the four (4) mile scale is fifty (50) yards and bearing resolution is one and one half degrees (1.5°). Range and bearing resolution is the minimum distance objects on the same bearing or range respectively must be separated to appear as separate targets on the scope.

b. An installed fathometer was not in operation during the outbound transit.

5. The Cold Bay Aids to Navigation System consists of Cold Bay Channel Lighted Buoy #1 (LL 3509), Cold Bay Channel Lighted Buoy #3 (LL 3511), Cold Bay Channel Buoy #4 (LLPG 264), Kaslokan Point Light (LL 3510) and Delta Point Light (LL 3513). The channel into Cold Bay is oriented in a nearly due north-south direction and is bounded by the ten fathom curve on both the east and west sides. Lighted Buoys #1 and 3 mark the western extremity while Channel Buoy #4 and Kaslokan Point Light normally mark the eastern extremity of the channel. However, at the time of the grounding in question Buoy #4 was lying on the beach approximately 500 yards east of its charted position at the high tide line. The buoy remained on the beach until 11 March when it was reset on its charted position. Kaslokan Point Light has an obscure sector from 186 1/2°T to 336°T and is located approximately 1800 yards south of the charted position of the missing buoy. The channel, as marked, nominally varies between 200 and 300 yards in width. A geographical presentation of the area, as depicted by Coast & Geodetic Survey Chart 8703, is appended hereto as Appendix 1. Soundings indicated thereon are in fathoms.

6. The SS HILLYER BROWN course recorder recording from 2053 AST on 7 March (all dates hereinafter shall assume the year 1973 unless differently specified) through 2130 AST the same date provides a near flawless presentation of the vessel's course. The outstanding quality of the trace is displayed in both the quadrant and the ship's heading sections of the graph. The recording was verified in both time and course at approximately 2000 AST on 7 March and thus, with the brief interval under consideration of approximately one and a half hours, the time as recorded on the recorder is assumed to be the same as the ship's time. Therefore, based on this assumption all times referred to hereinafter from 2030 AST through 2400 AST on 7 March are recorder times.

7. The ship's heading trace reflects a gradually starting turn to the right originating at 2116 AST on 7 March. This time/heading slope remains

uniform until some time before 2117 AST at which time the vessel has reached a heading of about 166°T. By minute 2118 AST the heading trace clearly reflects that the vessel has attained a heading of 195°T and the time/heading slope has radically changed from a readily apparent slope to a less discernible one. This slope change clearly reflects a significant increase in the rate of swing of the vessel. The quadrant tracing conclusively supports this heading change and reveals a smooth transition from the 90-180 quadrant to the 180-270 quadrant. At slightly after minute 2119 AST an obvious discontinuity appears in both the quadrant and heading tracings. The heading discontinuity starts to manifest itself at approximately 220°T and by 226°T it is easily recognizable. As the heading trace reaches 230°T the time/heading slope becomes barely discernible when almost the entire trace falls on the 2120 recording time line. At shortly after 2120 AST the tracing indicates that the vessel has reached its most westerly heading of approximately 257.6°T where it then swings back to 257°T and remains on that general heading until it began to drift free at approximately 0053 AST on 8 March.

8. The HILLYER BROWN arrived at the Cold Bay Channel Entrance during the early morning hours of 7 March. At approximately 0735 AST the HILLYER BROWN passed Cold Bay Channel Buoy #3 close aboard the port hand side as the vessel made its entrance into Cold Bay. The visibility at this time was very poor and the absence of Cold Bay Channel Buoy #4 was not noted. Lighted Buoys #1 and 3 were both visible to the naked eye and were similarly observed on radar. No significance was attached to the fact that #4 Buoy was not sighted because of its relatively insignificant part in a northerly transit into the bay. The HILLYER BROWN continued on into Cold Bay where it was forced to anchor because of heavy winds that precluded a safe discharge of cargo at the dock. At sometime after 1018 AST the winds had abated sufficiently to permit the HILLYER BROWN to weigh anchor and proceed on to the dock. With the consigned cargo of #15 diesel oil and bonded jet fuel offloaded at 2018 AST, the vessel made preparation for its departure from Cold Bay. Twelve minutes later, 2030 AST, the HILLYER BROWN's last line was cast off from the dock and the vessel began its outbound transit. For approximately the next twenty three minutes the vessel was maneuvered on various courses until it reached a position abeam of Delta Point Light at a distance of about one and a half miles. The time of this beam bearing was not recorded. At approximately 2053 AST the vessel was steadied up on a 150°T course and its engines were turning up eighty (80) revolutions per minute which corresponded to fourteen point six six (14.66) knots.

9. At the time the vessel settled down on its 150°T course there were five persons on the bridge. The vessel's Master, Captain [redacted], was principally occupied with observing the three (3) centimeter Decca Radar. The last time Captain [redacted] was in Cold Bay was 1954 and because of his unfamiliarity with the area he considered the Pilot to be in navigational control of the vessel. The Pilot, Captain Tingley, was similarly disposed at the vessel's ten (10) centimeter Ratheon Radar and was exercising navigational control of the ship. Although Captain Tingley described a record

of eleven (11) round trips into and out of Cold Bay that started five (5) years before the 7 March transit, he was not in the Cold Bay area for a year immediately preceding the grounding. Third Officer [redacted] was the mate of the watch and was primarily engaged in ensuring that the helmsman properly carried out the orders of the pilot. Mr. [redacted] was remaining in the general vicinity of the Engine Order Telegraph. Captain [redacted], Alaska State Pilot, was on the HILLYER BROWN bridge in the capacity of an observer pilot. Captain [redacted] had no specific duties and by his own description was essentially trying to keep out of the way. He was utilizing a personal chart in the Chartroom to check his observations as the vessel made its transit out of Cold Bay. The Helmsman, Mr. [redacted], was utilizing the non follow-up mode of the vessel's steering system. All steering orders were promptly carried out and no difficulties with the steering or engine controls were reported.

10. The HILLYER BROWN Pilot was utilizing the variable range marker of the vessel's ten centimeter radar on the four (4) mile scale to assure himself that the vessel was remaining approximately one and a half (1.5) miles from the western shore of Cold Bay. As the vessel progressed on down the bay the master kept himself apprised of the general position of the vessel by ranging on various objects and geographical locations with the vessel's three centimeter radar. Both the pilot and master were also observing the various lighted aids to navigation that were visible at the appropriate times during the transit. In addition to radar ranges both men were taking bearings, to the extent practicable with radar, on both geographic points and the aids to navigation available. On the other hand neither man obtained a visual bearing on any aid to navigation available during the transit nor did they request such a bearing from any other person in the wheelhouse. As the vessel neared a point approximately one and a half (1.5) miles from Kelp Point at least two of the aids to navigation were visible and three aids were discernible by radar. The two visible aids were Kaslokan Point Light and Buoy #3 while the three radar detected aids consisted of the two cited visible aids and Buoy #1.

11. The HILLYER BROWN rudder was put over "right five (5) degrees" at approximately the same time that Captain [redacted] determined that the ten (10) centimeter variable range ring, which was set on one and a half (1.5) miles, intersected Kelp Point. This rudder change was intended to bring the vessel around in sufficient time to shape up on course 180°T for its entrance into the channel. Kelp Point is a poorly defined projection of the surrounding land mass as shown on the chart being utilized (C&GS 8703) by the vessel. Moreover, its definition is further affected adversely by the aspect of this land mass in relation to the vessel's base course (150°T) and the relatively undetailed presentation of the large area chart being utilized. Approximately one (1) minute later the pilot ordered that "right rudder" be increased to fifteen (15) degrees. The vessel's heading at this time was approximately 166°T and its rate of swing was approximately 17° per minute. The rate of swing continued to accelerate until by 2119 AST on 7 March it had reached an average of 30° per minute. At some point in time shortly after 2119 AST and after the vessel had achieved a heading of at least 220°T, the SS HILLYER BROWN touched the bottom. The degree of this grounding became increasingly more extensive

and at approximately 2120 AST the vessel's Master, Captain [redacted], ordered "hard right rudder". Almost simultaneously with this rudder order Third Mate [redacted] noted Kaslokan Point Light obscuring. With the obscuring of the light the SS HILLYER BROWN ground to a stop and a "Stop" bell was rung down to the engine room which was recorded by Mr. [redacted] at 2120.7 AST 7 March.

12. The vessel was now hard aground at about dead low water and at an approximate position of .34 miles due north of Kelp Point, Alaska. Soundings taken around the ship shortly after the vessel stopped revealed a nineteen (19) foot depth on the port side amidships, a twenty two (22) foot depth on the starboard bow and at least twenty four (24) feet elsewhere within the sounded area. These values closely coincide with expected soundings at the grounding position with the vessel heading oriented as it was. In the meantime Captain [redacted] began taking safety measures necessitated by his awareness of a sizable spill of light straight run gasoline. Although it was completely dark the presence of gasoline on adjacent waters was readily obvious by the heavy accumulation of fumes. Tank ullages taken later revealed that approximately one thousand and four (1004) barrels of light straight run gasoline and three thousand six hundred sixty seven (3667) barrels of diesel oil were spilled into the waters of Cold Bay, Alaska as a result of HILLYER BROWN bottom damage. This bottom damage included the holing of one (1) tank containing gasoline and three (3) tanks containing the diesel oil.

13. At approximately 0125 AST on 8 March the SS HILLYER BROWN floated free from its grounded position. By 0200 AST the vessel was safely anchored approximately one point two (1.2) miles north of Kelp Point with Kaslokan Point Light bearing 184°T and Delta Point Light bearing 309°T. At approximately 0814 AST Captain [redacted] concluded that the accumulation of gasoline fumes had diminished sufficiently for a radio transmission advising his employers of the casualty. This information was relayed to the Coast Guard Marine Inspection Office, Anchorage, Alaska at approximately 0915 AST the same date. This initial call, from the Standard Oil Company Office in Seattle, Washington merely recited the fact that the vessel was grounded. It was not until later that day, at approximately 1500 AST, that the Officer in Charge of Marine Inspection, Anchorage, Alaska confirmed that a major oil spill had accompanied the grounding. The presence of the oil spill was promptly relayed to the Commander, Seventeenth Coast Guard District whereupon Coast Guard air and surface units were dispatched to Cold Bay to determine the extent of pollution and ensure timely clean-up operations. In addition to Coast Guard Cutters KLAMATH (WHEC 66) and IRONWOOD (WLB 297), elements of the Coast Guard Atlantic and Pacific Strike Force Teams were sent to Cold Bay and the Officer in Charge, Marine Inspection, Anchorage, Alaska was placed in overall charge as the On Scene Coordinator.

14. Third Mate [redacted] related that during the early morning darkness hours of 8 March he could detect an oil slick around the HILLYER BROWN with the aid of a flashlight. After it became light he observed the same

slick and described it at this time as "a rainbow sheen". Mr. [redacted] description of this oil slick was confirmed by Mr. [redacted], United States Environmental Protection Agency, Anchorage, Alaska, who conducted an aerial survey of the entire Cold Bay area on 9 March. Mr. [redacted] was accompanied at this time by Mr. [redacted], Standard Oil of California, Mr. [redacted], United States Fish and Wild Life Service, and the Coast Guard On Scene Coordinator. Their air and ground reconnaissance discovered that the largest concentration of oil started at the anchored vessel and extended southeast into Lenard Harbor, Alaska. By late afternoon of 9 March the spill was rapidly dispersing as evidenced by a change in its appearance from a "rainbow sheen" to a gray tinted sheen. The continuing strong and variable winds accelerated the dissipation of the petroleum products until by 14 March there was little evidence that any oil had ever been released into the waters of Cold Bay. The only identified beach area contaminated by diesel oil was a section on the east side of Cold Bay. The Board did not conduct an indepth inquiry into the ecological and environmental impact of the spill. Testimony by Mr. [redacted] and Lieutenant Commander J. J. Burley, U. S. Coast Guard, Marine Inspection Office, Anchorage Alaska revealed that indepth investigations of these considerations were being conducted unilateral of this Marine Board of Investigation. Although there is no evidence that the oil spill caused any damage to the water fowl or sea life in Cold Bay, Mr. [redacted] could not predict its long range impact on the area. He expressed particular concern for a National Wildlife Refuge which surrounds the Kinzarof Lagoon located on the northern end of Cold Bay.

15. In the meantime on 9 March, divers were conducting a survey of the SS HILLYER BROWN to determine the location and extent of damage to the vessel's hull. This inspection revealed that the hull was breached in at least the following locations, Starboard Foredeep Tank, Forward and Midships Pumprooms, Center Cargo Tanks 1 through 4 and Center Cargo Tanks 6 through 9. With these hull breaches the extent of potential pollution was governed only by the amount of cargo in the tanks and sealing effect of the water/oil interface. The holing of both pumprooms, and the presence of cargo oil therein from broken piping, rendered both spaces inoperative thereby precluding any means of transferring cargo. This inability to transfer the vessel's cargo prompted a request for a pumping system currently being developed by the Coast Guard. Two of these units, Air Deliverable Anti Pollution Transfer System (ADAPTS) and one of its commercial counterparts and Coast Guard Atlantic Strike Force personnel were dispatched to the scene to effect the transfer of the vessel's cargo. All three units were obtained from their manufacturer, Ocean Science and Engineering (OSE), Rockville, Maryland, where the ADAPTS were under development and the commercial model is a shelf item.

16. Offloading of cargo into the SS J L HANNA was completed on 18 March and both vessels remained in the area waiting for the weather to abate. The entire cargo was transferred by the use of the three OSE pumps without any noticeable difficulties. The transit from Cold Bay to San

Francisco, California commenced on 22 March under the authority of a Permit to Proceed to Another Port for Repairs issued by the Officer in Charge, Marine Inspection, Anchorage, Alaska on 20 March. This permit included a condition that required the vessel to be escorted by the "tug ELLEN FOSS for the entire voyage from Cold Bay, Alaska to Dixon Entrance in S.E. Alaska via the most sheltered route, then Coastwise to San Francisco, California. Two (2) salvage pumps to be carried and Cargo Tanks No. 3 Port and Starboard and No. 7 Port and Starboard to be ballasted to full capacity. No cargo or passengers permitted".

17. The HILLYER BROWN arrived in San Francisco Bay on 2 April having completed its voyage from Cold Bay, Alaska. On 14 April a joint drydock inspection was conducted in Bethlehem Steel Corporation Shipyard, San Francisco, California. Present at this survey were Coast Guard, American Bureau of Shipping and Chevron Shipping Company personnel. The survey revealed that the principal damage originated in the A strake of the Starboard Forward Deep Tank at approximately frame 87. This damage can best be described as a "can opener" shearing of the metal. The opening continued aft on the starboard side into the Forward Pump Room flat keel (FK) plate near its seam with the A strake. Passing through the Pumproom the breach then extends into Center Cargo Tanks 1 and 2 FK on the starboard side of the vertical keel (VK). The breach crossed over the VK at Watertight Bulkhead (W.T.) No. 69 and continued aft in the FK plate. Except for a relatively short distance of about six (6) feet in Center Cargo Tank No. 4 this plate rupture continued unchecked through Center Cargo Tanks No. 3, 4, 6, 7, 8, 9, and the Midship Pumproom. Thirty (30) full and seven (7) partial plates were renewed in order to effectively repair the breach.

18. In contrast with a relatively large amount of required bottom plate renewal the survey revealed a remarkable lack of internal damage except in the immediate area of the sheared plate. This damage consisted of broken heating coils, pipes, and some buckling of bottom longitudinals, center vertical keel, floors, transverse bulkheads, longitudinal bulkheads, and deep frames. In the case of deep frames (six (6) feet in depth) and the vertical keel (four (4) feet in depth), the buckling was limited to the web thereby leaving the flanges intact. The maximum height of any single bulkhead or deep frame web replacement was a 24" insert originating at the bottom plating. Satisfactory repairs to the vessel were completed on 16 May under the cognizance of the Officer in Charge, Marine Inspection, San Francisco, California.

19. A safety Broadcast originated by the Commander, Seventeenth Coast Guard District at 1952 AST on 28 February advised Coast Guard Radio Stations Ketchikan and Kodiak that Cold Bay Channel Buoy 4 (LLPG 264) was reported one-quarter (1/4) mile east of its charted position. This information was rebroadcasted on Radio Frequencies 466 kilohertz and 2670 kilohertz by Radio Station Ketchikan and 2670 kilohertz by Radio Station Kodiak after the preliminary announcements were made on 500

kilohertz and 2182 kilohertz respectively at shortly after 1959 AST 28 February. Both stations broadcasted this information again as Notice to Mariners No. 147 on their first regularly scheduled broadcasts on 1 March.

20. Captain Tingley did not receive the information regarding the missing buoy prior to boarding the HILLYER BROWN on 5 March nor did any vessel personnel provide him with this knowledge. Although the Pilot Station at Homer, Alaska, Captain Tingley's home base of operations, has the radio capability to receive the described broadcasts there is no record that it was received there. The Homer Pilot Station consists simply of an office that is manned from 0800 hours to 1700 hours each weekday. The office and a connecting residence of the Alaska Marine Pilotage Corporation President contain radio equipment capable of receiving Safety Broadcasts. Neither this equipment nor the individual pilots' home sets are routinely monitored unless the pilots organization is anticipating the arrival of a vessel. This organization does maintain a file of published Seventeenth Coast Guard District Local Notices to Mariners. The first published report describing the off-station Channel Buoy 4 appeared in Local Notice to Mariners No. 10 dated 6 March 1973.

21. Captain Tingley steadfastly maintained that the HILLYER BROWN grounded at a position that was slightly west of the charted position of Cold Bay Channel Buoy #4. The position provided by Captain Tingley was in the charted channel which reflected a charted depth of sixty six (66) feet.

CONCLUSIONS

It is concluded

1. That, the proximate cause of the grounding of the SS HILLYER BROWN in Cold Bay, Alaska on 7 March 1973 was faulty navigation on the part of the vessel's pilot and master. Their failure to take, or cause to have taken, visual bearings on the aids to navigation available during the vessel's transit from Cold Bay and to utilize installed sounding equipment during the same period does not reflect the prudence or competence expected of their offices.

2. That, the failure or inability of the HILLYER BROWN Pilot and Master to properly interpret and/or evaluate the vessel's radar information constituted the misuse of a valuable navigational and collision avoidance aid. Probable causative factors of this misuse were the two men's lack of recent exposure to the geographic area and the poor definition provided by the land mass. The cumulative effect of these factors is considered to have been further affected adversely by the large area chart in use at the time of the grounding.

3. That, the rate of swing of the SS HILLYER BROWN heading, its westerly heading obtained before the grounding, and duration of the turn indicates that the vessel was measurably to the East of where the pilot thought he was at the time the rudder order was given to make a base course change from 150°T.

4. That, the speed of the SS HILLYER BROWN limited the time available for the vessel to timely shape up on the southerly leg of its outbound transit. This limitation was further compounded by the pilot's failure to recognize that the rate of swing of the vessel's heading was insufficient to maintain a safe bearing on Kaslokan Point Light.

5. That, the SS HILLYER BROWN Pilot's contention that the vessel grounded within the charted channel is considered self-serving and is not supported by the facts. The grounding position ascertained by vessel personnel to be outside of the channel is clearly supported by the course recorder recording and the obscuring characteristic of Kaslokan Point Light at the time of grounding.

6. That, the relatively isolated and widespread geographic area serviced by the pilots of the Alaska Marine Pilotage Corporation suggests that this organization needs to institute a more comprehensive method of monitoring Safety Broadcasts in order that pilots will be aware of the status of Aids to Navigation and other matters that effect the Safety of Marine Navigation.

7. That, if the SS HILLYER BROWN was constructed with double bottom tanks, whose tops landed on the deep web frames, there would not have been any spillage of cargo incidental to the grounding. Further, the vessel's cargo transfer capability would have been retained to some degree and therefore could have been used to effect any desired list and/or trim changes.

8. That, there is evidence of negligence on the part of Coast Guard Licensed Master [redacted], License No. [redacted] arising out of his service as Master of the SS HILLYER BROWN on 7 March 1973.

9. That, there is evidence of negligence on the part of Coast Guard Licensed Pilot, William A. Tingley, License No. [redacted] arising out of his service as Pilot of the SS HILLYER BROWN on 7 March 1973.

10. That, the casualty may not have occurred if the SS HILLYER BROWN outbound transit was commenced after sunrise on 7 March 1973. Such a transit could have provided the pilot with a panorama of the available aids to navigation and Kelp Point that could not be provided by radar. Moreover, Cold Bay, Alaska, surrounded as it is by a wildlife refuge, is a particularly sensitive area and should be provided with reasonable safeguards against the danger of pollution.

11. That, there is no evidence that any personnel of the Coast Guard or any other governmental agency caused or contributed to the casualty or to its cause.

12. That, there is evidence of a violation of the Federal Water Pollution Control Act of 1970, as amended, by the owners of the SS HILLYER BROWN for the pollution of Navigable Waters of the United States on 7 March 1973.

RECOMMENDATIONS

It is recommended

1. That, the Commander, Seventeenth Coast Guard District consider restricting tank vessels from entering or leaving Cold Bay, Alaska during the period from sunset to sunrise.

2. That, a copy of this report be forwarded to the Alaska Marine Pilotage Corporation for their consideration of conclusion 6 herein.

3. That, the Commandant, U. S. Coast Guard, consider requiring that all tank vessels transitting the Navigable Waters of the United States be provided with double bottom tanks under all cargo tanks and contiguous pumprooms.

4. That, further investigation, under the provisions of R.S. 4450, be conducted into the actions of Captain [redacted], License No. [redacted] arising from his service as Master of the SS HILLYER BROWN on 7 March 1973.

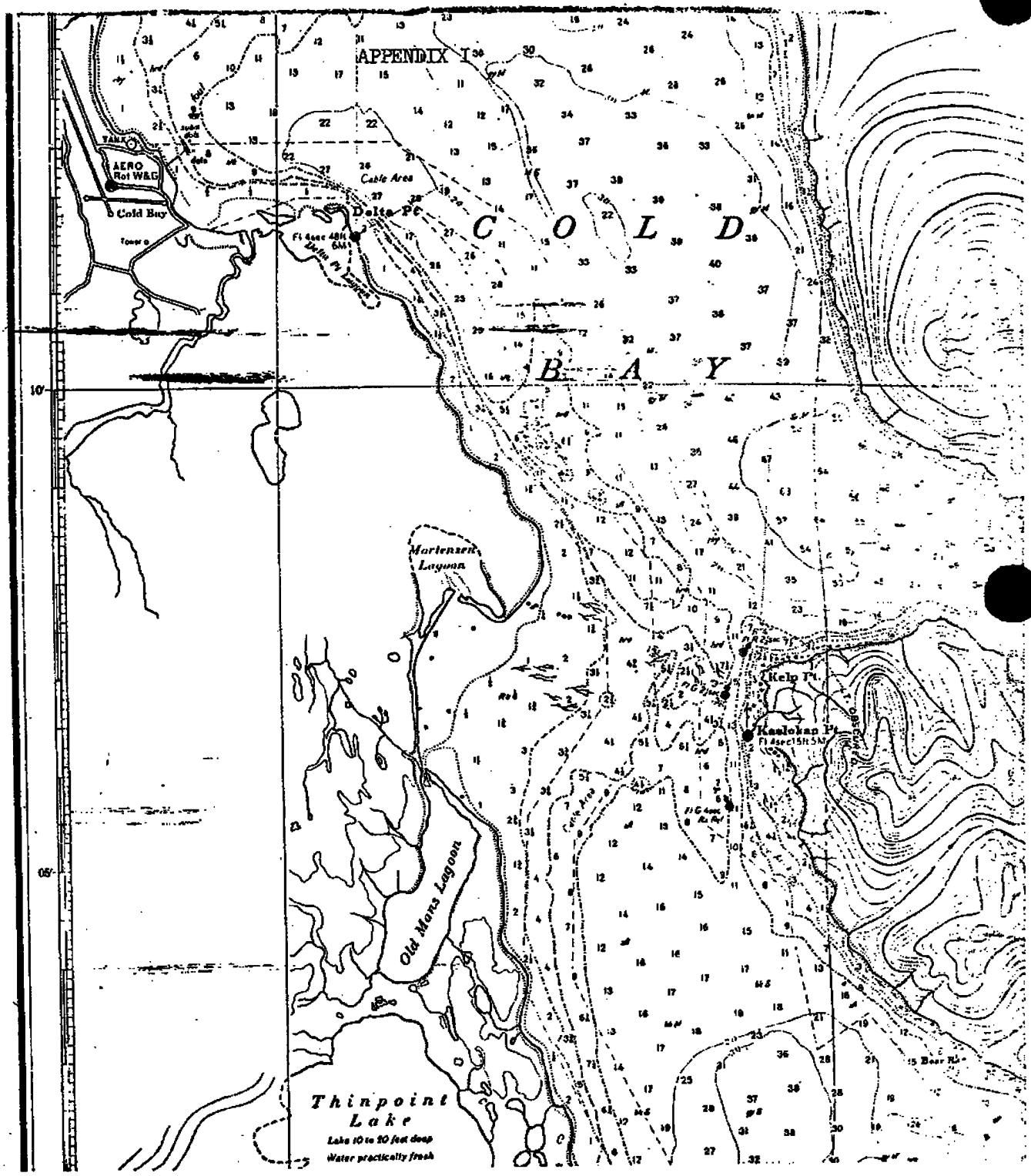
5. That, further investigation, under the provisions of R.S. 4450, be conducted into the actions of Captain William A. Tingley, License No. [redacted] arising out of his service as Pilot of the SS HILLYER BROWN on 7 March 1973.

6. That, further investigation under the administrative penalty proceedings be conducted by Commander, Seventeenth Coast Guard District regarding the possible violation of the Federal Water Pollution Control Act of 1970, as amended.

[redacted]
J. C. DOWLING, CAPT, USCG
Chairman

[redacted]
R. G. LYONS, CDR, USCG
Member

[redacted]
D. F. SMITH, CDR, USCG
Member and Recorder


APPENDIX I
AERO
Rot W&G
Cold Bay
Delta Pt
Cable Area
C O L D
B A Y
Marienszn Lagoon
Old Mans Lagoon
Kelp Pt
Kaslokan Pt
Thinpoint Lake
Lake 10 to 20 feet deep
Water practically fresh