

DEPARTMENT OF TRANSPORTATION



COAST GUARD

MARINE CASUALTY REPORT

**USCGC BLACKTHORN, SS CAPRICORN;
COLLISION IN TAMPA BAY
ON 28 JANUARY 1980 WITH LOSS OF LIFE**

**U.S. COAST GUARD
MARINE BOARD OF INVESTIGATION REPORT**

**AND
COMMANDANT'S ACTION**

REPORT NO. USCG 16732/01279

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16. Abstract On 28 January 1980 at approximately 2021 e.s.t. the U. S. Coast Guard Cutter BLACKTHORN and the U. S. tankship CAPRICORN collided in Tampa Bay near the junction of Cut "A" and Mullet Key Channels. As a result of the impact, the port anchor of CAPRICORN became imbedded in BLACKTHORN's port side. The momentum of the two vessels caused the CAPRICORN's port anchor chain to become taut and resulted in the capsizing of the BLACKTHORN. The Capricorn grounded on the north side of Cut "A" channel and the BLACKTHORN sank in Cut "A" channel. Twenty seven BLACKTHORN crew members were rescued, however, twenty three crew members perished. There were no personnel casualties aboard the CAPRICORN. This report contains the U. S. Coast Guard Marine Board of Investigation report and the Action taken by the Commandant to determine the proximate cause of the casualty and the recommendations to prevent recurrence. The Commandant has concurred with the Marine Board that the proximate cause of the casualty was the failure of both vessels to keep well to the side of the channel which lay on their starboard side. The primary contributing cause was determined to be the failure of the persons in charge of both vessels to ascertain the intentions of the other through the exchange of appropriate whistle signals. It was also determined that attempts to establish a passing agreement by using only radiotelephone communications failed to be an adequate substitute for exchanging proper whistle signals.			
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USCGC BLACKTHORN, SS CAPRICORN: COLLISION
IN TAMPA BAY ON 28 JANUARY 1980 WITH LOSS
OF LIFE

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DEPARTMENT OF TRANSPORTATION
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16732/USCGC BLACKTHORN -
CAPRICORN

29 December 1980

Commandant's Action

on

The Marine Board of Investigation convened to investigate the circumstances surrounding the collision of the USCGC BLACKTHORN (WLB 391) with the SS CAPRICORN, O.N. 243804, with subsequent capsizing and sinking of the USCGC BLACKTHORN in Tampa Bay, Florida on 28 January 1980 with multiple loss of life

The report of the Marine Board of Investigation convened to investigate the subject casualty has been reviewed; and the record, including the findings of fact, conclusions and recommendations, is approved subject to the following comments.

REMARKS

1. The statement in finding of fact 1 is concurred with to the extent that it provides a summary description of the events associated with the casualty. While there is conflicting testimony concerning the precise location of initial impact, the evidence clearly establishes that the vessels collided in the channel near the junction of Cut "A" and Mullet Key Channels. The first sentence of finding of fact 1 is not concurred with to the extent that it includes the words "approximately midway between Cut "A" Channel lighted bell buoy "1A" (LLNR 1047) and lighted buoy "2A" (LLNR 1049.50)".
2. In reference to finding of fact 2 it should also be noted that the SS CAPRICORN was enrolled and licensed in accordance with 46 USC 251 at the time of the casualty. Accordingly 46 USC 364 mandated that the SS CAPRICORN be under the control and direction of a pilot licensed by the Coast Guard.
3. Findings of Fact 2(a)(1) and 2(b)(5) describe the propulsion systems of both vessels. A technical error is noted in 2(a) in that the BLACKTHORN's main propulsion shaft rotation (diesel electric) is reversed by reversing the generator excitation polarity and not the main motor excitation. It is also noted that the CAPRICORN's



main propulsion shaft rotation (turbo electric) is reversed by switching two phases of the three phase power supply to the main (synchronous) motor. The CAPRICORN's throttlemaster in his testimony estimated that he answered the astern bell in less than 30 seconds.

4. Finding of Fact 6(e) indicates that a plot of a line of position between the lights referred to by Pilot Knight in his testimony would result in the ship crossing "through the junction north of the range line intersections". Since an actual plot of this testimony was not made a part of the report or record, this statement is taken to mean that if such a line were plotted, the line would pass through the junction north of the range line intersections. It is recognized that a plot of an actual ship's track would be affected by several factors (e.g. size of vessel, speed of vessel, rudder used, starting point north or south of channel axis, current, etc.).

5. Finding of Fact 8(b) creates the erroneous impression that the commanding officer departed the bridge for the engine room because of a malfunctioning shaft tachometer. The testimony establishes that the shaft tachometer had been observed to be malfunctioning during sea trials earlier on the day of the casualty. The commanding officer's reason for departing the bridge was his concern with the performance of a newly installed propulsion shaft thrust bearing because the engineering officer had advised him not to exceed 170 propeller shaft RPM's until the bearing proved to be satisfactory.

6. Finding of Fact 8(d) describes the passage between BLACKTHORN and PAT B but does not make reference to the un rebutted testimony of Captain Wanamaker of the PAT B in which he testified that BLACKTHORN sounded a passing whistle signal after both vessels had agreed to a port to port passage on the radiotelephone. This testimony bears on the statement contained in finding of fact 8(1) that it was "the ship's general policy of not sounding whistle signals if passing agreements had been made by radio".

7. Finding of Fact 8(1) finds that there was a general ship's policy of "not sounding whistle signals if passing agreements had been made by radio" and that "the commanding officer felt that this would avoid possible confusion". It should be noted that the testimony of the commanding officer, the officer of the deck and the quartermaster of the watch is at variance with this finding. In addition the testimony of Captain Wanamaker of the PAT B describing the sounding of a whistle signal by BLACKTHORN after a passing agreement had been made by radio is inconsistent with this finding.

8. Finding of Fact 26(a) describes the number and kind of drills conducted onboard BLACKTHORN between 27 July 1979 and 28 January 1980. A review of drills and training should include consideration of the expected performance in terms of existing training standards. In this regard the following additional information is noted for the 27 July 1979 - 28 January 1980 period:

a. Comparison of drills required by Existing Training Standards (LANTAREA INSTR. 352.1 "OPTREX") for the above time period and those held on BLACKTHORN is as follows:

<u>TYPE OF DRILL (partial listing)</u>	<u>RECOMMENDED FREQUENCY (Minimum)</u>	<u>DRILLS HELD ONBOARD BLACKTHORN</u>
Abandon Ship	2	2
Fire	6	24 (22 in port 2 with abandon ship)
Setting Material Conditions	26	32+ (held as a consequence of fire drills and underway procedures)
Collision	Not Specified	1

COMMENTS ON PREFACE TO CONCLUSIONS

1. The Board's "Preface to Conclusions" describes the approach used in attempting to fix the position of the collision. This approach relies heavily on an attempt to reconstruct the post-impact movements of both vessels and to relate this reconstruction to the location of debris. However, review of the process employed by the Board indicates that the results are primarily dependent upon analysis of when certain events occurred. Even slight changes in the estimates of the post-impact speeds and courses of the vessels, and at the times of which the vessels struck and at which the debris fell from the vessels, would result in a different collision location. Due to the imprecision of the estimates of critical times and the lack of evidentiary support for certain of the estimates, the Board's proposed reconstruction of events can best be viewed as hypothetical. While the Board thus lacked sufficient evidence to identify the precise point of the collision, and particularly along the direction of the channel, its careful and elaborate analysis together with evidence establishes a reasonably limited area in which the collision could only have occurred.

COMMENTS ON CONCLUSIONS

1. Conclusion 1 is not concurred with. As noted above, I am unable to concur with the preciseness with which the point of collision is stated in the Board's conclusion 1. The evidence does establish that the collision occurred in an area northward of the centerline of Cut "A" and close to a line drawn through buoys 1"A" and 2"A", an area that can be fairly characterized as at or near mid-channel.

2. I concur with the Board that the proximate cause of the collision was the failure of both vessels to keep well to that side of the channel which lay on their starboard side. It can be noted that how wideners or other navigational variants along the sides of the customary or identified channel affect the fairway or mid-channel has not been subject to judicial or nautical definition as far as I have been able to determine. The significance of attempting to resolve that issue is diminished by the inability to determine with an adequate degree of conviction the precise point of

collision, and the obligation of each vessel to stay sufficiently to the right in the channel, having due regard for the constraints of the Tampa Bay entrance channel. It can also be suggested that any uncertainty regarding mid-channel location heightens the prudent navigator's obligation to stay well to the right. Whatever the precise location of the channel midpoint or the point of collision, it is clear that neither BLACKTHORN nor CAPRICORN was being navigated so that each would pass well clear on the port side of the other.

While I concur with the other contributing causes stated by the Board I think it is important to emphasize that the failure to ascertain the intentions of the other through the exchange of appropriate whistle signals was the primary contributing cause. It is also relevant to observe that attempts to establish a passing agreement by using only radiotelephone communications failed to be an adequate substitute for exchanging proper whistle signals.

3. Conclusion 5(f)(2) is not concurred with since the evidence does not establish that such a policy was in existence onboard the BLACKTHORN. A single failure to comply with the rules of the road and/or testimony to the effect that occasions could arise where whistle signals would not be sounded to avoid creating confusion, are insufficient to establish that this was a ship's policy.

4. Conclusion 15 and 18 are conflicting in regard to what caused the BLACKTHORN to roll over on the port beam. There is considerable evidence which indicates that the BLACKTHORN was pulled over by the taut anchor chain. Accordingly conclusion 18 is not concurred with insofar as it attributes the capsizing to a loss of reserve buoyancy.

5. Conclusion 28 is concurred with to the extent that it refers to evidence of inadequate training on the part of certain individuals in the crew. As noted in the report of the Marine Board, other crew members distinguished themselves in a highly professional manner. While the frequency of emergency drills met or exceeded the minimum requirements of LANTAREA INSTR. 3502.1 (COMLANTAREA OPTREX) subsequent to July 1979, it is apparent that this case illustrates the need for a special emphasis on drills and training when a vessel experiences a prolonged inport period in which the normal crew turnover would act to reduce the vessel's overall military readiness. It is clear that realistic and meaningful drills and training are essential under such circumstances.

6. Conclusions 47(c) and 48(c) are not concurred with inasmuch as 33 CFR 80.03(3) does not require any signals for a crossing situation. Rather, this is a definitional section explaining what a single short blast means when a privileged vessel in a crossing wishes to sound it.

ACTION CONCERNING THE RECOMMENDATIONS

1. Recommendation 1:

Action: This recommendation is concurred with. A professional Rules of the Road examination has been developed. Successful completion of this examination will be a prerequisite for an officer being assigned to duty as officer of the deck underway, commanding officer, or executive officer aboard Coast Guard vessels. The examination is similar in content to those administered to licensed officers of the Merchant Marine. The initial examinations were administered during October and November 1980.

2. Recommendation 2:

Action: This recommendation is not concurred with. U. S. Coast Guard Regulations (CG-300) require the use of radar in or near areas of reduced visibility, or when necessary for the safety of the vessel and that the position of the vessel be known at all times. These requirements, if followed, should adequately provide for safe navigation. The involvement of radar in this casualty as a causal factor was more a case of limited use than the lack of maintaining a shipping plot.

3. Recommendation 3:

Action: The intent of this recommendation is concurred with. As discussed previously, the issue involved in this case with regard to drills is not the number required or the nature and quality. The primary issue is the timing of certain drills and exercises after long inport and overhaul periods. This is particularly true when a ship has experienced personnel turnovers. No change in the numbers and kinds of drills is indicated. However the existing training guidelines will be expanded to emphasize the need for personnel and ship survival related drills and instructions prior to getting a vessel underway, particularly if the commanding officer feels the level of readiness of the ship's personnel is not satisfactory.

4. Recommendation 4:

Action: This recommendation is concurred with. All Coast Guard recruits are now required to be able to swim 100 meters. This is a recent increase from 50 yards. Additionally all recruits receive instruction in "drown proofing". The feasibility of incorporating survival equipment instructions in recruit training is being investigated.

5. Recommendation 5:

Action: This recommendation is concurred with. A review has been initiated regarding the use, stowage and maintenance of inflatable liferafts aboard Coast Guard vessels. Certain areas requiring improvement have already been identified and corrected. Specifically, guidance has been promulgated requiring all rafts and hydrostatic releases to be serviced annually under the direction of a U. S. Coast Guard Marine Inspector at an approved servicing facility listed in Commandant Instruction M16714.3 (old CG-190). Additionally, all Navy Mark 5 rafts in flexible containers will be replaced by Navy Mark 5 rafts in rigid containers. Navy Mark 3 rafts are no longer authorized due to their age and have been ordered removed from all Coast Guard vessels.

A forthcoming change to the Naval Engineering Manual (CG-413) will contain specific data concerning all types of liferafts in service, including installation instructions, inspection requirements and servicing procedures. Applicable sections of the NavShips Technical Manual will also be included in this amendment. Information contained in technical publications issued by the manufacturer of each type raft will be provided with each raft.

Finally, procurement of Coast Guard approved 15 person and 8 person rafts is being carried out to replace the Navy Mark 5 and Mark 2 rafts. A study is also being made looking toward improved shipboard stowage arrangements including the use of float free installations or hydrostatic releases.

6. Recommendation 6:

Action: Recommendation 6 is not concurred with. There are other types of life jackets that would be easier to don in the water, however their flotation characteristics and ability to keep an individual's head out of water, particularly if unconscious, are not as effective as the jackets presently in use. Redesigning the life jacket presently in use to facilitate donning in the water would adversely affect existing desirable characteristics. The possibility of including instructions pertaining to the donning of life jackets in the water in training programs will be considered.

7. Recommendation 7:

Action: Recommendations 7(a), (c) and (d) are concurred with and the Commander Seventh Coast Guard District has been directed to take necessary action. The other recommendations are addressed as follows:

7(b) The need to reassess traffic management measures in Tampa Bay is recognized. Coast Guard Headquarters will develop the necessary ground work for an indepth analysis of the situation by the Commander, Seventh Coast Guard District.

7(e) That part of the recommendation concerning the scale of chart 14414 is not concurred with. The scale of the navigation chart is based more on geographic considerations than on the channel size that can be depicted. To obtain an optimum-use chart a compromise is made between including as many adjacent land areas as possible and providing adequate detail in the navigation channel. Additionally, increasing the scale would likely require the introduction of a third chart to cover the route from the Bay entrance to the Port of Tampa.

With regard to the charting of Mullet Key Channel, the National Ocean Survey will be asked to review the chart in keeping with this recommendation.

8. Recommendation 8:

Action: Individual items contained in this recommendation are addressed as follows:

8(a) This recommendation is concurred with and the useability of stability books will be reviewed at selected field units. However, it is believed that the stability book, as presently formatted, is an excellent tool and can be effectively utilized with a relatively short period of study.

8(b) This recommendation is concurred with. The adequacy of instruction in vessel stability for cadets and officer candidates is currently being evaluated. Additionally, the need for a refresher course in stability for commanding officers, executive officers and engineering officers assigned to sea duty is being investigated.

8(c) This recommendation is concurred with. Rigging a boat out for sea has as its primary purpose the ability to recover personnel lost over the side in a timely fashion. Several years ago when most Coast Guard cutters were equipped with manual davits, it was necessary to rig out a boat in order to ensure a timely launching. Today, many of our ships have hydraulic single whip davits which enable a crew to launch a boat stowed in the cradle very quickly. Therefore, it is not necessary for all cutters to rig out a boat. Older vessels such as the 327' high endurance cutters (WHEC) and the 205' - 213' medium endurance cutters (WMEC) are equipped with manual davits

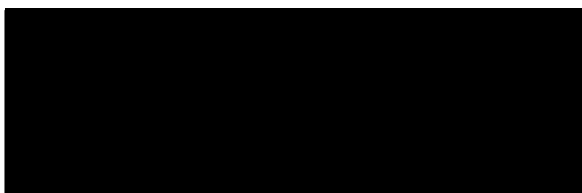
and still need to rig a boat for sea, which they do with the aid of a "strongback". The strongback enables the davits to be fully extended and still maintain tension on the "belly gripes" to hold the boat securely in place. However, the manual davits on a 180' buoy tender (WLB), such as BLACKTHORN, are not designed to be used with a strongback, and thus, these cutters cannot adequately rig out a boat. In view of these differences, the wording in paragraph 4-2-15A(1) of the U. S. Coast Guard Regulations is being reviewed for minor changes to meet the needs and capabilities of different cutters.

8(d) This recommendation is concurred with. The Coast Guard boarding and inspection program will be reviewed to determine its effectiveness in ensuring merchant vessel compliance with 33 CFR 164.

8(e) This recommendation is concurred with. The Federal Communications Commission (FCC) regulations in part 251(c) Title 83 of the Code of Federal Regulations require that "use of power greater than (1) watt in a bridge to bridge station shall be limited to the following situations:

- (1) Emergency;
- (2) Failure of the vessel being called to respond to a second call at low power; and
- (3) A broadcast call as in paragraph (a)(1) of this section in a blind situation, e.g. rounding a bend in a river".

These regulations were enacted to prevent the "overpowering" problem. However, violations are common place and enforcement is difficult. Correction of any problems in this area most likely lie in developing an awareness on the part of users of bridge to bridge radio. Although the FCC is primarily responsible for enforcement of the regulations, the Coast Guard will continue to evaluate the situation in order to determine what additional measures may be necessary to improve enforcement and education. The FCC will be provided with a copy of this report for their information and appropriate action.



J. B. HAYES



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

16732/
BLACKTHORN/
• CAPRICORN
1 May 1980

- From: Marine Board of Investigation
To: Commandant (G-MMI)
- Subj: USCGC BLACKTHORN (WLB 391) and SS CAPRICORN, O.N. 243804; collision in Tampa Bay, FL, on 28 January 1980, resulting in the capsizing and subsequent sinking of USCGC BLACKTHORN with multiple loss of life.

FINDINGS OF FACT

1. The USCGC BLACKTHORN and the U. S. Tanker CAPRICORN collided nearly head on at the junction of Mullet Key Channel and Cut "A" Channel, approximately midway between Cut "A" Channel Lighted Bell Buoy "1A" (LLNR 1047) and Lighted Buoy "2A" (LLNR 1049.50), Tampa Bay, FL, at about 2021 EST on 28 January 1980. During impact CAPRICORN's port anchor became imbedded in BLACKTHORN's port side, towing BLACKTHORN stern first up Cut "A" Channel astern of CAPRICORN until the motions of the two vessels placed them perpendicular to each other. The anchor chain led under BLACKTHORN's hull, causing her to capsize rapidly to port. Soon after, CAPRICORN grounded on the north side of Cut "A" Channel and BLACKTHORN sank in the middle of the channel. Twenty-seven BLACKTHORN crewmembers were rescued, suffering various minor injuries that did not require immediate hospitalization over 24 hours. Twenty-three BLACKTHORN crewmembers perished. CAPRICORN personnel did not sustain any injuries. CAPRICORN was refloated the following day and proceeded under her own power into port, having sustained minor collision and grounding damage. BLACKTHORN was salvaged from the channel bottom 3 weeks after the casualty and towed into port, having sustained extensive collision damage localized to the port side and major damage to all equipment, wiring and machinery due to the time immersed in the water.

2. VESSEL DATA

NAME	BLACKTHORN	CAPRICORN (Ex: BUNKER, 1977)
OFFICIAL NUMBER	WLB 391	243804
CALL SIGN	NODJ	KIHX
BUILT	1944 Duluth, MN	1943 Mobile, AL
REBUILT	-	1961 (Jumboized T-2)



SERVICE	Public Vessel	Tanker
CARGO	None, except for 1 automobile and 5 motorcycles belonging to crew members	151,611 net bbl, No. 6 oil elevated to 139° F (2.5% sulphur content)
GROSS TONS	984 (Displacement tonnage)	14,126.42
NET TONS	-	10,367
LENGTH	180 ft LOA 170 ft LBP	605 ft LOA 585.9 ft (Registered Length)
BREADTH	37 ft	75.3 ft
DEPTH	17 ft 3.5 in	41.8 ft
DRAFT	Fwd: 12 ft 0 in Aft: 13 ft 6 in	Fwd: 31 ft 6 in Aft: 31 ft 6 in
PROPULSION	Diesel Electric	Steam Turbo-Electric
HORSEPOWER	1200 SHP	7000 SHP
HOMEPORT	Galveston, TX	New York, NY
OWNERS	United States of America/U. S. Coast Guard	Kingston Shipping Co. Inc. TRIAD Office Center Suite N215 2001 Marcus Avenue Lake Success, NY 11042
OPERATORS	Same	Apex Marine Corporation TRIAD Office Center Suite N215 2001 Marcus Avenue Lake Success, NY 11042
COMMANDING OFFICER/MASTER	George J. Sepel, LCDR, U. S. Coast Guard	George P. McShea, Jr.
LICENSE	None	USCG License: No. [REDACTED] Issue 1-4; Master, Steam and Motor Vessels of any Gross Tons upon Oceans, Radar Observer. MMD: [REDACTED]

Any unlicensed rating in
the deck department,
including Able Seaman

PILOT None

Harry E. Knight

LICENSE None

USCG License: No. [REDACTED]
Issue 2-2; Master of
Coastwise Towing Vessels
of not over 750 Gross Tons
not more than 200 miles
offshore upon the Gulf of
Mexico and Lower
Mississippi River to
Geismer, LA; Radar
Observer; Operator of
uninspected towing vessels
upon Oceans, not more than
200 miles offshore and the
Inland Waters of the
United States. First Class
Pilot of Steam and Motor
Vessels of any gross tons
upon Tampa Bay and all
waters tributary thereto,
Lower Mississippi River
from Geismer, LA (mile
187 AHP) to the sea via
South and Southwest
Passes, Galveston sea buoy
to Houston turning basin
upon vessels of not over
750 gross tons.

MMD: [REDACTED]

a. BLACKTHORN

(1). BLACKTHORN was one of nineteen 180 ft C Class Buoy Tenders, built in 1943-1944, 10 by Zenith Dredge Company, Duluth, MN, and the other 9, BLACKTHORN included, by Marine Iron and Shipbuilding Company, Duluth, MN. This single screw vessel was built to service aids to navigation, with a structurally reinforced bow for auxiliary icebreaking. Construction was of welded/riveted steel. BLACKTHORN was powered by two 700 horsepower diesels driving two d.c. main generators which in turn provided power to drive a 1200 hp d.c. motor. The direction of shaft rotation could be changed almost instantly merely by changing polarity of the main motor excitation, taking approximately 10 seconds to go from full ahead to full astern. Engines were controlled through three control stands, one of which was in the pilothouse and one on each bridge wing. The ship's whistle was controlled by use of a Y-shaped cable running overhead the width of the bridge and could be

sounded from almost any position inside the pilothouse. There were no whistle pulls on either bridge wing. Tactical maneuvering data was posted on the bridge along with RPM/speed tables.

(2). BLACKTHORN was equipped with a Triton Modar VHF-FM transceiver which covered the maritime band of 156-162.5 MHz. This unit was a 25 watt model with a transmitter HI/LO switch to reduce power output to 1 watt as required by 47 CFR 83.713(b). The radio was installed with a "piggy back" monitor receiver crystallized for channel 13, used to maintain the continuous listening guard required by the Vessel Bridge-to-Bridge Radiotelephone Act. The main unit was multi-channel and included channels 6, 12, 13, 14, 16, 21A, 22A, 23A, 81A, 82A, 83A and 26. It was also equipped with an automatic reverting circuit that switched the main receiver to channel 16 each time the microphone was hung up after use, regardless of the position of the channel selector switch.

(3). BLACKTHORN also carried 3 VHF-FM hand held radio transceiver units, referred to as COMCOs. They were crystallized for channels 13, 16, 21, 22 and 83. Power output was 2.2 watts if the push-to-talk (PTT) bar were depressed or 1 watt if a button switch were used. When underway, one of these radios, set on channel 13, would be placed on each bridge wing for use by the conning officer.

b. CAPRICORN

(1). CAPRICORN was built by Alabama Drydock and Ship Building Co., Mobile, AL, in 1943 as a single screw tanker to standard T-2 design and machinery arrangement. The vessel was jumboized in 1961 by the addition of a new midbody built by Bethlehem Steel Co., Baltimore, MD, and installed by Bethlehem Steel Co., Sparrows Point, MD. The vessel is a typical jumboized T-2 with the bridge structure moved from midship to the after house. CAPRICORN does not have a bulbous bow. The vessel has a raised forecastle deck with a partial raised solid bulwark around the bow periphery. The foremast is located on the forecastle deck aft of the anchor windlass. The forward white range light and an air powered whistle are located on the foremast. The bridge is located 465 feet from the bow.

(2). Two king posts are located approximately mid-length, one-quarter breadth from each side of the vessel. These king posts do not restrict visibility from the bridge. The bridge deck is 25 feet higher than the forecastle deck in relation to the keel, with two open bridge wings that extend outward to the extreme breadth of the hull. The after white range light and steam whistle are located above the after house.

(3). Equipment on the bridge includes telemotor and DECCA electric steering with gyro pilot. There is a Mark XIV Sperry gyro compass with repeaters at the telemotor steering station,

the hand electric steering stand and the flying bridge. The gyro also provides input to the RDF and both radars. There are no bridge wing gyro repeaters. The only gyro repeater useable for visual bearings is located on the flying bridge.

(4). The bridge radio communications include a Triton Modar VHF-FM with a "piggy back" channel 13 monitor. The primary unit has transmit and receive capability for channels 13 and 16. The other VHF-FM radio is an AP Radioteletone with the capability of simultaneously selecting any two VHF-FM marine channels. It alternately scans the two channels selected. Electric whistle controls, with a selector for the forward or after whistle, are located forward on each bridge wing and inside the pilot house. Manual pulls for the after whistle are also positioned in the same three locations. Maneuvering data information is posted on the bridge. There is no indication of a method for interpreting the distance of advance and transfer during turns from that data.

(5). CAPRICORN is propelled by two water tube propulsion boilers which generate steam at a maximum allowable working pressure of 500 psi, supplying it to a turbine driving an a.c. main generator which in turn provides power to a 6600 hp a.c. motor. This plant provides a design sea speed of 14.5 knots.

3. RECORD OF DEAD

a. The following persons lost their lives as a result of this casualty:

NAME: SUBRINO IBANEZ AVILA, Subsistence Specialist First Class, USCG

SSAN: [REDACTED]

DOB: [REDACTED]

ADDRESS: [REDACTED]

NOK: Mrs. [REDACTED] (wife)

NAME: RANDOLPH BRENT BARNABY, Seaman/Gunners Mate, USCG

SSAN: [REDACTED]

DOB: [REDACTED]

ADDRESS: [REDACTED]

NOK: Mrs. [REDACTED] (wife)

NAME: RICHARD DALE BOONE, Machinery Technican Second Class, USCG

SSAN: [REDACTED]

DOB: [REDACTED]

ADDRESS: [REDACTED]

NOK: Mrs. [REDACTED] (wife)

NAME: WARREN RENAIL BREWER, Seaman Apprentice, USCG

SSAN: [REDACTED]

DOB: [REDACTED]

ADDRESS: [REDACTED]

NOK: Mrs. [REDACTED] (mother)

NAME: GARY WAYNE CRUMLY, Quartermaster Second Class, USCG
SSAN: [REDACTED]
DOB: [REDACTED]
ADDRESS: [REDACTED]
NOK: Mrs. [REDACTED] (wife)

NAME: DANIEL MONREAL ESTRADA, Damage Controlman Second Class, USCG
SSAN: [REDACTED]
DOB: [REDACTED]
ADDRESS: [REDACTED]
NOK: Mrs. [REDACTED] (wife)

NAME: THOMAS RICHARD FAULKNER, Electrician's Mate, Second Class, USCG
SSAN: [REDACTED]
DOB: [REDACTED]
ADDRESS: [REDACTED]
NOK: Mrs. [REDACTED] (wife)

NAME: WILLIAM RAY FLORES, Seaman Apprentice, USCG
SSAN: [REDACTED]
DOB: [REDACTED]
ADDRESS: [REDACTED]
NOK: Mr. and Mrs. [REDACTED] (parents)

NAME: DONALD RAY FRANK, Subsistence Specialist Third Class, USCG
SSAN: [REDACTED]
DOB: [REDACTED]
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NOK: Mr. and Mrs. [REDACTED] (parents)

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NOK: Mr. and Mrs. [REDACTED] (parents)

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ADDRESS: [REDACTED]
NOK: Mrs. [REDACTED] (wife)

NAME: JACK JOSEPH ROBERTS, JR., Chief Warrant Officer (W-2), USCG
SSAN: [REDACTED]
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NAME: GEORGE RONALD ROVOLIS, JR., Seaman Apprentice, USCG
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NOK: Mr. and Mrs. [REDACTED] (parents)

NAME: FRANK JOHN SARNA III, Ensign, USCG
SSAN: [REDACTED]
DOB: [REDACTED]
ADDRESS: [REDACTED]
NOK: Mr. and Mrs. [REDACTED] (parents)

NAME: EDWARD FRANCIS SINDELAR III, Electrician's Mate Third Class, USCG
SSAN: [REDACTED]
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ADDRESS: [REDACTED]
NOK: Mr. and Mrs. [REDACTED] (parents)

NAME: LUTHER DAVID STIDHEM, Chief Machinery Technician, USCG
SSAN: [REDACTED]
DOB: [REDACTED]
ADDRESS: [REDACTED]
NOK: Mrs. [REDACTED] (wife)

4. WEATHER AND TIDE

a. Weather on the evening of 28 January was as follows: the sky was partly cloudy; visibility was clear and at least 7 miles. Seas were calm and there was a light wind from the north at approximately 5 knots. Air temperature was 61°F, water temperature was 64°F. Moonrise was at 1522 and it was over three-quarters full. Time of sunset was 1807. Predicted current at the Mullet Key Channel entrance was 055°T at 1.2 knots at 2033 (maximum flood). Predicted current at the Sunrise Skyway Bridge (0.2 miles north of the channel) was 060°T at 0.9 knots at 2032 (maximum flood). Commander, Coast Guard Group, St. Petersburg stated that debris from BLACKTHORN was observed drifting 090°T at one knot after the casualty.

5. RADAR

a. BLACKTHORN was equipped with an AN/SPS 64(V)2 surface search radar which is a 20 kw X-band (3 cm) model. There were two display indicators in the pilothouse. The 16" indicator was located on the portside adjacent to the helm. The 12" indicator was located in the forward starboard corner. The radar unit could be operated in either the head up or gyro stabilized mode. It was equipped with both fixed range rings and a variable range marker with a digital readout. The display scale could be set at 1/4, 1/2, 3/4, 1½, 3, 6, 12, 24, 48 and 64 miles. Bearings to contacts could be taken using the electronic bearing line feature or a mechanical bearing cursor. The radar had been working satisfactorily ever since installation on 24 February 1977.

b. CAPRICORN is equipped with two DECCA radars. The newer one which was installed in October 1979 is an RM916C S-band (10 cm) with a 9 inch scope true presentation. The other is an RM314 X-band (3 cm) with a 9 inch scope relative presentation. Both radars have fixed range rings for determining distance.

c. There is no evidence to indicate that either BLACKTHORN's or CAPRICORN's radars were not operating properly on 28 January. However, there is evidence that neither ship was making full use of radar for detecting approaching vessels and evaluating their motion. BLACKTHORN was using her radar to assist in maintaining a navigation plot.

6. MULLET KEY AND CUT "A" CHANNELS

a. National Ocean Survey (NOS) Chart No. 11414, 24th Edition, dated March 31, 1979 is the current largest scale chart (1:40,000) available for Tampa Bay, Southern Part. This casualty

occurred at the junction of Mullet Key Channel and Cut "A" Channel. Mullet Key Channel, widened to 600 feet in 1979, is depicted by a central range line, 081°-261°T, and dotted lines 500 feet apart. The latter delineate the outer edges of the former 500 foot wide channel. The charted positions of the navigational buoys are on the dotted line for the south edge of the channel, and the charted positions of the buoys on the north side are 100 feet north of the dotted line.

b. Cut "A" Channel, which was widened to 500 feet in 1979, is also identified by a central range line, 063°-243°T, and dotted lines 400 feet apart, delineating the outer edges of the former 400 foot wide channel. East of the Skyway Bridge, Cut "A" Channel Buoy "3A" (LLPG 99) and Lighted Buoy "4A" (LLNR 1050) are positioned 500 feet apart to reflect this widening. The charted positions of these two buoys are each approximately 50 feet north and south of the dotted lines. There are no Cut "A" Channel buoys west of the Skyway Bridge except at the junction of Cut "A" and Mullet Key Channels. The south edge of the channel is marked by Lighted Buoy "2A". Lighted Bell Buoy "1A" marks the midpoint of the north edge of the junction widener and has no marking relationship to the north side of either Mullet Key or Cut "A" Channels. The distance between the charted position of Buoys "1A" and "2A" is 788 feet (See figure 1, Army COE chartlet).

c. Cut "A" Channel Lighted Buoy "2A" also marks the junction of the Intracoastal Waterway (IWW) with the main shipping channel. Additionally, vessels using Southwest Channel, south of Egmont Key, enter or depart the main shipping channel at this point. Vessels that use either the IWW or Southwest Channel are smaller, shallow draft vessels. The controlling depth of Southwest Channel is 17 feet. The controlling depth of the Intracoastal Waterway is 9 feet.

d. The Sunshine Skyway Bridge crosses Cut "A" Channel about three-quarters of the way down the channel. The twin center spans are 800 feet wide and have green navigation lights on the underside of the center of the spans identifying the centerline of Cut "A" Channel. There are also two sets of red navigation lights 430 feet apart, which approximate the location of the edge of the former 400 foot wide channel.

e. The limitations of the junction of Mullet Key and Cut "A" Channels are such that pilots feel that two large ships should not meet in the junction. Harry E. Knight, the pilot aboard CAPRICORN, testified that inbound loaded ships normally commence the turn into Cut "A" Channel by ranging the north side red lights under the Skyway Bridge with the Cut "A" Range Rear Light (LLNR 1049). A plot of this results in the ship crossing through the junction north of the range line intersections and near the center point between Cut "A" Channel Lighted Bell Buoy "1A" and Lighted Buoy "2A". However, Pilot Knight insisted throughout his testimony that the normal turn for such vessels was executed south of Mullet Key Channel range line close to Buoy "2A".

WIDENER OF MULLET KEY CUT

AND CUT "A" (TAMPA BAY)

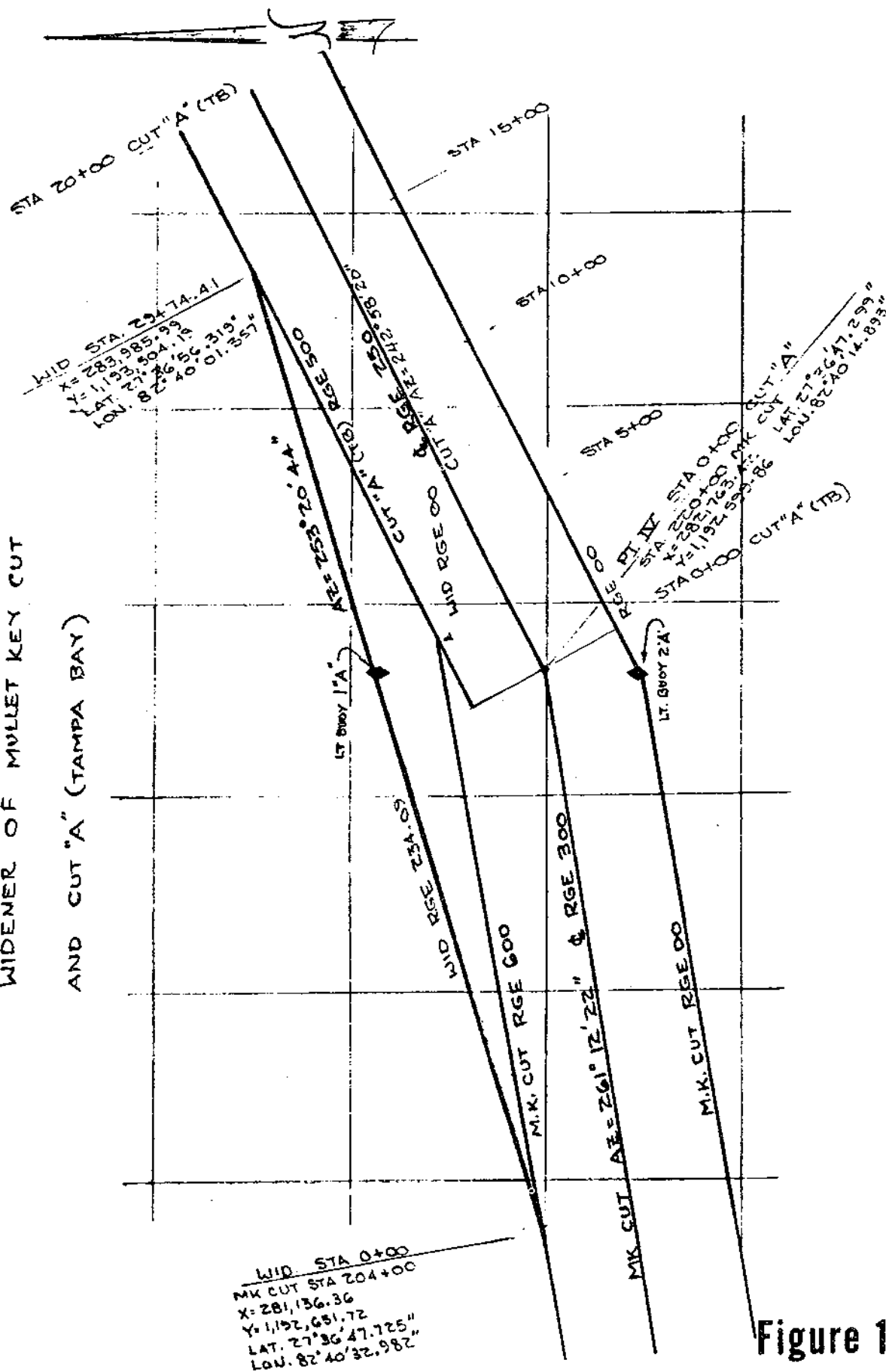


Figure 1

7. CAPRICORN'S INBOUND TRANSIT

a. CAPRICORN, with George P. McShea, Jr. as master, departed St. Croix, Virgin Islands on 24 January bound for Florida Power and Light Co. at Weedon Island Station in Upper Tampa Bay with 151,611 net barrels of No. 6 oil. At 1027 on 28 January CAPRICORN anchored in the Fairway Anchorage seaward of Egmont Key. Nine licensed officers, 23 unlicensed merchant seamen and one person in addition to the crew were on board. CAPRICORN's Certificate of Inspection dated 23 June 1979 and issued at Jacksonville, FL, required a total of six able seaman. For this voyage two of the required able seamen, [REDACTED]

[REDACTED] were holders of Merchant Mariners Documents endorsed as Able Seaman - 12 Months.

b. Prior to entering the Navigable Waters of the United States, Chief Mate John Gordon had the steering gear, main propulsion machinery and control communications and alarms tested, but did not ensure that the emergency generator or that storage batteries for the emergency lighting and power systems were tested. He logged that all equipment was tested in accordance with 33 CFR 164.25 and reported the foregoing to Captain McShea. It was Captain McShea's policy that all tests required in 33 CFR 164.25 need not be conducted prior to every occasion of entering U.S. Navigable Waters, if such tests were otherwise conducted on a periodic basis, i.e. the emergency generator and storage batteries were routinely tested once a week, regardless of the vessel's location.

c. At 1846 CAPRICORN weighed anchor and proceeded at 70 RPM, 12 knots, into Egmont Channel. According to [REDACTED] Mate [REDACTED] the port anchor was housed and set on the brake with the gear disengaged, the devil's claw off and the riding pawl down. The starboard anchor was housed and was not ready for letting go. The anchor detail was then secured after the chief mate reported to the master that the port anchor was ready for letting go. He indicated that it takes two men to release the anchor windlass brake. The port anchor was a 13,500 pound stockless type with eleven shots (990 feet) of 2½ inch stud-link chain.

d. Pilot Knight embarked at 1911 after which he assumed the conn and, at the suggestion of Captain McShea, increased speed to 78 RPM, which is 13.8 knots through the water according to CAPRICORN's maneuvering data. After Pilot Knight came aboard he advised Captain McShea that the Cut "A" Channel Range Front Light (LLNR 1048) was extinguished and that Mullet Key Channel Buoy 14 (LLPG 99) was off station in the direction of center channel. Pilot Knight indicated that there were two piloted outbound vessels that CAPRICORN would meet on her inbound transit. They were the only piloted vessels of which he was aware. Pilot Knight had piloted CAPRICORN on two previous occasions, most recently in October 1979, and felt he was familiar with her maneuvering characteristics. Captain McShea did not pass any

information to Pilot Knight concerning whether or not the anchors were ready for letting go.

e. On entering Egmont Channel Pilot Knight made an open SECURITE call on channel 13 using his hand held Motorola VHF-FM radio. At that time he steadied on Egmont Range (LLNR 1032 and 1033) and determined the gyro error to be zero by making an observation on the range without benefit of a bearing circle. Prior to this, CAPRICORN's gyro error had usually been 1° West according to Captain McShea. At 2000 CAPRICORN passed Egmont Key Light (LLNR 1038) abeam to starboard, proceeding towards Mullet Key Channel. Pilot Knight observed the outbound KAZAKHSTAN, a USSR passenger vessel, east of the Sunshine Skyway Bridge in the vicinity of Cut "B" Channel approximately 7 to 8 miles away. At that time he received an open SECURITE call from the tug OCEAN STAR, O.N. 572329, which was pushing a loaded barge in Mullet Key Channel. Pilot Knight set a course of 081°T upon entering Mullet Key Channel and steadied up on the range. In addition to Pilot Knight and Captain McShea, the bridge was manned by the 8 to 12 watch which consisted of [redacted] Mate [redacted] the watch officer, and Able Seaman [redacted] helmsman. The 10 cm radar was in operation and was looked at periodically by Captain McShea and [redacted] Mate [redacted]. The 3 cm radar was on standby. Ordinary Seaman [redacted] was the bow lookout. He was not equipped with binoculars. He had been instructed not to routinely report well lighted vessels in the channel unless there was something unusual about them. This was to keep the bridge from being deluged with routine calls. Upon relieving the previous bow lookout, he was informed that the port anchor was ready for letting go. [redacted] observed that the riding pawl was in the up position on the port anchor chain.

f. CAPRICORN met and passed the tug OCEAN STAR just east of Mullet Key Channel Buoy "15" (LLPG 99) and Lighted Buoy "16" (LLNR 1045). At the time of this passing, CAPRICORN was close to or on the range. Soon after, Pilot Knight observed KAZAKHSTAN outbound, doing in excess of 14 knots, turning into Mullet Key Channel from Cut "A". The bow lookout called the bridge to report this vessel because he felt that it was in the middle of the channel and that it was going to be a close passage. Radio communications were established with Pilot [redacted] on KAZAKHSTAN using the pilot's hand held radio on VHF-FM channel 13. Both pilots agreed to a port to port passing. According to personnel on the tug PAT B, O.N. 290289, and BLACKTHORN, who overheard the conversation, Pilot [redacted] advised Pilot Knight that a Coast Guard vessel was following KAZAKHSTAN. However, Pilot Knight and Pilot [redacted] testified that this conversation occurred after the collision. The two pilots then shifted to VHF-FM channel 77 for continued discussions. As the two vessels passed close aboard, Pilot [redacted] apologized to Pilot Knight for crowding him.

g. After passing KAZAKHSTAN, approximately 50 feet to port, Pilot Knight, still talking to Pilot [redacted] on channel 77, left

the port bridge wing and went to the starboard bridge wing to observe Mullet Key Range. Captain McShea followed Pilot Knight inside the pilothouse and stopped at the radar. At this time Knight first observed the white masthead and range lights and green side light of BLACKTHORN as she was proceeding outbound west of the Sunshine Skyway Bridge in Cut "A". Although Captain McShea had periodically checked the radar, which was on the 3 mile scale, he had not previously detected this outbound contact. He now sighted the BLACKTHORN approximately two thirds of the way down Cut "A" Channel from the bridge. The bow lookout, Ordinary Seaman [REDACTED], had also sighted but did not report the cutter ahead. He did not consider anything to be unusual about BLACKTHORN when he first sighted her.

h. Pilot Knight shifted his hand held radio back to channel 13 and attempted to contact the outbound cutter with no reply. He walked back inside the pilothouse and stood just to the left of the centerline of the ship. He observed the relative bearing of the oncoming vessel and the aspect of her running lights remain constant for about 30 seconds. The bearings were taken visually without benefit of a bearing circle. He attempted a second call and again received no reply. Pilot Knight, constrained by CAPRICORN's draft to remain in the channel and approaching his normal turning point, did not change course or speed. He decided against sounding a one short blast whistle signal proposing a port to port passage, because he did not want to "limit the options of the other vessel". By this time BLACKTHORN appeared to have passed Lighted Buoy "1A". Now, Pilot Knight felt BLACKTHORN was not going to change course into Mullet Key Channel but, instead, was going to cross ahead and go out of the channel east of Lighted Buoy "2A". At this time Captain McShea, concerned due to the lack of radio contact and trying to evaluate the situation, left the radar and walked up alongside the pilot and said, "What's this guy trying to prove?" Pilot Knight did not respond to the comment or indicate that the Intracoastal Waterway and Southwest Channel traffic departed Cut "A" Channel near Lighted Buoy "2A". By this time the bow of CAPRICORN was fast coming up abeam of Lighted Buoy "2A". CAPRICORN had to commence its turn soon or risk grounding on the southeast bank of Cut "A" Channel.

i. Pilot Knight now felt that there was no chance for a port to port passing. He put the rudder left 10 degrees and sounded two short whistle blasts. Captain McShea had reached the same conclusion and silently concurred with his pilot's actions. CAPRICORN's bow lookout, [REDACTED], determined that something was wrong when BLACKTHORN kept steaming down the channel with no indication that it was going to turn. He intended to report it to the bridge when he heard the two whistle blasts from the air whistle just behind him. Knowing the bridge had seen the oncoming vessel, he did not make his call. No answering whistle signal was received from BLACKTHORN. Five to 10 seconds later Knight ordered the rudder 20 degrees left, then immediately hard left, and sounded the danger signal. Captain McShea then

observed the range lights of the oncoming cutter line up very quickly, indicating a right turn directly towards CAPRICORN.

j. Chief Engineer [REDACTED] had been inside the deckhouse when he opened the forward starboard door to go out and get some air. [REDACTED] immediately heard CAPRICORN's danger signal and saw a vessel close off the port bow. He ran down to the engine room control platform and told First Assistant Engineer [REDACTED] to immediately answer all bells. Previously the engine room watch had been augmented by an additional engineer, as was the practice while in restricted waters. Normal throttle response time would have been longer had not Wattam directed otherwise.

k. During her transit from anchorage no one on CAPRICORN plotted her position on the navigation chart or evaluated the danger of each closing contact, other than by seaman's eye. It was not the practice of Captain McShea to require positions to be plotted for Tampa Bay transits.

l. Pilot [REDACTED] testified that on most ships he has piloted in Tampa, the ship's personnel would mark the times of passing some of the aids to navigation on the chart but in no case were actual fixes plotted. He further stated that on about 15% of the ships no marks at all were made on the chart.

8. BLACKTHORN'S OUTBOUND TRANSIT

a. Prior to getting underway BLACKTHORN personnel conducted tests of radio and navigational equipment, steering gear, pilot house controls and the ship's whistle. Earlier in the day, during sea trials which had lasted about two hours, BLACKTHORN had experienced main generator problems which were later corrected by a manufacturer's representative prior to departing for sea. At 1804 BLACKTHORN departed Gulf-Tampa Drydock en route Mobile, AL, having been in the shipyard since 15 October 1979. Six officers and 44 enlisted crewmembers were on board. The vessel was fully loaded with 51,270 gallons of water (95 percent full) and 26,695 gallons of diesel oil (95 percent full) according to log entries at 0000 on 28 January. The 16" radar was on and manned for navigational purposes. The 12" radar was operating, but was unmanned. There were telescopic alidades on each bridge wing gyro repeater to aid in obtaining visual bearings. A VHF-FM COMCO, set on channel 13, was also placed on each bridge wing for the conning officer.

b. LCDR Sepel unmoored BLACKTHORN and retained the conn to get a feel for the response of the ship after correction of the problems which had been encountered during the sea trials. During the transit down Sparkman Channel, LCDR Sepel observed KAZAKHSTAN underway in Seddon Channel in a southerly direction on a converging course. He determined that BLACKTHORN, making approximately 12 knots, was pulling ahead of KAZAKHSTAN and turned into Cut "D" Channel ahead of her. When clear of Pendola

Point and satisfied the ship was responding normally, LCDR Sepel directed the Executive Officer, LT David B. Crawford, to assume the conn. During this time, it had been observed that the shaft tachometer was not operating properly. Determining this to be a minor problem, the decision was made to continue and repair it the following day. However, LCDR Sepel decided to go below to the engine room to check out the situation with the Engineer Officer and departed the bridge. Shortly thereafter he returned.

c. BLACKTHORN had set a modified special sea detail by this time which retained the extra personnel for the bridge watch and engine room. The anchor detail and after steering remained manned. There were four men on the forecastle ready to let the anchors go. QM1 Jeffrey Huse had determined the gyro error to be 1° West using a telescopic alidade on one of the terrestrial ranges soon after getting underway. The navigation team on the bridge consisted of ENS Frank Sarna plotting, ET1 Jerome Ressler on the radar and QM1 Huse taking visual bearings. Although the navigation team was plotting periodic fixes and passing them to the conn, the conning officer was essentially navigating by seaman's eye. Recommended times to turn to new courses were passed, but no dead reckonings or turn bearings were laid on the chart. The conning officer was using seaman's eye to navigate from one cut to another and employing the terrestrial ranges to help him line up in the channel. Turns were made directly from one channel to another. The "dogleg" wideners were not used. No one was assigned to maintain a shipping plot. Ship's policy was to maintain one during fog navigation only. Neither of BLACKTHORN's boats were rigged for sea and it was the Commanding Officer's policy not to do so.

d. During the transit of Upper Tampa Bay BLACKTHORN met and passed the tug PAT B, O.N. 290289, pushing a loaded barge up Cut "E" Channel. Although a port to port passage was arranged on Channel 13, BLACKTHORN maintained a position close to center channel, forcing the PAT B to move further to her right. BLACKTHORN and PAT B passed at less than 40 feet. The close passing did not affect the maneuverability of either vessel.

e. KAZAKHSTAN increased speed and was overhauling BLACKTHORN. When attempts at radio contact were unsuccessful, speed reductions were necessary so as not to get too close. Pilot Maddox finally raised BLACKTHORN on Channel 13. His request that BLACKTHORN move out of the channel was granted. The brightly lighted KAZAKHSTAN passed in Cuts "D" and "C" while BLACKTHORN moved out of the channel. When BLACKTHORN reentered in Cut "C" Channel LT Crawford asked LCDR Sepel if he would temporarily relieve him of the conn. The Commanding Officer directed that ENS John Ryan, the Officer of the Deck (OOD), take the conn. This was approximately 1955. Shortly thereafter BLACKTHORN turned into Cut "A" Channel. ENS Ryan turned directly from Cut "B" to Cut "A" Channel; he did not utilize the widener or make a "dogleg" turn. ENS Ryan had observed that the Cut "A" Channel Range Front Light was extinguished, which he brought to the attention of LCDR Sepel.

f. SA Mark Gatz, who was equipped with binoculars, had been the only assigned lookout on the flying bridge since BLACKTHORN got underway. Ship's policy was to station the lookout on the flying bridge to get the height of eye advantage in order to detect contacts at greater distances. The anchor detail on the forecastle was considered by LCDR Sepel to be a secondary lookout. However, testimony indicated that no one on the anchor detail considered himself to be a lookout. SA Gatz was wearing head phones and was on the 1JV circuit along with SA Steven Coleman on the forecastle and HM3 Ricky Chamness on the bridge. ENS Ryan directed an additional circuit be manned when he learned that phone talkers were experiencing background noise on the 1JV circuit. SK1 Ronald McCray was called to the bridge and directed to man the 2JV circuit along with SNQM Roger Shine in after steering and an unknown person in the engine room. Although there was noise on this line also, communications were possible on both circuits. The engine room was manned with extra personnel in order to monitor equipment that had been worked on during the yard period.

g. As BLACKTHORN approached the Sunshine Skyway Bridge, lookout Gatz became engrossed with a shrimp boat that appeared to be overtaking them (later identified as THE BAYOU, O.N. 511656). The navigation team, under the direction of ENS Sarna, was locating new terrestrial points to use for fixes after passing under the bridge. LT Crawford had returned from below and was on the port bridge wing along with LCDR Sepel and ENS Ryan. Since Cut "A" Range Front Light was extinguished, ENS Ryan was periodically taking visual bearings on Cut "A" Range Rear Light to help determine his position with respect to the center of Cut "A" Channel. All of the bearings were virtually constant with no appreciable change as they moved down the channel. The course written on the navigation chart was 242° True. The range line for the channel is 243° True.

h. ENS Ryan conned BLACKTHORN under the Sunshine Skyway Bridge just to the right of the green navigation lights positioned on the underside of the bridge marking the centerline of Cut "A" Channel. At that time ENS Sarna marked the vessel's position on the navigation chart as minute 18, which indicated a speed of 11.7 knots. LCDR Sepel went inside the pilothouse, looked at the 16" radar, and observed a large radar contact to the east of Mullet Key Channel Buoy "15". He looked ahead and saw the bright lights of KAZAKHSTAN on the same relative bearing as the radar contact. LCDR Sepel then moved to the chart table to examine the chart and refresh his memory on the trackline past Egmont Key. Soon after clearing the Skyway Bridge, LT Crawford asked ENS Ryan if he had talked to a vessel whose navigation lights were just beginning to separate from the lights of KAZAKHSTAN in Mullet Key Channel. ENS Ryan replied that he had not. He requested that LT Crawford contact the inbound vessel on channel 13 using the COMCO VHF-FM transceiver so that he could concentrate on evaluating the oncoming contact. HM3 Chamness while inside the pilothouse also sighted lights emerging from behind KAZAKHSTAN. After watching them for a period of time and noting that they appeared to have a

very rapid left bearing drift, Chamness asked the flying bridge lookout, SA Gatz, if he saw them. When Gatz verified that he did see the lights, Petty Officer Chamness did not report the sighting to the conn because it appeared by then that ENS Ryan was already aware of them. The anchor detail on the bow had their attention concentrated on the KAZAKHSTAN ahead of them. The passenger liner was brilliantly lighted with red, green, blue and white deck lights. The four crew members on the bow did not notice the CAPRICORN until she sounded her whistle and collision was imminent.

i. LT Crawford called the inbound vessel in Mullet Key Channel and a short time later heard a garbled response, followed clearly by the words, "coming out of anchorage, won't be in your way". LT Crawford testified that LCDR Sepel ordered him to "roger" for the transmission; LCDR Sepel denied giving such an order. There were no other witnesses who recalled such an exchange. At approximately the same time, KAZAKHSTAN was conversing with OCEAN STAR on VHF-FM Channel 13 in the vicinity of Mullet Key Channel Lighted Bell Buoy "13" (LLNR 1044). OCEAN STAR, using 25 watts power, was informing Pilot Maddox on KAZAKHSTAN that she was crossing the channel to enter the anchorage east of Egmont Key and that she would be out of his way and leave him plenty of sea room.

j. During this period ENS Sarna had obtained and plotted a fix west of the Skyway Bridge but did not place a time next to it. BLACKTHORN was tracking on or slightly to the right of Cut "A" range line. ENS Ryan attempted to take bearings of the oncoming vessel using the port bridge wing gyro repeater, but could not because of the obstruction caused by the port boom vang. (When the ship's boom is cradled amidships, the port and starboard boom vangs located on the forward corner of the bridge wings obstruct an arc of visibility of the telescopic alidades from dead ahead to 10 degrees inboard.) He then went to the starboard bridge wing gyro repeater and obtained a bearing.

k. LCDR Sepel was still at the chart table when he overheard LT Crawford's radio call and the garbled response, "going into or coming out of anchorage (he couldn't remember which), I won't be in your way", over the Triton monitor. This alerted him to the presence of another vessel in addition to KAZAKHSTAN. In the meantime, ENS Ryan had returned to the port bridge wing gyro repeater after passing through the pilothouse and stopping to take a short look at the radar. He took a second bearing on the incoming vessel, determined a slight left bearing drift, then turned and took a quick bearing astern on Cut "A" Range Rear Light and found it to be the same as the previous ones. Having heard nothing from the Executive Officer and assuming that a port to port passage had been successfully arranged ENS Ryan decided to commence his right turn into Mullet Key Channel early in order to provide a little more sea room for the oncoming vessel. He ordered Helmsman QM3 Richard Gauld to come right to 263°, which was the gyro compass course for Mullet Key Channel. He did not

give a rudder command, leaving the amount of rudder to the helmsman.

1. ENS Ryan did not take any turn bearings or a bearing on Lighted Bell Buoy "1A" to see how this new course change would leave the buoy. He was using seaman's eye to negotiate the turn. Also, he did not sound a one short blast whistle signal due to the ship's general policy of not sounding whistle signals if passing agreements had been made by radio. The Commanding Officer felt that this would avoid "possible confusion". LCDR Sepel then stepped onto the port bridge wing, sighted the oncoming CAPRICORN for the first time, and said, "Where the (expletive deleted) did he come from?" He motioned to ENS Ryan to continue right.

m. Whistle signals from the oncoming vessel were heard and LCDR Sepel yelled, "Right full rudder!", thereby automatically taking the conn from ENS Ryan. This order was heard by O'Boyle, CAPRICORN's bow lookout. LCDR Sepel ordered that "standby for collision" be piped and put the engines back full, using the port bridge wing pilothouse control. BLACKTHORN's course had changed about 20° to the right when impact occurred. All anchor detail personnel scrambled off the bow onto the buoy deck just before impact except for SN Michael Rhodes, who had previously relieved SA Coleman as phone talker. He couldn't unhook the headset in his haste and thus was trapped on the bow at impact.

9. COLLISION

a. At 2021, according to CAPRICORN's bell book, CAPRICORN and BLACKTHORN collided port bow to port bow at a relative angle of 180°. It is estimated that collision occurred between 5-15 seconds after CAPRICORN's sounding of the danger signal. Immediately after impact CAPRICORN stopped her engines. Impact forced BLACKTHORN to an approximate 15° starboard list, after which she rolled to port and settled at an approximate 5° port list. As both vessels continued past each other, CAPRICORN's port anchor raked BLACKTHORN's side and ripped into the crew's head and shower area, where it became imbedded as the anchor chain commenced running out. CAPRICORN placed her engines full astern with her rudder remaining hard left. BLACKTHORN's engines had been backing full since before impact and her rudder remained right full.

b. CAPRICORN decelerated while in a left turn, towing BLACKTHORN stern first in Cut "A" at a rate of astern speed never before attained in the Commanding Officer's memory. Pilot Knight kept the rudder hard left to ground the vessel and avoid colliding with the Sunshine Skyway Bridge. The anchor chain continued to run out, overriding the brake. The bow lookout, O'Boyle, had watched the two vessels collide until dust and debris from impact and the running anchor chain clouded his vision. He also heard the port anchor chain running out immediately after impact.

c. About 20 off duty crew members assembled on BLACKTHORN's messdeck, the mustering location of the damage control party, and awaited further instructions. The General Quarters alarm had not been sounded and no further instructions had been piped over the 1 MC public-address system. CWO2 John Miller, the Engineer Officer, determined from MKC Luther Stidhem, the Engineer Officer of the Watch, that the engine room was not taking on water. CWO2 Miller checked the motor room and found it dry also. Three individuals who had been in after steering exited that compartment, dogging the door behind them but leaving the port side porthole open. BM3 Charles Bartell, after emerging from forward berthing, dogged the watertight doors to forward and after crew's berthing.

d. There was confusion and panic on the messdeck. New crew members who had reported on board during the yard period froze. During the 3½ month yard period, six new crew members had reported aboard straight from boot camp or via class "A" school. This was their first day underway on BLACKTHORN. Some of them went to the Watch, Quarter and Station Bill posted in the starboard passage-way aft of the messdeck, adjacent to the ship's office, to check their collision at sea assignments. BM3 Bartell took charge on the messdeck and ordered material condition ZEBRA set, including the closing of the open portholes. He also ordered damage control equipment broken out from the repair party locker and personnel to report to their General Quarters stations. SS2 Clint Campagna reported to the bridge by telephone from the messdeck and was told to standby for instructions.

e. MK1 Bruce LaFond, who had been in the portside crew's shower area at the time of collision, was found by MKC Rondal Litterel and CWO2 Miller in the port maindeck passageway, naked, injured and in apparent shock, mumbling something about the anchor in the shower. MKC Litterel went forward to the crew's head and shower area to check out the damage, and found a large anchor imbedded in the joiner bulkhead separating the crew's shower from the vestibule at the top of the port ladder from after crew's berthing. SN Rhodes, having been injured on the forecastle at impact, was being helped to the messdeck by SS3 David Marak and SN Anthony Ware. FNMK Robert Niesel, who had been in after berthing when the collision occurred, was on the messdeck securing portholes when he became concerned that someone might still be in after berthing. He undogged the watertight door, 1-77-1, and went below and thoroughly checked the space, finding no one.

f. On the bridge, QM1 Huse was directed to broadcast a MAYDAY on VHF-FM Channel 16. QM2 Gary Crumly went to the chart room to break out the inflatable lifejackets for the bridge personnel. LCDR Sepel asked ENS Sarna where the nearest shoal water was and received a reply of Mullet Key Shoal to the north. At that time LCDR Sepel brought the engines to stop and then may have placed them ahead to proceed towards shoal water. There is conflicting evidence as to whether or not LCDR Sepel actually put the pilothouse controls in the ahead position. The first divers on

scene found the pilothouse controls at the stop position. The malfunctioning tachometer inside the pilothouse showed that the engines were astern at approximately 100 RPMs when the gauge stopped functioning after capsizing. Although LCDR Sepel could not remember putting the controls ahead during his testimony, his personal notes written hours after the collision stated he had done so. Many survivors reported seeing the propeller still turning after the vessel capsized, but the only one who could recall the direction of rotation described it as being in a backing direction.

10. CAPSIZING

a. BLACKTHORN suddenly rolled to port and capsized within 15 to 20 seconds. LCDR Sepel, while still handling the pilot house controls on the port bridge wing, shouted, "Abandon ship!" No one had time to pipe the order over the 1 MC public-address system before the vessel rolled on her port beam. As the vessel rolled over, the ship's service generators tripped off the line and the vessel's lights went out throughout the ship. No personnel could recall any of the emergency battle lanterns coming on. Personnel on the messdeck exited fore and aft. BM3 Bartell attempted to reach the starboard boat to cut the boat falls, free it and get it over the side. By that time the vessel was too far over, so he continued aft towards the fantail in an unsuccessful attempt to cut the liferafts free before they were submerged. EM3 Larry Clutter ran to the 01 deck starboard lifejacket locker and started throwing lifejackets to men already in the water. Several men who were fortunate enough to reach the starboard side of BLACKTHORN as she rolled on her port side climbed the hull onto the keel as the vessel continued to roll to an inverted position.

b. SA GATZ on the flying bridge also experienced difficulty in freeing his sound powered phone and, as the vessel rolled, he was dragged under. Unable to unhook the headset, he cut the strap with his knife, freeing himself, and made his way to the surface.

c. SA Michael Gray and SN Rhodes were on the messdeck after the BLACKTHORN capsized. SN Rhodes went forward and, standing on the port bulkhead of the starboard vestibule, opened and held the 130 pound starboard watertight door, 1-70-1, over his head while the vessel was on its port side so that two of his shipmates could escape. Then, he escaped as water rushed in. FNMK Niesel had just finished his inspection of after berthing when the vessel rolled. He fought his way up the starboard ladder as water rushed up the athwartships passageway and flooded after berthing. Upon reaching the top of the ladder the flooding water swept him onto the inverted messdeck, where he swam through the starboard watertight door to the buoy deck and escaped.

d. As the vessel rolled to an inverted position, SA Warren Brewer climbed up into the engine room through the escape scuttle

located aft on the messdeck. He shined a flashlight down through the scuttle and shouted, "I've found a way out! I've found a way out!" The personnel still trapped in the pitch dark, rapidly flooding messdeck rushed for the scuttle and apparent safety. SA Gray, realizing that the engine room was not the way out, convinced SA Charles Hall and another crew member of that fact and, linked together, led them underwater toward the starboard door out to the buoy deck. As they exited the messdeck the three men became separated, and Gray surfaced alone beneath the inverted buoy deck. He reported the situation to LCDR Sepel who was hanging onto the bars in the freeing ports, outside the vessel. Realizing that the rapidly flooding vessel was in imminent danger of sinking, LCDR Sepel ordered SA Gray not to attempt to return to the messdeck. He directed SA Gray to dive under the bulwark and swim away from the vessel to avoid being carried under by the suction of the sinking vessel.

e. Many personnel gathered in the water around the quarterdeck shack that was floating next to BLACKTHORN. CWO2 Miller cajoled and organized them, ordered other men off the capsized vessel into the water and into lifejackets, and mustered them around the quarterdeck shack for mutual support while awaiting rescue. The apparently unconscious CWO2 Jack J. Roberts, Jr., was brought to the quarterdeck shack by FNMK Niesel and EM3 Clutter.

f. All of the survivors reported difficulty in being able to make full use of their lifejackets. Many of them could not untie the tightly bundled jackets in the cold water and clutched them to their chest for use as a float. Others, who were able to don a jacket, either had difficulty in finding the securing straps and left the jacket hanging open or, if unable to sort out the various straps, grabbed them into a clump and tried to hold the jacket together. In no case did any of the survivors utilize the leg straps and in only one case were the collar straps tied together. One survivor put his head through one of the armholes and was able to utilize it in that fashion.

g. CAPRICORN's anchor fell from BLACKTHORN's side to the channel bottom at an approximate position bearing 067°T, 527 yards from the junction of Mullet Key Channel and Cut "A" Channel range lines. A section of CAPRICORN's bolster and an 11 by 3 foot section of steel plate weighing about 1100 pounds was found in the same location. CAPRICORN's bow grounded on the north side of Cut "A" Channel in a position bearing 046°T, 800 yards from the junction of Mullet Key Channel and Cut "A" Channel range lines. She then pivoted left, finally coming to rest on a heading of 281°T at 2035.

11. FLOODING

a. After capsizing there was free access for water entry above the main deck through the port side shell damage from frame 68 to frame 98. Flooding occurred through the port side hull damage below the main deck from frame 58 to about frame 66. This small

penetration opened the hull in way of the main hold and forward berthing. Flooding to after berthing would have also occurred through the damaged watertight door structure (1-89-2) and vestibule at frame 89 port side.

b. Watertight accesses to the engine room, motor room and after steering were secured. The after steering porthole, port side, was open at the time of collision and was not secured after the collision. The 7 by 7 foot hatch (1-23-0) leading from the buoy deck to the forward hold was found near where BLACKTHORN came to rest on the bottom some time after capsizing. Flooding of the engine room and motor room would have occurred through vents on the 01 deck at frame 115, after BLACKTHORN rolled 90 degrees and the water level was above the centerline.

12. SEARCH AND RESCUE

a. A MAYDAY from BLACKTHORN was received at Group St. Petersburg at 2022:26 on 28 January on channel 16 VHF-FM. After Group requested the state of damage, BLACKTHORN responded, "standby" at 2023:14. No further transmissions from BLACKTHORN were received. At 2024:25, CAPRICORN transmitted a SECURITE call on channel 16, announcing that it had been in a collision with another vessel which appeared to be sinking. When Group St. Petersburg called back asking for more information, an unidentified vessel (believed to be THE BAYOU) broke in at 2025:09 and reported the vessel had sunk and asked for assistance on scene. CAPRICORN also requested that Group St. Petersburg dispatch all vessels. Less than 4 minutes after BLACKTHORN sent its MAYDAY, CAPRICORN reported itself possibly aground at 2025:54. Radio communications during the initial SAR phase on Channel 16 were orderly.

b. The shrimp boat, THE BAYOU, which had been following BLACKTHORN in Cut "A" Channel, arrived on scene within minutes and commenced rescuing survivors. THE BAYOU picked up 23 survivors and provided them with clothing, food and warmth. THE BAYOU was manned by William Parker, Vince Dyer and Charles Whitelaw.

c. Group St. Petersburg ordered UTB CG 41452 underway en route the scene and recalled the crews of USCGC VISE (WLIC 75305) and WHITE SUMAC (WLM-540). Five other Coast Guard small boats were dispatched. Surface and shoreside assistance was provided by U. S. Coast Guard Auxiliary, Eckerd College Search and Rescue Unit, Pinellas County Sheriff's Office, St. Petersburg Police Department, Florida Marine Patrol, Florida Highway Patrol, Tampa Police Department, Tampa Fire Department, Palmetto Police Department, commercial shrimp vessels and civilian volunteers.

d. CG 41452 arrived on scene at 2052 and rescued 4 survivors. CWO2 Roberts was retrieved from the water where he had been supported by FNMK Niesel, EM3 Clutter, BM3 Bartell and CWO2 Miller. CWO2 Miller was without a lifejacket but would not leave the water until CWO2 Roberts had been taken on board.

e. Several BLACKTHORN personnel on THE BAYOU, including BM3 Bartell and HM3 Chamness, had gone aboard CG-41452 to assist in recovering CWO2 Roberts. BM3 Bartell reentered the water and assisted in placing CWO2 Roberts in the Stokes litter where he was lifted to the deck of the 41 footer. BM3 Bartell was then brought aboard the 41 footer where he commenced resuscitation efforts on the lifeless CWO2 Roberts under the direction of HM3 Chamness in a vain attempt to save his life. All survivors were taken to Mullet Key by THE BAYOU and CG 41452 where they were turned over to shoreside rescue and assistance personnel.

f. CAPRICORN had an oar propelled lifeboat launched and underway within 24 minutes which continued to search for 2 hours. The lifeboat was manned by Second Mate Stephen Sadler as boat officer and volunteers David Gilmore, Peter Hulsebosch, William Thom, Donald Barney, Robert Rentz and Bennie Spencer.

g. Airborne support was provided by Coast Guard Air Station Clearwater helicopters CG-1481 and CG-1495. The Pinellas County Sheriff's Office, Tampa Police Department and St. Petersburg Police Department also provided helicopters for search assistance.

h. Civilian divers from Eckerd College Search and Rescue Unit arrived on scene about 2 hours after the accident and conducted scuba diving on BLACKTHORN to detect the presence of survivors. The divers did not enter the sunken vessel and no evidence of life was detected.

i. Three 'hard hat divers from Coastal Diving and Marine Construction of Tampa arrived on scene at 0500. They dove two times for orientation and to help position USCGC VISE over BLACKTHORN. On the third dive the starboard side of the hull was tapped from the outside. Debris could be heard randomly striking the hull from the inside of the vessel. On the fourth through sixth dives three bodies were recovered. No air pockets or survivors were found inside BLACKTHORN after a search of all accessible spaces. Scuba divers from the Pinellas Park Fire Department retrieved two bodies from the buoy deck of BLACKTHORN on the morning of 29 January.

j. The active Coast Guard search terminated at 1650 on 30 January. Twenty-seven survivors and six deceased had been accounted for. On 3, 5 and 6 February, individual bodies were found within 5 miles of the accident site. On 19 February, the remaining 14 bodies were found on board BLACKTHORN after it had been raised from the channel bottom.

13. REFLOATING CAPRICORN

a. After going hard aground, CAPRICORN dropped her starboard anchor at short stay to secure her position. All spaces were checked for damage and no holed tanks were found. Fearing the port anchor might still be snagged in BLACKTHORN, Captain McShea

ordered the anchor chain cut free on the forecastle and released into the water. After waiting for the "higher" high tide, CAPRICORN was freed at 1920 on 29 January with the assistance of tugs. She then continued under her own power to Weedon Island Station where she was unloaded.

14. BODY LOCATION

a. The body of CW02 Jack J. Roberts, Jr., was recovered by CG 41452 on the evening of 28 January. The death certificate lists the cause of death as drowning. His body was removed for burial to Machtelah Cemetery, Pascagoula, MS.

b. The body of MK1 Bruce M. LaFond was recovered by divers on the morning of 29 January on BLACKTHORN in the after area of the messdeck. The death certificate lists the cause of death as drowning. His body was removed for burial to Galveston County Memorial Cemetery, Hitchcock, TX.

c. The body of SA Charles D. Hall was recovered by divers on the morning of 29 January on the buoy deck, where it was wedged between the starboard boom vang winch and the bulkhead at frame 70. The death certificate lists the cause of death as drowning. His body was removed for burial to Culpepper National Cemetery, Culpepper, VA.

d. The body of MK1 Danny R. Maxcy was recovered by divers on the morning of 29 January in the vessel, at the base of, the upper ladder to the engine room. The death certificate lists the cause of death as drowning. His body was removed for burial to Spring Hill Memorial Gardens, Mobile, AL.

e. The body of ET1 Jerome F. Ressler was found by divers on the morning of 29 January on the buoy deck, forward port side. The death certificate lists the cause of death as drowning. His body was removed for burial to Arlington National Cemetery, Fort Myer, VA.

f. The body of SS1 Subrino I. Avila was recovered on 29 January by divers from the hatch leading from the aft athwartships passageway to the fantail. His foot was caught on the wire ladder rail and a strap of the lifejacket he had partially donned was snagged on something in the hatch. The death certificate lists the cause of death as drowning. His body was removed for burial to Galveston, TX.

g. The body of ENS Frank J. Sarna III, was recovered on the surface on the evening of 3 February, 50 yards south of BLACKTHORN's position on the bottom. The death certificate lists the cause of death as drowning. His body was removed for burial to Arlington National Cemetery, Fort Myer, VA.

h. The body of SA William R. Flores was recovered on the surface on 5 February, 1 mile southwest of Sunshine Skyway Bridge center

span. The death certificate lists the cause of death as drowning. His body was removed for burial to Benbrook Cemetery, Fort Worth, TX.

i. The body of QM3 Richard W. Gauld was recovered on the surface on 6 February in position latitude 27°-33.5'N, longitude 82°-44.6'W. The death certificate lists the cause of death as drowning. His body was removed for burial in Birmingham, AL.

j. Fourteen bodies were removed from BLACKTHORN on 19 February when she was raised. The body of QM2 Gary Wayne Crumly was found in the chartroom. The cause of death was listed as drowning. An autopsy report for Crumly conjectured that there was evidence that he may have suffocated rather than drowned, but it was not conclusive. The remaining 13 bodies were found in the starboard side upper level of the engine room. Death certificates in each instance listed the cause of death as drowning. However, with the exception of MK2 Richard D. Boone and FA Michael D. Luke, autopsy reports conjectured that there was evidence that raised the possibility of suffocation. Below is a list of locations of interment:

<u>NAME</u>	<u>LOCATION</u>
SNGM Randolph B. Barnaby	Gulf of Mexico, off Galveston, TX
MK2 Richard D. Boone	Lakewood Memorial Park, Hughson, CA
SA Warren R. Brewer	National Cemetery, Memphis, TN
QM2 Gary Wayne Crumly	Jefferson Memorial, Birmingham, AL
DC2 Daniel M. Estrada	Southlawn Cemetery, Tucson, AZ
GM2 Thomas R. Faulkner	Forest Park East Cemetery, League City, TX
SS3 Donald R. Frank	Live Oak Memorial Park, Jefferson County, TX
DC3 Lawrence D. Frye	Houston National Cemetery, Houston, TX
SA Glen E. Harrison	Wilhelm-Thurston Crematory, St. Petersburg, FL
FA Michael K. Luke	Restvale Cemetery, Worth, IL
SA John E. Prosko	Sugar Grove Cemetery, Toronto, OH
SA George R. Rovolis, Jr.	Greenwich Cemetery, Savannah, GA
EM3 Edward F. Sindelar III	Arlington National Cemetery, Ft. Myer, VA
MKC Luther D. Stidhem	Galveston Memorial Park, Galveston, TX

15. POLLUTION

a. As a result of the initial capsizing some oil was released which adversely affected many of the survivors in the water, both from ingestion and vapor inhalation. It had dissipated by daylight and could not be recovered.

b. There were no holed cargo or bunker tanks on CAPRICORN.

c. On 7 February a light sheen was observed over the wreck site. Environmental Coastal Pollution Cleanup Services of St.

Petersburg, FL, was contracted to stage cleanup equipment for immediate deployment. On 11 February a heavy stream of oil emanated from the wreck. Cleanup commenced immediately and continued until 14 February, during which time about 1700 gallons of diesel oil were recovered. The amount of oil that escaped recovery during salvage of BLACKTHORN was minimal.

d. The cost for pollution response was unusually high because of the type of equipment that was deployed and the need for a mobile platform which consisted of a barge, tug and attendant crews.

16. SALVAGE

a. Commandant, U.S. Coast Guard sought salvage assistance from Chief of Naval Operations, who provided the requested support. LCDR F. D. Meyer, USN, Commanding Officer, USS Preserver (ARS-8), was designated as On-Scene Commander and LCDR S. W. Delaplane, USN, Commanding Officer Harbor Clearance Unit Two, was designated as salvage master. Salvage efforts were augmented by explosive ordnance disposal (EOD) personnel from Explosive Ordnance Disposal Group Two (EODGRU TWO) Detachment, Fort Lauderdale, FL.

b. On 30 January USN divers determined BLACKTHORN to be resting on her port side (frames 56-135), 100 degrees from the vertical in approximately 48 feet of water on a heading of 287°T. The divers buoyed the bow and stern. An extensive internal survey was conducted primarily to determine if any of the crew members might be trapped and alive within the confines of the ship. Results were negative. However, debris inside the vessel restricted access to certain spaces, precluding a high confidence search of all interior spaces within the constraints of safety for diving personnel. The 7 by 7 foot forward cargo hold hatch cover was found lying on the bottom approximately 15 feet away from the buoy deck which was in a vertical orientation. The port and starboard watertight doors to the buoy deck, 1-70-1 and 1-70-2 and the watertight hatch leading from officer's country to the fantail, 01-135-0, were found open.

c. On 4 February the salvage master commenced efforts to rig for parbuckling (righting) BLACKTHORN utilizing two commercial heavy lift derrick barges, the CAPPY BISSO (650 tons lift) and LITTLE DAVID (100 tons lift). BLACKTHORN was righted on 13 February. Several days elapsed while efforts were made to lift BLACKTHORN. On 19 February the Barge KENYON (150 tons lift) in concert with the other two barges lifted BLACKTHORN from the bottom. Within 10 hours BLACKTHORN was dewatered. On 20 February BLACKTHORN was towed to Gulf-Tampa Drydock in Tampa.

17. CAPRICORN DAMAGE

a. CAPRICORN was examined afloat and on drydock in Jacksonville, FL, on 7 February and subsequent dates to determine the extent of damage resulting from the collision and grounding. As a result

of the collision CAPRICORN received damage in the port bow area to side shell plating, deck plating, bulwark, life rail, anchor crown and fluke doubler plates, hawse pipe structure and bolster, and various internals in the general area. The brake for the port wildcat was burned and the port devils claw was bent.

b. As a result of the grounding some sections of the starboard bilge keel were torn away and others were set up. A section of the flat plate keel was indented and several starboard shell plates were set up with internals buckled or distorted. The tips of all propeller blades were nicked and the stern tube packing gland was leaking excessively.

c. Satisfactory repairs were completed under the cognizance of the Officer in Charge, Marine Inspection, Jacksonville.

18. BLACKTHORN DAMAGE

a. BLACKTHORN was examined afloat and on drydock on 22 February and subsequent dates at Tampa to determine the extent of damage resulting from the collision, subsequent capsizing and sinking. As a result of the collision BLACKTHORN received extensive damage on the port side forecastle deck, bulwark, fashion plate and the sheer strake between frames 57 and 64. The superstructure between the main and 01 decks from frames 70 to 98 was torn and holed with all internals in the area extensively damaged and distorted. The port bridge wing support was bent and torn adrift at the base. The port boat and davits were extensively damaged (see figure 2).

b. As a result of the sinking there was extensive damage to the machinery, equipment and entire vessel due to exposure to sea water, salt, oil, debris and marine growth. There was damage also to deck plating, shell plating, and internals caused by bottom contact and the salvage efforts to right and dewater the vessel. Deck fittings including rails, hawser reels, jackstaff, mast, antennas, awnings, lights and other fittings were damaged or missing.

c. Due to the extensive damage and the cost to make needed repairs, Commandant, U. S. Coast Guard decided to decommission and place the BLACKTHORN in an "inactive, out of commission in reserve" status as soon as possible.

19. DEBRIS FIELD SEARCH

a. Three searches of the channel using side scanning sonar were made in order to position BLACKTHORN and to locate other debris which might be on the bottom. One of these searches was contracted for by Apex Marine Corporation and two by the Board. CAPRICORN's port anchor and chain and possibly some other major pieces of debris were detected. The Board requested diver support from the U. S. Navy in order to execute a detailed bottom search.

b. Scuba equipped divers of EODGRU TWO Detachment, Fort Lauderdale under Officer in Charge, LCDR Stephen Gilchrist, USN, and augmented by personnel of EODGRU TWO Detachments, Key West and Panama City, FL, were tasked to provide diver support. During the early stages of the search, hard hat divers contracted by Apex Marine Corporation participated under supervision of four divers from U. S. Coast Guard Atlantic Strike Team.

c. The search commenced in the general vicinity of Cut "A" Channel Lighted Bell Buoy "1A" in an area based upon testimony. As soon as some debris of potential evidentiary value was detected on the bottom, a plan was developed for making a comprehensive bottom search from the line connecting Buoy "1A" to Cut "A" Channel Lighted Buoy "2A", extending eastward and westward across the width of the channel. The divers conducted this cross channel search using two jackstays anchored on the bottom. A search was made along the jackstay, after which each end of the jackstay was moved 6 feet to the next adjacent area to be searched.

d. The search area extended from approximately 190 feet to the east and 390 feet to the west of Buoy "1A" and approximately 415 feet to the east and 210 feet to the west of Buoy "2A", across the channel. The probability of detection was 86 percent. An area of 911,000 square feet was searched. The search period extended from 27 February to 25 March.

e. As each item was located it was buoyed by the diver. Either the U. S. Army Corps of Engineers vessel CANAVERAL or FLORIDA would pick up the buoy and plumb the buoy line to position the marked object. The position was then established by use of a Motorola Multi-Range Navigation Survey System which provided an accuracy of plus or minus 3 meters (10 feet) or the Cubic Model 40A System with an accuracy of plus or minus $\frac{1}{2}$ meter. The degree of accuracy experienced by equipment operator Carl Nigh throughout the search was 5 feet or less. These positions were then plotted on a U. S. Army Corps of Engineers survey chart of the area (see figure 3). A list of significant items with their bearing and distance from a datum of the junction of Cut "A" Channel and Mullet Key Channel range lines (27°-36'-47.299"N, 82°-40'-14.893"N) is as follows:

<u>ID NO.</u>	<u>LOCATION</u>	<u>DESCRIPTION</u>
8M-1P	064°T - 106.6 yds	1½" STEEL PLATE CURVED
8M-2P	069°T - 101.6 yds	1½" STEEL PLATE CURVED
10M-2P	055°T - 80.6 yds	1½" STEEL PLATE
10M-3P (a)	048°T - 59 yds	METAL PLATE, CRUMPLED
10M-3P (b)	048°T - 59 yds	METAL PLATE, CRUMPLED

11M-1P(a)	049°T - 73	yds	TORN & TWISTED METAL PLATE
11M-1P(b)	049°T - 73	yds	TORN & TWISTED METAL PLATE
11M-2P	059°T - 70	yds	METAL PLATE
11M-3P	047°T - 74.3	yds	PIECE OF METAL (BROKEN I OR T BEAM, GREY PAINT ON ONE SIDE)
BOLSTER	067°T - 527	yds	LARGE HORN SHAPED PIECE 1½" STEEL PLATE
PLATING	067°T - 527	yds	11' x 3' STEEL, WEIGHING APPROXIMATELY 1100 lb
BLACKTHORN	064°T - 875	yds	SHIP
FORWARD HATCH COVER	064°T - 870	yds	7' x 7' STEEL
CAPRICORN's ANCHOR	063°T - 542	yds	13,500 lb STOCKLESS

f. During the initial stages of the bottom search, the U. S. Navy divers reported that they could not relocate several pieces of debris which had been precisely positioned. The Board evaluated the situation and requested that the Federal Bureau of Investigation consider the possibility that there might have been tampering with evidence. The FBI conducted an investigation, the results of which were inconclusive according to an informal report by that agency.

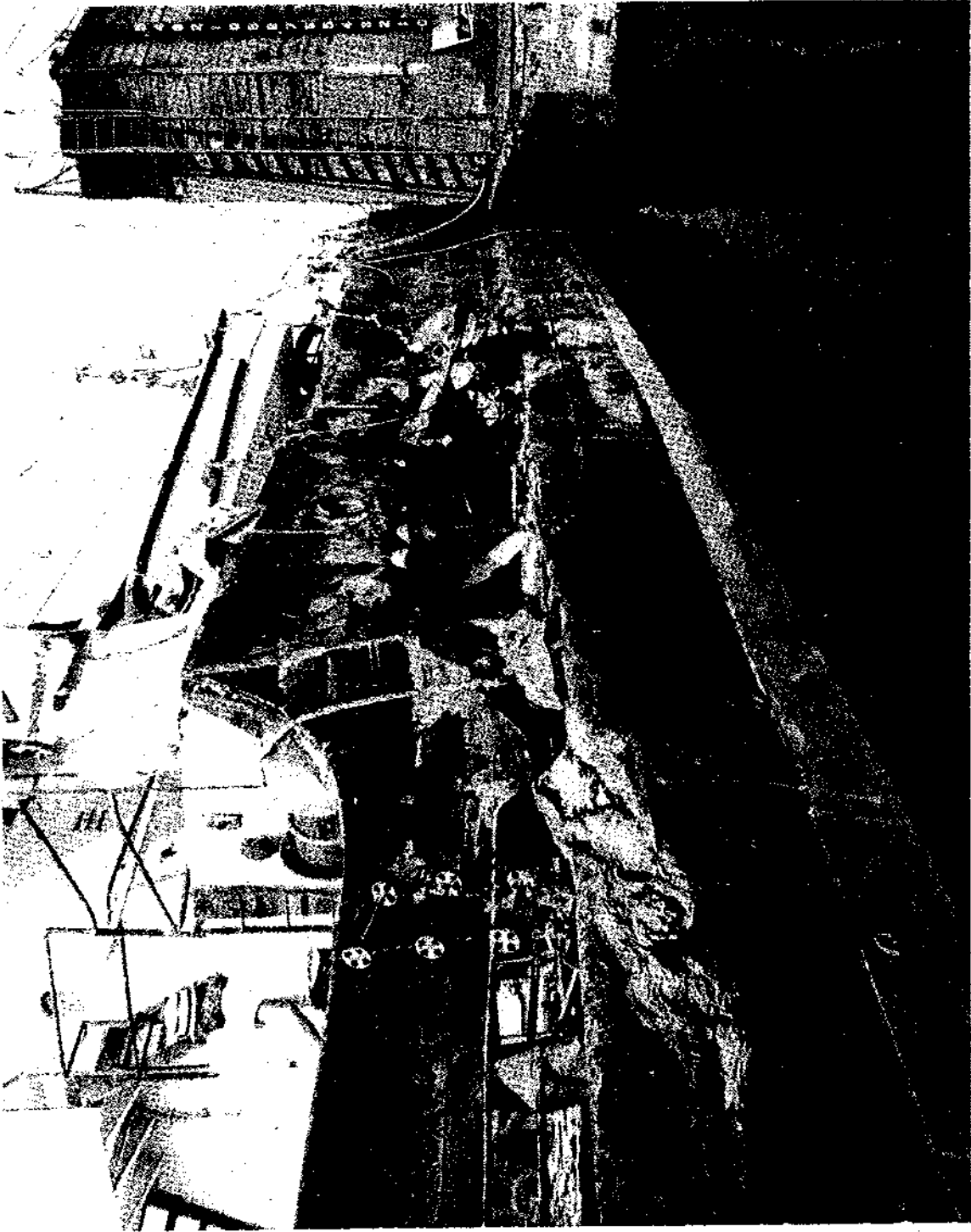


Figure 2

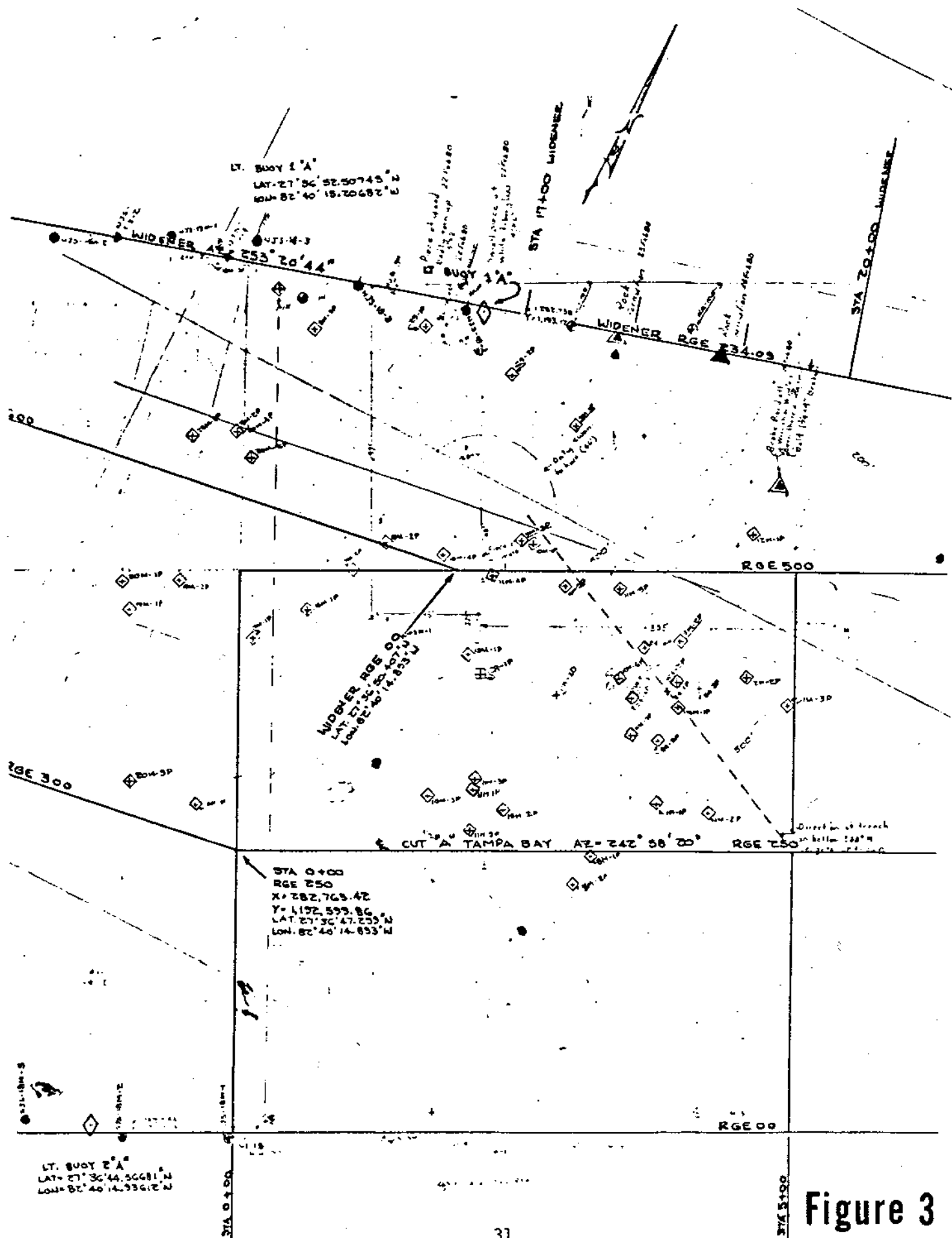


Figure 3

20. DEBRIS ANALYSIS

a. Dr. R. Craig Jerner of EMTEC Corp. Norman, OK, a qualified metallurgical expert, visited BLACKTHORN at Tampa on 26 March to view debris recovered from the channel bottom and to make tentative comparisons. The results of his analysis are as follows:

<u>DEBRIS</u>	<u>SOURCE VESSEL</u>
11M-1P(b)	BLACKTHORN (frame No. 67, port side)
11M-3P	BLACKTHORN (frame No. 67, port side)
10M-3P(a)	BLACKTHORN (frame No. 81, port side)
10M-3P(b)	BLACKTHORN (frame No. 81, port side)
11M-1P(a)	BLACKTHORN (frame No. 90, port side)
BOLSTER	CAPRICORN (port horn shaped bolster piece)
11M-2P	CAPRICORN (port bolster piece)
10M-2P	CAPRICORN (port hawse pipe piece)
8M-1P	CAPRICORN (port hawse pipe piece)
8M-2P	CAPRICORN (port hawse pipe piece)

21. COURSE RECORDER ANALYSIS

a. Captain William R. Griswold, a qualified expert on course recorders, analyzed CAPRICORN's course recorder trace for the times material to this casualty. The course recorder chart indicated Greenwich Mean Time. Captain Griswold stated that his accuracy was $\frac{1}{2}$ degree in heading and $\frac{1}{2}$ minute in time. Although he could not determine the time or the heading of CAPRICORN at collision from the course record, he observed anomalies that were caused by forces external to the vessel at the course recorder times of 0114 $\frac{1}{2}$, 0115 $\frac{1}{2}$ and 0120 $\frac{1}{2}$. He stated that the external forces necessary to produce such anomalies could be from a collision, a grounding or dropping an anchor. He also stated that such an anomaly could have occurred at approximately 0111, but it could not be specifically identified.

b. Mr. Anthony Suarez, a course recorder and vessel maneuvering expert, testified on behalf of CAPRICORN. Based on a reconstruction of the course recorder track of CAPRICORN, taking into consideration the current at the time, Mr. Suarez concluded that the collision occurred at 01:10.9 uncorrected course recorder time. Mr. Suarez indicated CAPRICORN's heading at the time of collision to be 079.6°T, after which it swung to 086°T, back to 079.6°T, then to 082° and into a large left turn. Mr. Suarez also indicated that the position of collision was on a bearing of 238°T at a distance of 90 yards from the junction of Mullet Key Channel and Cut "A" Channel range lines.

c. During his testimony Mr. Suarez reviewed the advance and transfer data of CAPRICORN that was posted on the bridge at the time of the collision. It was his opinion that CAPRICORN could

not maneuver as indicated, but would require much greater distances to conform with the advances expected of a vessel of her size, at the speeds indicated.

22. IMPACT ANALYSIS

a. Paul R. Van Mater, Ph.D., a qualified expert on impact analysis, presented a report of his investigation which contained an analysis of the collision based on a study of the plans of both vessels and observations of damage made during on site inspections. During his inspection of the CAPRICORN in Jacksonville on 6-8 February, Dr. Van Mater observed damage to the port hawse pipe bolster and surrounding plate. Dr. Van Mater also observed that the last section of anchor chain was tight, pulled hard against the keeper, and that the devils claw for the port anchor was damaged and not usable.

b. It was Dr. Van Mater's opinion that the relative heading of the two vessels was 180°, plus or minus 5°, at impact with a 16 foot separation of their centerlines. He indicated that as events progressed in time after impact the degree of speculation as to precisely what happened increases, and that there could have been several scenarios as to when the hawse pipe sections may have fallen out.

23. STABILITY ANALYSIS

a. Mr. Matt Kawasaki, a stability expert from Design Associates, Inc., New Orleans, LA, visited BLACKTHORN at Luckenbach Terminal, Tampa on 27 March. He indicated that the two sets of marks radiating aft and down the port side of BLACKTHORN and in line with the aft portion of the holed side shell were made by CAPRICORN's anchor chain. The damaged aft portion of the port bilge keel was in way of one set of marks. Mr. Kawasaki concluded that the anchor chain exerted a force of at least 125 long tons as it damaged the bilge keel. This force was sufficient to roll BLACKTHORN beyond 45 degrees, which was the point of no return for the after damage condition.

b. Based on curves which he constructed reflecting the after damage stability of BLACKTHORN, Mr. Kawasaki concluded that the maximum righting arm occurred at slightly over 20 degrees. Further, he concluded that there was probably no "down flooding" below the main deck through the damaged side shell or any other hull openings during initial capsizing because of the very short time involved. However, flooding was inevitable.

c. Mr. Christopher Loeser, a civilian naval architect from the Naval Engineering Division at Coast Guard Headquarters, Washington, DC, evaluated the pre-damage stability of BLACKTHORN. Mr. Loeser stated that the BLACKTHORN habitability modification and addition of a marine sanitation device were not of sufficient impact to require conducting a new inclining experiment.

d. Based on an estimate of BLACKTHORN's loaded condition prior to the collision, Mr. Loeser concluded that she met the weather criteria for small commercial cargo vessels. Also, BLACKTHORN met the present Coast Guard intact stability criteria. On 28 January the intact curves of stability for full load closely reflected BLACKTHORN's actual condition prior to collision. The point of no return was about 80 degrees.

e. It was Mr. Loeser's opinion that BLACKTHORN could not meet a two compartment floodable length criteria.

24. DOCUMENTARY EVIDENCE PRESERVATION

a. The FBI laboratory at Washington, DC, received numerous documents, logs and records that had been water soaked on board BLACKTHORN during her 22 days on the channel bottom. After restoration all documents were fully useable as evidence. The navigation chart, which was found on the bridge crumpled up in mud and debris, was reconstructed in detail, after which all pertinent sections were readable and useable.

25. LIFERAFT ANALYSIS

a. The inflatable lifeboat allowance for BLACKTHORN is four 15 man liferafts. She had her full allowance of four 15 man Navy liferafts aboard.

b. During the shipyard availability in Tampa, BLACKTHORN arranged through Commander, Eighth Coast Guard District for the annual inspection of her four 15 man liferafts by Atlantis Marine and Industrial Supply Co. Inc., New Orleans, LA. Both the contract and the inspection report stated that all four liferafts were Navy Mark V, whereas two were, in fact, Navy Mark III. The inspection was completed on 5 December 1979 and the rafts were shipped to BLACKTHORN at Gulf-Tampa Drydock on 6 December, where they were stored ashore until 27 January.

c. Prior to stowing the four liferafts on board BLACKTHORN, BMC Richard Robinson removed each liferaft from its soft case and unrolled it to check the equipment. The latter procedure was in accordance with instructions contained in the Naval Engineering Manual (CG-413). In one raft he found a 4 inch tear in an inflation chamber and two empty CO2 bottles. He repacked the liferaft without the CO2 bottles, wrote "BAD" on the flexible carrying case and stowed it in the port liferaft rack on the gun tub (02 deck). This liferaft, a Navy Mark V, Serial No. C6642, was on BLACKTHORN when it was raised. BMC Robinson also found empty CO2 bottles in a second liferaft. This liferaft, a Navy Mark III, Serial No. 25, was out of its carrying case, deflated and floating in the water after the sinking.

d. BMC Robinson ascertained that the other two liferafts were in serviceable condition with full CO2 bottles. In the process of

being loaded on board BLACKTHORN, one of these liferafts was accidentally inflated. It was tied to the port rail of the fantail opposite a refrigerator and several 70 lb engine starting batteries, which were secured to the starboard side. After BLACKTHORN capsized and sank, this liferaft, a Navy Mark III, Serial No. 127, was found partially deflated and floating on the surface in a severely damaged condition.

e. The remaining good liferaft, a Navy Mark V Mod 1, Serial No. HD1531, was stowed in the starboard liferaft rack on the gun tub with the sea painter allegedly secured to a nearby rail. One of the unusable rafts was stowed on top of it. The good liferaft was found on the bottom of the Cut "A" Channel in its flexible carrying case by divers searching for debris, several weeks after the casualty. Liferaft expert Mr. Fred F. Patten of RFD-PATTEN Inc., Lake Worth, FL, later inspected this liferaft. He intentionally triggered the CO2 activating lanyard and observed the liferaft inflate fully.

f. Upon discovering that two of her liferafts were unserviceable, BLACKTHORN arranged to borrow a 15 man inflatable liferaft, Navy Mark V, Serial No. 427, from USCGC STEADFAST (WMEC 623). It was loaded on board on 27 January in its rigid container and secured on the fantail. After BLACKTHORN capsized this liferaft was found in a partially inflated condition floating upside down. This raft had last been serviced in March 1977.

g. BLACKTHORN's four liferafts included two which were 24 and 25 year old MK III rafts. Mr. Patten stated that these rafts probably should have been replaced by newer liferafts. Although Mr. Patten would not fix a service life on inflatable liferafts, he observed that one of the Mark III's had minimum tear resistance (a condition that could only be detected by destructive testing).

h. Two of the eight CO2 bottles inspected by Atlantis Marine were last hydrostatically tested in August 1972. Chapter 9230.1.1 of Naval Engineering Manual requires that hydrostatic tests be conducted every 5 years.

i. Commandant Instruction M10470.10 dated 2 January 1979 refers to policies concerning the maintenance, inspection and repair of liferafts on Coast Guard vessels. This instruction pertains to Navy Mark V and Coast Guard approved liferafts only. The instruction refers to the Naval Engineering Manual (CG-413), which further references the Naval Ships' Technical Manual for instructions concerning inflatable liferafts. Chapter 583 of Naval Ships' Technical Manual, paragraph 583.13.21 directs that all MK3 liferafts shall be surveyed without regard to apparent condition. The reason cited is that the hull tube base cotton fabric is subject to unpredictable failure due to deterioration, resulting in a lack of reliability.

j. Chapter 583 further cautions that the MK V Mod 1 liferaft's manual release (sea painter) should not be attached to the

stowage rack. Additionally, the liferaft should not be tied or lashed to the ship in any manner to eliminate the possibility of its being towed under with a sinking ship. Mr. Patten questioned the ability of any liferafts in flexible containers to rise to the surface after being dragged under water. This was based upon the fact that the containers would be compressed by water pressure, thus reducing buoyancy and preventing surfacing of the raft unless the CO2 inflation cylinders were triggered.

k. Chapter 583, paragraph 583-13.51, states that inflatable liferafts should be located to permit ready manual overboard launching into the water without hitting any obstruction. The stowage of liferafts in the racks on the port and starboard sides of the gun tub on BLACKTHORN requires that each 385 lb raft be carried down a ladder to the main deck and thrown overboard. If the liferaft were dropped to the next deck by releasing the hinged stowage rack, it is possible that damage to the raft would result, according to Mr. Patten.

1. Very few BLACKTHORN personnel indicated during testimony that they understood how to release and operate inflatable liferafts.

26. BLACKTHORN DRILLS AND TRAINING

a. During the period from the time LCDR Sepel assumed command on 27 July 1979 until the collision on 28 January, there were two "all hands" drills held on BLACKTHORN. These drills were logged as fire drills, but LCDR Sepel testified that they progressed to the stage where abandon ship was subsequently ordered. During this same period 23 duty section drills were held; 22 for fire and 1 for collision.

b. During the Board proceedings, LCDR Sepel, LT Crawford and CWO2 Miller, the Engineer and Damage Control Officer, were unable to demonstrate basic theoretical knowledge of vessel stability. They also did not understand the information contained in the vessel's stability book.

c. Many crew members did not know where life preservers were stowed or how to launch life rafts.

d. LCDR Sepel indicated that OODs were qualified after a period of on-the-job training, and that the procedures consisted of their being verbally questioned by qualified OODs, the Executive Officer and the Commanding Officer. During testimony ENS Ryan, the conning officer just prior to the time of collision, demonstrated a lack of understanding of the Inland Rules and Pilot Rules relative to whistle signals, and vessels meeting in a bend in a narrow channel. As a matter of further confusion, he applied International Rules of the Road criteria in regard to whistle signals and course changes.

PREFACE TO CONCLUSIONS

1. VESSEL MOVEMENTS AFTER IMPACT (SEE FIGURE 4)

a. Immediately after initial impact the forward port hull of BLACKTHORN came into contact with CAPRICORN's port anchor. CAPRICORN's engines were at stop and her rudder was hard left. BLACKTHORN's engines were backing full and her rudder was right full. Extremely massive forces were applied to the anchor and hawse pipe of CAPRICORN resulting in substantial shattering of the port bolster and hawse pipe. BLACKTHORN was forced into a starboard heel of about 15°. As the two ships continued past each other, CAPRICORN's port anchor raked the side shell, ripping the fashion plate on the forward port buoy deck. As BLACKTHORN heeled, one fluke ripped into BLACKTHORN's sheer strake and main deck plating in way of frame 58. The anchor was pulled from the hawse and imbedded in the side of BLACKTHORN in the crew's head and shower. A piece of the bolster was carried by the anchor into BLACKTHORN's holed side.

b. CAPRICORN's anchor chain continued to run out under drag of the port wildcat brake. Responding to her left full rudder, CAPRICORN's stern swung away from BLACKTHORN. CAPRICORN placed her engines back full as the sterns of the two vessels cleared. BLACKTHORN was moved astern in step with the CAPRICORN through the combined effects of BLACKTHORN's back full bell and CAPRICORN's anchor chain. The chain led from the imbedded anchor aft along BLACKTHORN's port side at a downward angle, making discernable marks on the hull.

c. About 2 minutes after impact, CAPRICORN's ahead momentum had slowed so that BLACKTHORN commenced to close, easing the tension on the anchor chain, allowing it to drag on the bottom. The chain was at or near its bitter end. The easing of chain tension allowed BLACKTHORN's stern to swing to port (consistent with engines backing full) over the anchor chain. At approximately this time LCDR Sepel brought BLACKTHORN's engines to stop for a few moments and then may have placed them in the ahead position, leaving the rudder right full as he attempted to head for shallow water. CAPRICORN's ahead momentum again brought the chain into tension, causing BLACKTHORN to capsize to port. CAPRICORN's heading was approaching 040°T; BLACKTHORN's head was approximately 270°T.

d. On capsizing, the anchor fell to the bottom, pulling debris from BLACKTHORN along with the torn section of CAPRICORN's bolster. CAPRICORN stopped her engines (they were back full for 2½ minutes) to avoid backing over BLACKTHORN. CAPRICORN's ahead momentum dragged her anchor on the bottom for approximately another 165 feet before coming to a stop, bow aground, on a heading of 023½°T. CAPRICORN continued to swing slowly at this position due to her momentum and the flooding current before finally coming to rest on a heading of 281°T (see figure 5).

e. After capsizing, flooding occurred and BLACKTHORN continued to drift with the current about 350 yards in a direction of 059°T. She came to a final rest on the bottom, port side down, on a heading of 287°T, approximately 12 to 15 minutes after capsizing.

2. LOCATING THE POSITION OF COLLISION

a. The board considered the following in evaluating the debris field:

- (1) Effect of current. This was concluded to be relatively small. For example, with a sinking rate of 5 feet per second and with a current set and drift of 060°T at 1 knot, a piece of debris could come to rest on the bottom at a position approximately 14 feet up channel or 060°T from its point of entry into the water.
- (2) Sliding effect. This was concluded to be insignificant. Pieces of debris with varying geometric shapes, which originated from adjacent areas of both vessels, were found on the bottom in close proximity to each other.
- (3) Trajectory through the air. The lateral distance that debris may have traveled through the air after exiting the vessel was not taken into consideration.
- (4) Position error. This was based upon navigational system accuracy and the assumptions noted in paragraph 2.a.(1). The accuracy of the positioning of the debris was 5 feet or less. Therefore, by combining this figure with the effects of current, the most likely position where each piece entered the water lies within an area approximately 10 by 19 feet. The channel axis 060°-240°T, and the cross channel axis, 150°-330°T, intersect at the east 14 foot/5 foot point (see diagram page 39). The Board assumed this accuracy for the critical debris, i.e. CAPRICORN's hawse pipe and BLACKTHORN's bulwark, when positioning the point where the pieces entered the water.

b. The Board concluded that buoy deck pieces 11M-1P(b) and 11M-3P at frame 67 fell off BLACKTHORN immediately because of their proximity to pieces 10M-3P(a)(b), 11M-1P(a), 11M-2P and 10M-2P on the channel bottom (see figure 3) and the travel of the anchor along BLACKTHORN's side. The nature of these pieces and their common location supports the assumption that they fell to the bottom as collision occurred. An assumption that any of these pieces remained on the deck of BLACKTHORN until some later time is non-supportive. The only heeling action of BLACKTHORN of sufficient magnitude to drop pieces into the water was at capsizing. This location would have been in close proximity to CAPRICORN's anchor marks further up channel. The significant distance between CAPRICORN's large bolster piece and the small matching bolster piece 10M-2P (1½ inch steel) indicates that

10M-2P fell to the bottom close to the location of collision. The next BLACKTHORN debris to fall to the bottom came out as the anchor moved aft through frames 81 and 90. It is logical to assume that the force of the anchor or chain tore out hawse pipe piece 10M-2P, followed by pieces 8M-1P and 8M-2P at about the same time. The proximity of all these pieces on the channel bottom lends credence to the fact that they were deposited at nearly the same time.

c. It is important to note that pieces 11M-2P and 8M-2P form a course line that is within several degrees of CAPRICORN's known course prior to collision. It is believed that these pieces would not have been deflected to starboard as a result of the collision. Therefore, the center of CAPRICORN could not have been further north than a course line generated by these pieces. The same rationale applies to pieces 11M-3P and 11M-1P. It is believed that BLACKTHORN could not have been to the south of these pieces at the time of impact.

d. The Board determined that CAPRICORN's bolster piece fell into BLACKTHORN's side during impact while both vessels were alongside each other. The rationale for this decision was that there is no other reasonable explanation for how the bolster piece could have been found on the channel bottom next to CAPRICORN's anchor marks. The bolster piece must have fallen out with the anchor when BLACKTHORN capsized.

e. In summary, the above discussion indicates that when CAPRICORN's port anchor impacted with BLACKTHORN, the hawse pipe was shattered and the port side of BLACKTHORN was ripped so that debris from both vessels fell to the channel bottom. This sequence has been reconstructed and, when taken with the bottom positioning of the debris, accurately reflects the position of collision.

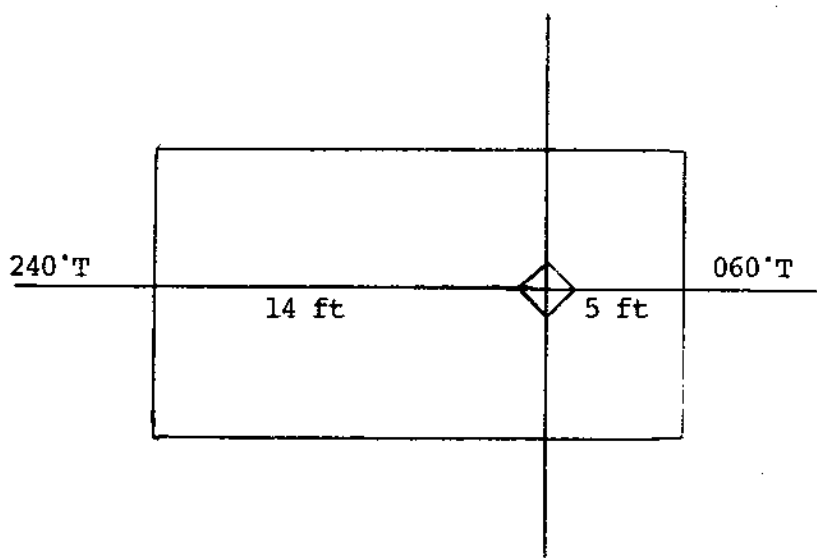
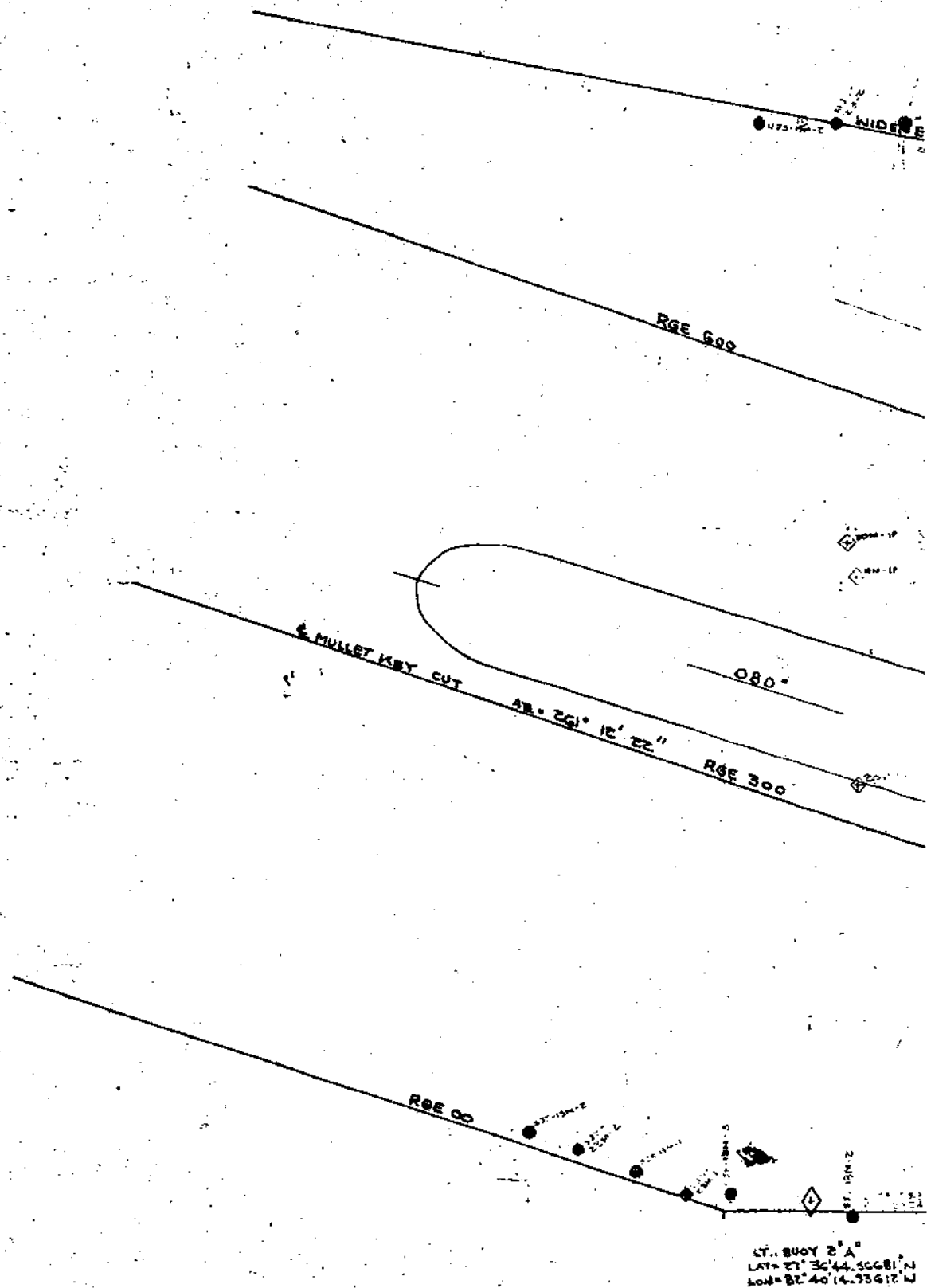
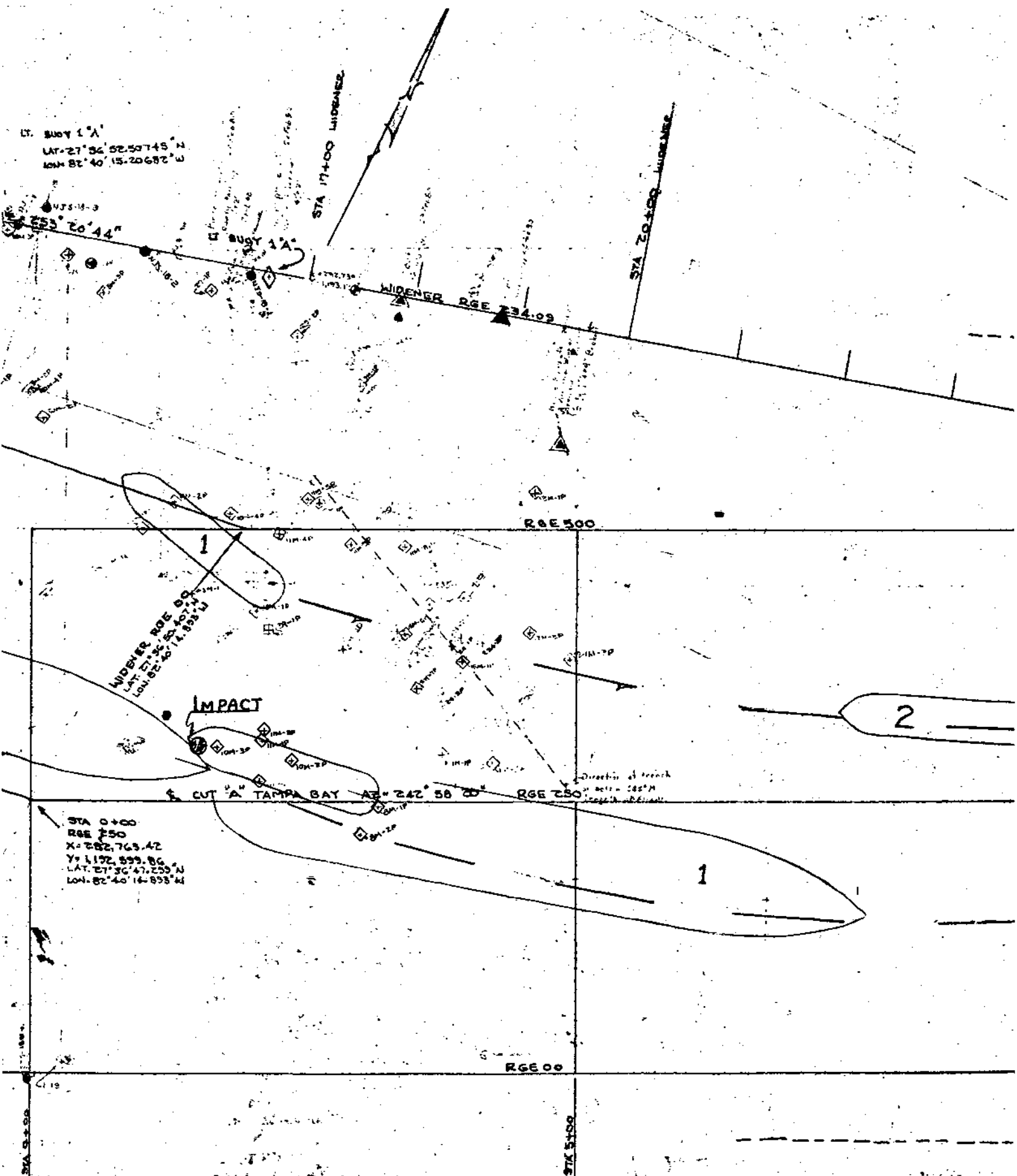
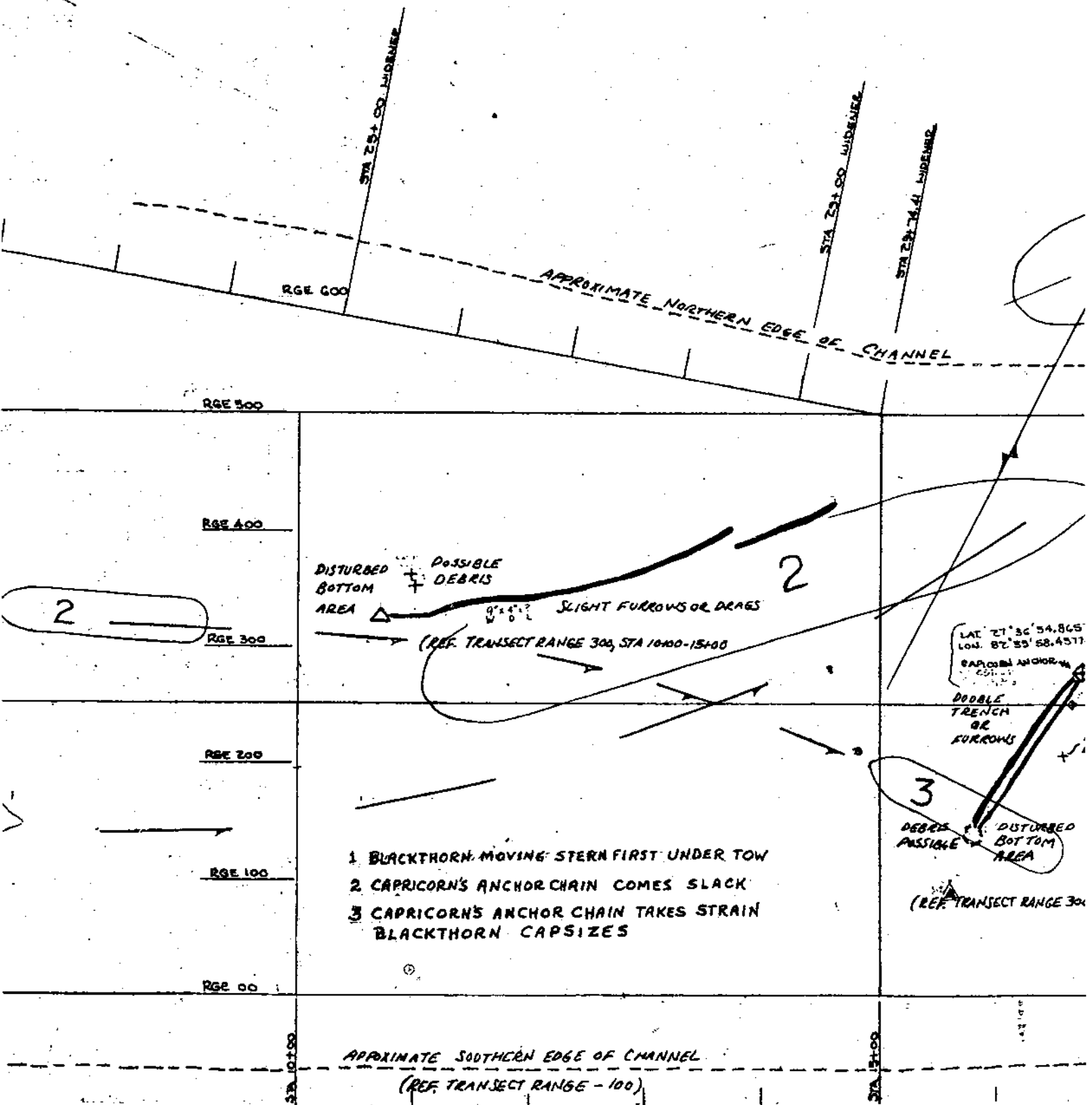


CHART 508



LT. BUGH 1A
LAT. 27° 34' 52.50745" N
LON. 82° 40' 15.20682" W





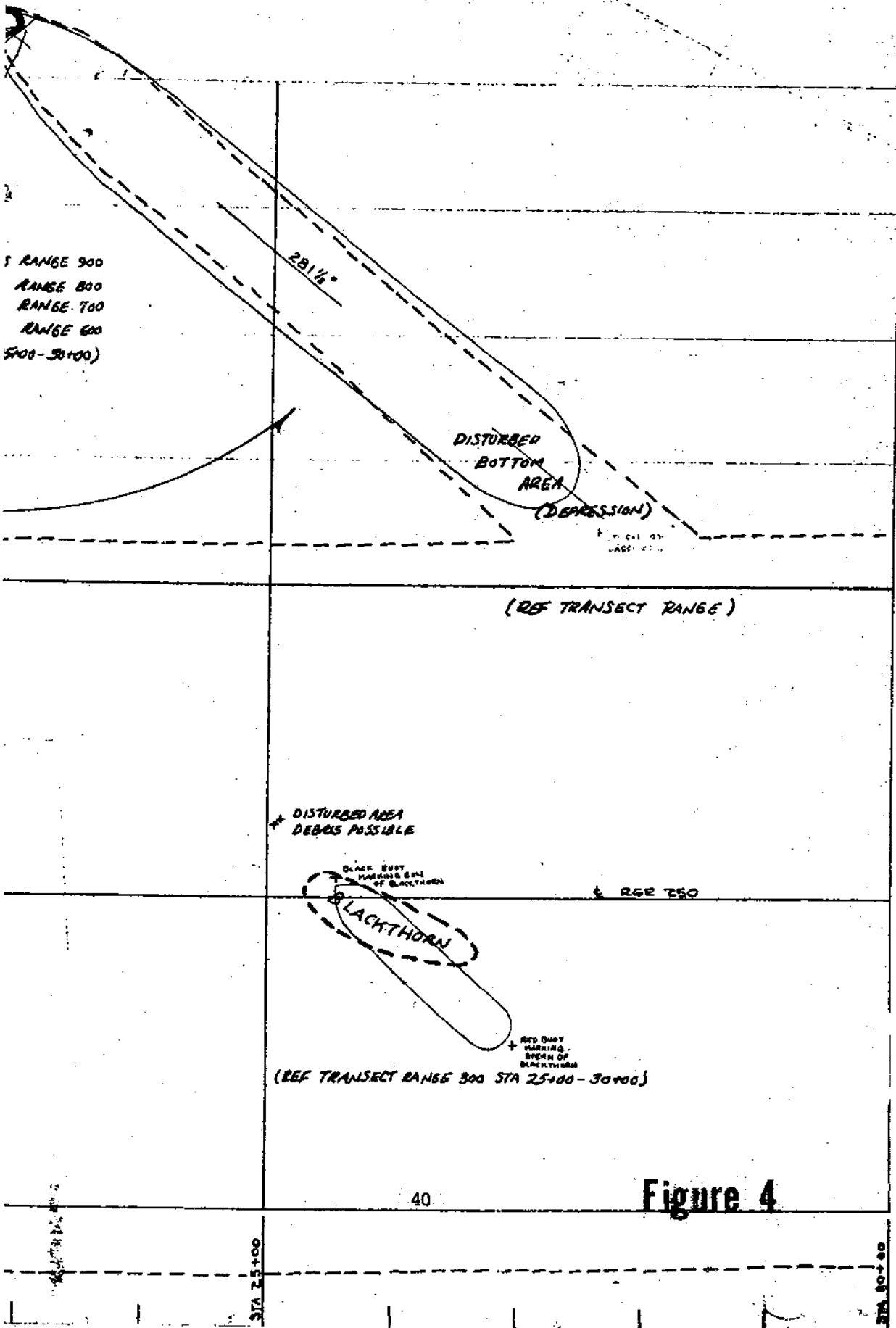
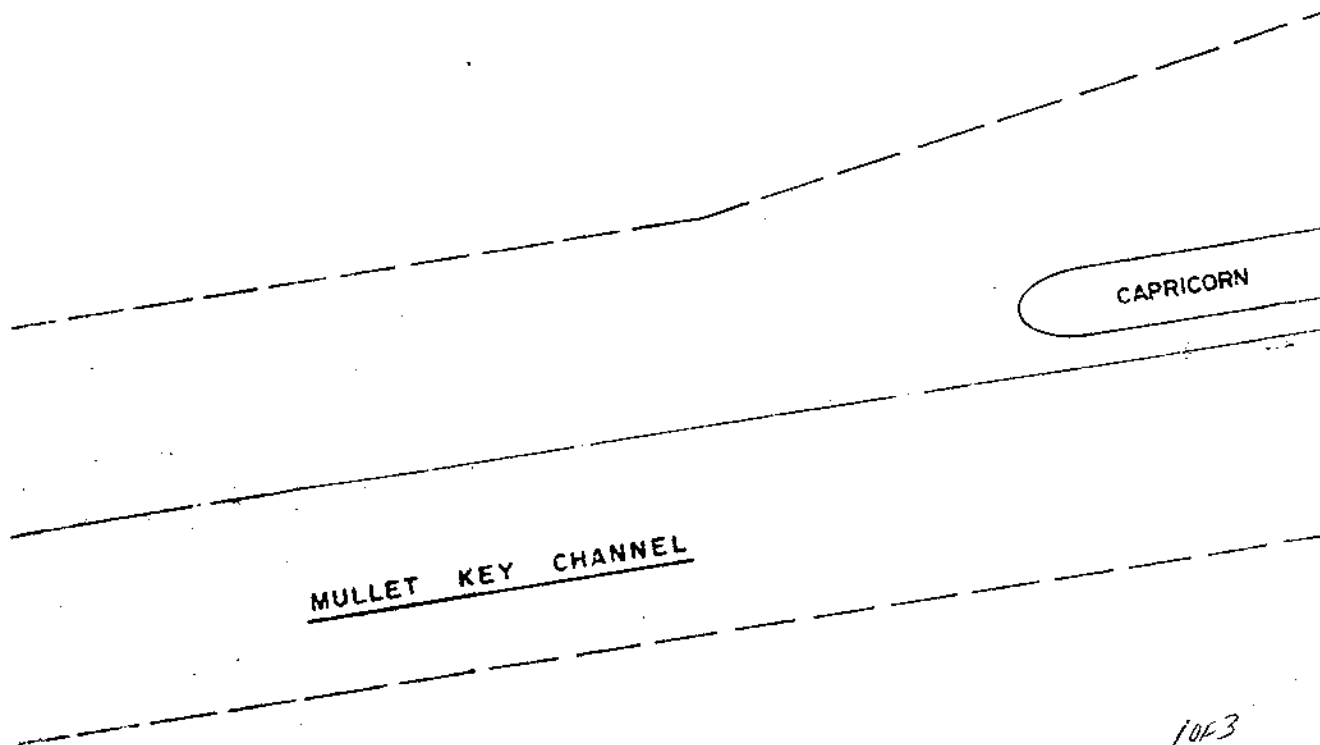
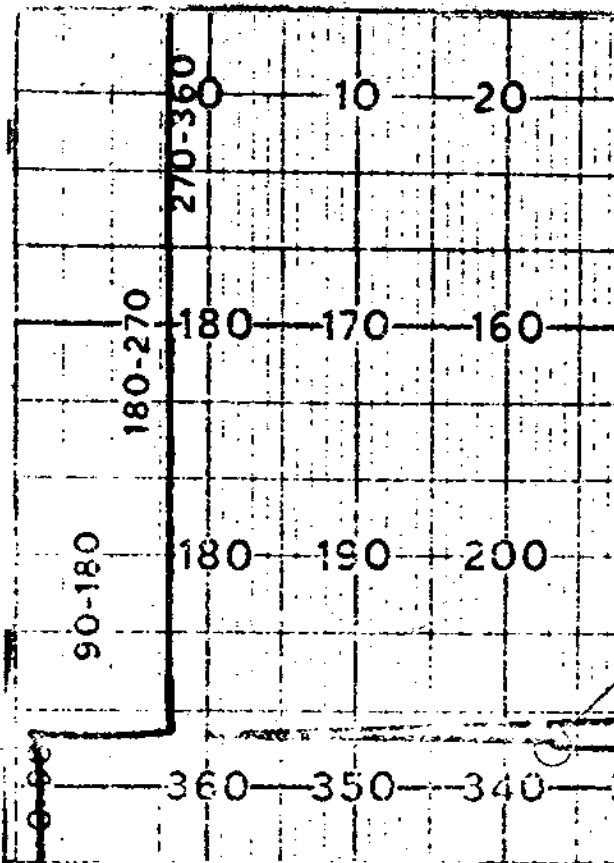
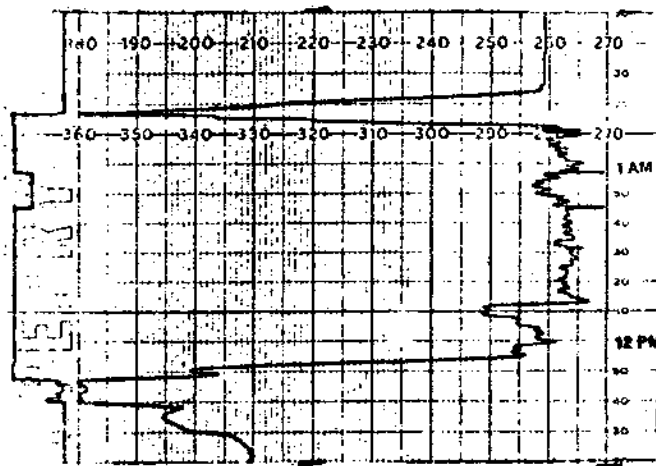


Figure 4



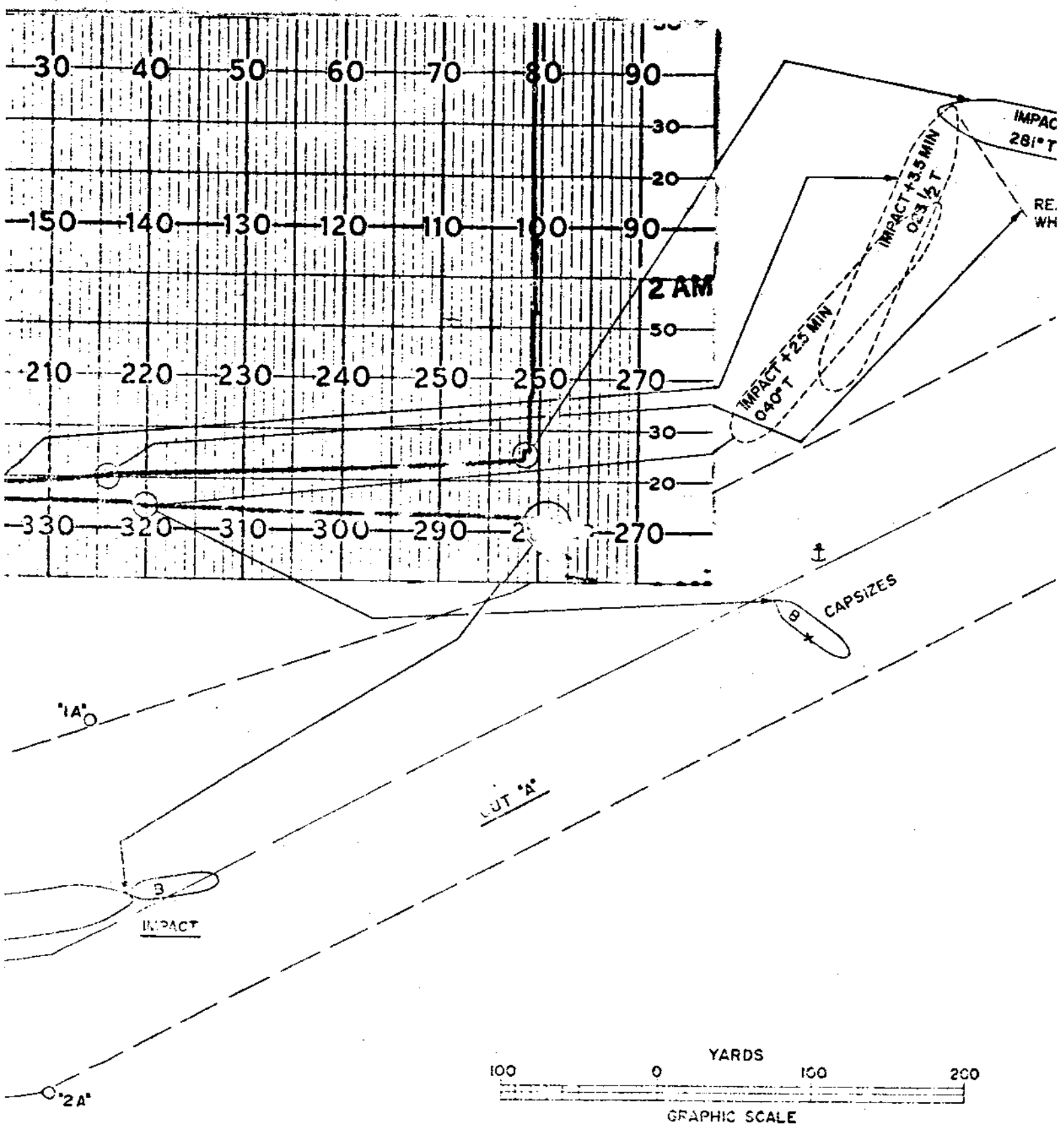
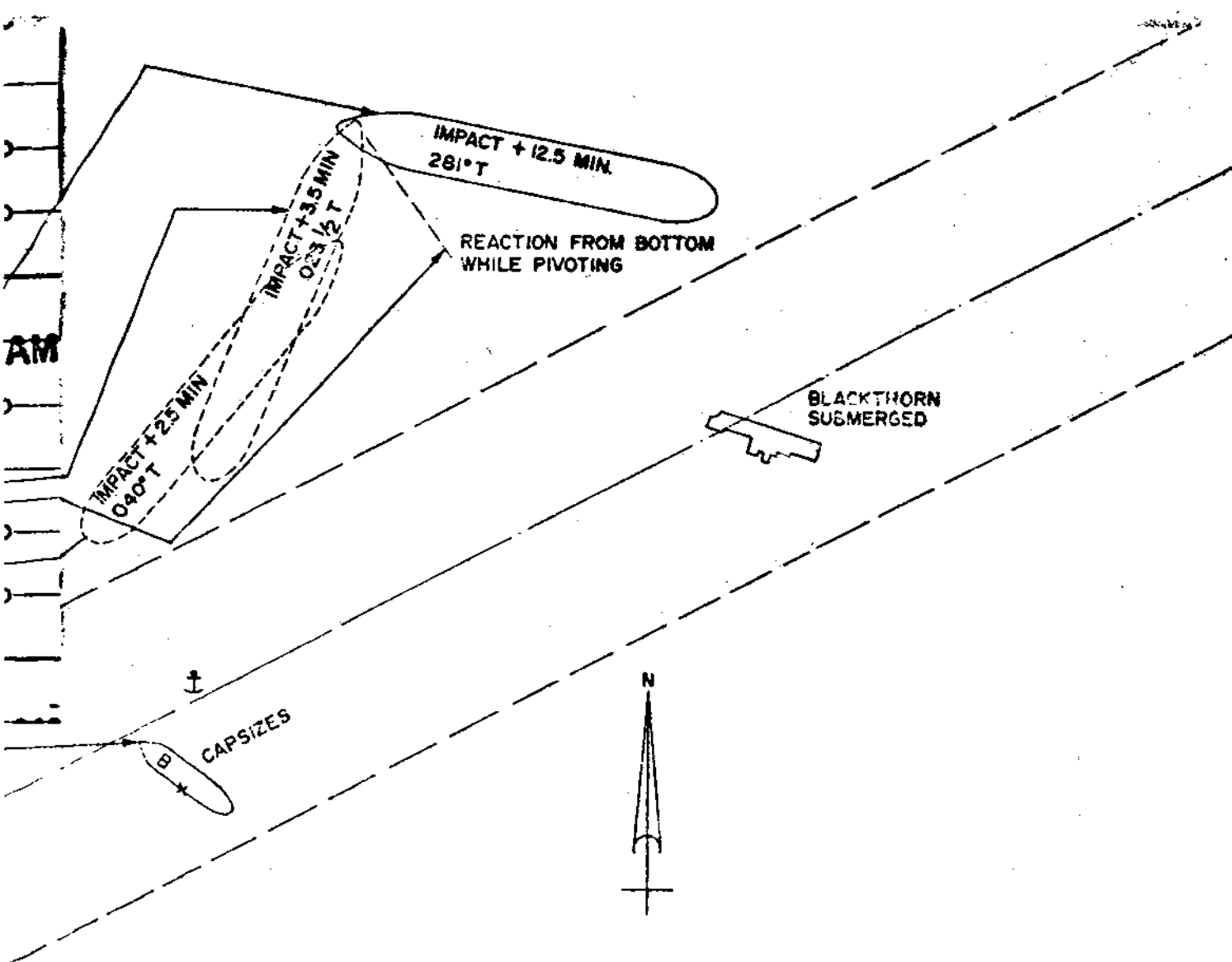


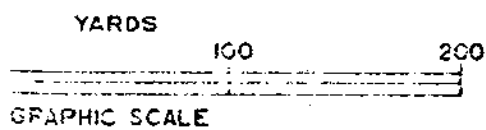
CHART C

20F3



ALL POSITIONS ARE ESTIMATES
BASED ON EVIDENCE

TAKEN FROM CHART 11414.
OUTER BOUNDARY LINES OF
THE CHANNEL ARE APPROXI-
MATE DUE TO THE DISTORTION
OF CHART 11414 IN THIS AREA.



HART C

CONCLUSIONS

1. BLACKTHORN and CAPRICORN collided at a position bearing 044° degrees true 160 feet from the junction of Mullet Key Channel and Cut "A" Channel Range lines. This conforms closely to the location of recovered debris that first fell to the bottom, and the dead reckoning position of the BLACKTHORN from her last plotted fix at her computed speed of 11.7 knots.

2. The time of collision has been established as approximately 2021½ based on the fixes on BLACKTHORN's chart and the time elapsed to the estimated position of impact, using a speed over the ground of 11.7 knots. This time is further corroborated by testimony, notations in CAPRICORN's bell book and Coast Guard Group St. Petersburg's radio logs.

3. The headings of the two vessels at time of impact were close to the inbound and outbound courses for Mullet Key Channel. These headings are consistent with the 180° degree angle of impact and the course recorder trace of CAPRICORN. Any other heading that would conform to the anomalies that appear after the hard left course change, indicated at the uncorrected time of 0112 on the course recorder chart, is impossible when examined with respect to the maneuvers of both vessels prior to impact.

4. The proximate cause of the collision was that both vessels failed to keep well to that side of the channel which lay on their starboard side, when it was in fact safe and practicable to do so.

5. Contributing to the cause of the collision was that:

- a. BLACKTHORN, after sighting CAPRICORN, continued on a track of 243°T in Cut "A" Channel with her port bridge wing riding on or near the leading line and failed to use Cut "A" widener in order to provide additional sea room for the inbound vessel. This served to confuse CAPRICORN as to BLACKTHORN's intentions in the absence of radio or whistle communications.
- b. CAPRICORN, after sighting BLACKTHORN, continued inbound without changing course or speed. She commenced her turn from a position slightly left of the Mullet Key Channel range line into Cut "A" Channel shortly before collision. This turn, absent an outbound vessel meeting in the bend, could be considered the normal turn which would be made by an inbound deep draft vessel.
- c. The Commanding Officer of BLACKTHORN failed to keep apprised of the situation, and failed to effectively supervise his relatively inexperienced conning officer, particularly when the ship was departing an unfamiliar port at night.

- d. The conning officer of BLACKTHORN failed to immediately advise the Commanding Officer, who was on the bridge, that an inbound vessel had been sighted.
- e. A port to port passing agreement was not reached due to a total reliance on radio communications which, in this case, were not successful.
- f. Both ships failed to use whistle signals to reach a port to port passing agreement. This was attributed to:
 - (1) the conning officer of BLACKTHORN not having a complete understanding of both the use of whistle signals when approaching a bend in a narrow channel and the distinction in situations and signals between the Inland Rules and the International Rules of the Road.
 - (2) BLACKTHORN's policy of not initiating whistle signals as required by Pilot Rule 80.3, if a passing agreement had been previously reached by radio.
 - (3) Pilot Knight's deliberate delay and subsequent failure to initiate a one short blast whistle signal in order to "leave the options open" to BLACKTHORN. If, in fact, Pilot Knight suspected that BLACKTHORN might proceed across his bow into the IWW, resulting in a crossing situation as opposed to proceeding down Mullet Key Channel, he should have initiated a one blast signal as stand-on vessel. Thus, it would appear that a one blast whistle signal would have been appropriate for either a meeting or a crossing situation even though, in the case of the latter, CAPRICORN would have had to alter course to the left to conform to the channel.
- g. Pilot Knight failed to sound the danger signal and to reduce speed as soon as he became in doubt concerning the intentions of BLACKTHORN.
- h. Captain McShea failed to sound the danger signal and reduce headway when he first voiced doubt as to the intentions of the oncoming vessel, and after observing that the pilot had failed to take such action.
- i. Both vessels failed to make effective use of their radar for early detection and evaluation of approaching vessels.
- j. CAPRICORN failed to post a proper lookout by instructing the bow lookout not to report well lighted vessels in the channel. Had he reported BLACKTHORN upon first sighting as KAZAKHSTAN cleared his arc of vision, advance warning might have been given to the master and the pilot.
- k. Earlier visual sightings of each vessel by the other were hindered by the brightly lighted KAZAKHSTAN which was positioned between BLACKTHORN and CAPRICORN.

6. The following did not contribute to the collision:

- a. The failure of BLACKTHORN to post a proper lookout, in that he was wearing headphones over both ears, was at his post for over 2 hours and was neither vigilant nor properly stationed, i.e. not as far forward and low down as possible. Had an alert lookout been stationed where required, however, he would not have seen CAPRICORN's range lights emerge from behind KAZAKHSTAN any sooner than personnel actually sighted CAPRICORN from the bridge.
- b. Cut"A" Channel Range Front Light was extinguished and Mullet Key Channel Buoy "14" was off station.
- c. CAPRICORN prior to collision had her port anchor housed with the wildcat disengaged, the brake set, the devils claw loosely secured to the anchor chain and the riding pawl disengaged.
- d. BLACKTHORN's decision not to operate outside the channel when there was sufficient depth of water to do so.

7. The reasons for failure of attempts by CAPRICORN and BLACKTHORN to contact each other on VHF-FM channel 13 are unknown. BLACKTHORN's call to CAPRICORN may have been overridden by OCEAN STAR's conversation with KAZAKHSTAN.

8. Pilot Maddox advised Pilot Knight prior to collision that a Coast Guard vessel was following KAZAKHSTAN.

9. Both ships sighted each other visually approximately 2 minutes before collision.

10. When BLACKTHORN ordered right full rudder and engines back full, collision was inevitable.

11. When CAPRICORN sounded two blasts of the whistle and put her rudder over, collision was inevitable. At the time of impact the hard left rudder had not caused any discernable change in heading.

12. The course recorder on CAPRICORN was about 10 minutes slow at the time of impact.

13. Almost immediately after impact the massive forces acting on CAPRICORN's port anchor fractured the port bolster and hawse pipe, then overrode the brake and caused the devils claw to fail.

14. When CAPRICORN's anchor penetrated BLACKTHORN's hull in way of frame 58, it commenced to be torn from its hawse pipe. Immediately thereafter, BLACKTHORN pieces 11M-1P(b) and 11M-3P, from the area of frame 67 at the port buoy deck aft corner, were ripped out by the anchor and fell to the channel bottom. The

anchor was then embedded into the crew washroom area. Almost simultaneously, CAPRICORN's bolster piece and piece 11M-2P were torn free. The bolster was carried onto BLACKTHORN, and piece 11M-2P fell to the channel bottom. The hawse pipe continued to disintegrate, dropping piece 10M-2P to the channel bottom, followed by pieces 8M-1P and 8M-2P. As both vessels moved past each other, the anchor rotated or moved in such a manner that pieces 10M-3P(a) and (b) at frame 81 and piece 11M-1P(a) at frame 90 dislodged and fell to the channel bottom.

15. The proximate cause of capsizing was that CAPRICORN's anchor chain reached its bitter end while leading under BLACKTHORN's hull, came up with a strain and rolled BLACKTHORN to port. It cannot be determined if BLACKTHORN had applied an ahead bell at the time of capsizing.

16. The stability of BLACKTHORN after collision was adequate to save the vessel had the capsizing force of CAPRICORN's anchor and chain not been applied.

17. The lack of understanding of vessel stability on the part of LCDR Sepel, LT Crawford and CWO2 Miller did not contribute to the capsizing of BLACKTHORN.

18. The open starboard watertight door to after berthing, 1-77-1, and the open porthole in after steering did not contribute to capsizing. By the time flooding would have occurred through these openings, BLACKTHORN had rolled past the point of no return due to the loss of reserve buoyancy as a result of port side damage.

19. The open watertight doors from the port and starboard passageways to the buoy deck, 1-70-1 and 1-70-2, the damaged port watertight door to after berthing, 1-89-2, and the open hatch, 01-135-0, from officers country to the fantail did not contribute to capsizing and contributed very little to the rate of flooding. The effect of these open fittings was completely overshadowed by the large hole in the port side created by the collision. A tremendous inrush of water occurred as soon as the vessel rolled sufficiently to submerge the maindeck gunwale.

20. The 11 by 3 foot piece of steel plating found on the channel bottom bearing 067°T, 527 yards from the junction of Mullet Key Channel and Cut "A" Channel range lines is the approximate size of the shell plating which is missing from BLACKTHORN's port side.

21. CAPRICORN's anchor, bolster piece and BLACKTHORN's 11 by 3 foot side shell plating fell out of BLACKTHORN's side upon capsizing and were found in the location where CAPRICORN's anchor marks commence on the channel bottom.

22. After capsizing, those men who climbed up into the engine room through the escape scuttle located in the aft messdeck area

may have done so because of disorientation or limited ability to swim.

23. BLACKTHORN drifted in a direction of 059°T between the time of capsizing and the time of sinking.

24. BLACKTHORN's forward hatch cover was undogged but remained in place, probably due to water pressure, until she came to rest on the bottom of Cut "A" Channel in a position bearing 064°T, 875 yards from the junction of Mullet Key Channel and Cut "A" Channel range lines.

25. Approximately 1 minute after BLACKTHORN capsized, CAPRICORN's bow grounded on a heading of 023.5°T after which she continued to pivot left due to her momentum and the flood current, finally coming to rest on a heading of 281°T, 9 minutes later.

26. The proximate cause of the grounding was Pilot Knight's decision to maintain hard left rudder following the collision and deliberately ground the vessel in order to avoid any possibility of striking the Sunshine Skyway Bridge. The turning moment generated by CAPRICORN's port anchor towing the BLACKTHORN astern, and then the anchor dragging on the channel bottom, probably made a grounding inevitable in the 500 foot wide channel.

27. The portion of the course recorder trace after minute 0112, on which a major left turn commenced, depicted anomalies which represented CAPRICORN's anchor dropping out of BLACKTHORN at minute 0114.5 and CAPRICORN's bow grounding at minute 0115.5. The cause of the anomaly at minute 0120.5 cannot be determined. It may have been the result of a reaction to the channel bottom during the vessel's swing after grounding the bow.

28. There was insufficient all hands training on board BLACKTHORN in underway emergency drills since July 1979. Further, personnel had insufficient knowledge in the launching and use of liferafts.

29. The inboard liferaft stowage arrangement on BLACKTHORN's 02 deck makes compliance with the launching requirements outlined in Chapter 583, Naval Ships' Technical Manual, difficult to achieve due to the weight of the rafts.

30. It is difficult for vessel personnel to readily obtain all applicable information regarding liferafts, because it is necessary to refer to COMDT INST M10470.10, Naval Engineering Manual, various Coast Guard Technical Publications and Naval Ships' Technical Manual.

31. BLACKTHORN did not have sufficient serviceable liferafts to accommodate all personnel. This may have contributed to the loss of a maximum of four lives.

32. The immediate presence of THE BAYOU was responsible for the saving of many BLACKTHORN personnel, considering their inability to properly don lifejackets or to have liferafts available.

33. The fact that BLACKTHORN did not have a boat rigged out for sea did not contribute to loss of life.
34. BLACKTHORN's stability booklet is too complex for practical use by operating personnel.
35. Due to its relatively small scale, NOS chart 11414 is not optimum for accurate navigation in the marked channels. The dashed lines representing Mullet Key Channel and Cut "A" Channel do not accurately represent the widened channels. Additionally, the placement of the Mullet Key Channel lighted and unlighted buoys is misleading in that they are not equidistant from the range line.
36. Cut "A" Channel Lighted Bell Buoy "1A" does not completely identify the widener between Mullet Key and Cut "A" Channels.
37. More than one-fourth of CAPRICORN's required able seamen were holders of U.S. Merchant Mariners Documents endorsed as Able Seaman-12 Months.
38. No fixes were plotted on CAPRICORN's navigation chart during her transit from Fairway Anchorage west of Egmont Key to her grounding at Cut "A" Channel.
39. Merchant vessels in Tampa Bay are not complying with the requirements of 33 CFR 164 regarding plotting of fixes and passing this information to the pilot.
40. The impact on the environment as a result of oil pollution from this casualty was negligible.
41. The cause of death for all deceased as a result of this casualty was drowning.
42. The efforts of CWO2 J.S. Miller, BM3 C.E. Bartell, HM3 R.L. Chamness, EM3 L.C. Clutter, SA M.D. Gray and SA M.A. Rhodes with regard to post collision survival actions are commendatory and worthy of recognition. This matter has been referred to the Commandant for consideration.
43. The actions of William Parker, Vince Dyer and Charles Whitelaw of the shrimp boat, THE BAYOU, with regard to rescue of BLACKTHORN survivors are commendatory and worthy of recognition. This matter has been referred by Commander, Coast Guard Group, St. Petersburg to Commander, Seventh Coast Guard District, for consideration.
44. The actions of Second Mate Stephen Sadler as boat officer and volunteers David Gilmore, Peter Hulsebosch, William Thom, Donald Barney, Robert Rentz and Bennie Spencer as oarsmen in the No. 4 lifeboat of CAPRICORN, with regard to their search efforts for survivors following the collision, are commendatory and worthy of recognition. This matter has been referred to Commander, Seventh Coast Guard District, for consideration.

45. There is evidence of:

- a. failure to sound 1 short blast of the whistle for a meeting and port to port passage (Inland Rules, Article 18, Rule I; Pilot Rule 80.4);
- b. failure to stay to the starboard side of mid-channel (Inland Rules, Article 25; Pilot Rule 80.10);
- c. failure to sound the danger signal (Inland Rules, Article 18, Rule III; Pilot Rule 80.1);
- d. hazarding a vessel by not using radar to detect the presence of vessels ahead to avoid the danger of collision; (Article 110, UCMJ);
- e. failure to employ such means and devices as may be available for detecting and avoiding danger from collision [Coast Guard Regulation 6-11-4B(2)];
- f. failure to require that the lookout not remain at his post in excess of 2 hours [Coast Guard Regulation 6-11-4B(3)] and
- g. failure to report to the Commanding Officer the presence of an inbound vessel [Coast Guard Regulation 6-11-4A(4)].

on the part of ENS John R. Ryan for his conduct in this casualty. This matter has been referred to Commander, Seventh Coast Guard District, for further investigation under the provisions of the Uniform Code of Military Justice.

46. There is evidence of:

- a. failure to sound 1 short blast of the whistle for a meeting and port to port passage (Inland Rules, Article 18, Rule I; Pilot Rule 80.4);
- b. failure to stay to the starboard side of mid-channel (Inland Rules, Article 25; Pilot Rule 80.10);
- c. failure to sound the danger signal (Inland Rules, Article 18, Rule III; Pilot Rule 80.1);
- d. hazarding a vessel by not using radar to detect the presence of vessels ahead to avoid the danger of collision (Article 110, UCMJ);
- e. hazarding a vessel by failing to supervise an inexperienced conning officer in unfamiliar waters at night (Article 110, UCMJ);
- f. failure to use the radar when necessary for the safety of the vessel [Coast Guard Regulation 4-2-2A(14)];

- g. failure to take special care that all precautions required by the applicable laws and regulations to prevent collisions are observed [Coast Guard Regulation 4-2-2A(11)];
- h. failure to insure that all meeting and passing agreements made using radio communications are followed by appropriate whistle signals [Coast Guard Regulation 4-2-2A(11); Pilot Rule 80.3];
- i. failure to station at least one lookout in the bow as far forward and as near the water as feasible when traversing a congested traffic area [Coast Guard Regulation 4-2-2A(9)];
- j. failure to insure that sufficient liferafts were on board for all personnel (Coast Guard Regulation 4-1-2A) and
- k. failure to insure that personnel on board were proficient in emergency drills (Coast Guard Regulation 4-1-2A).

on the part of LCDR George J. Sepel for his conduct in this casualty. This matter has been referred to Commander, Seventh Coast Guard District, for further investigation under the provisions of the Uniform Code of Military Justice.

47. There is evidence of:

- a. failure to sound 1 short blast of the whistle for a meeting and port to port passage (Inland Rules, Article 18, Rule I; Pilot Rule 80.4);
- b. failure to stay to the starboard side of mid-channel (Inland Rules, Article 25; Pilot Rule 80.10);
- c. failure to sound 1 short blast of the whistle in a crossing situation to indicate intention to hold course and speed [Pilot Rule 80.03(3)];
- d. failure to sound the danger signal when in doubt as to the intentions of BLACKTHORN (Inland Rules, Article 18, Rule III; Pilot Rule 80.1);
- e. failure to reduce speed or stop the vessel (Inland Rules, Article 29) and
- f. failure to evaluate the danger of each closing contact [Title 33 Code of Federal Regulations, Part 164.11(f)].

on the part of Pilot Harry E. Knight for his conduct in this casualty. This matter has been referred to Commander, Seventh Coast Guard District, for further investigation under the provisions of Revised Statutes 4450.

48. There is evidence of:

- a. failure to sound 1 short blast of the whistle for a meeting and port to port passage (Inland Rules, Article 18, Rule 1; Pilot Rule 80.4);
- b. failure to stay to the starboard side of mid-channel (Inland Rules, Article 25; Pilot Rule 80.10);
- c. failure to sound 1 short blast of the whistle in a crossing situation to indicate intention to hold course and speed [Pilot Rule 80.03(3)];
- d. failure to sound the danger signal when in doubt as to the intentions of BLACKTHORN (Inland Rules, Article 18, Rule III; Pilot Rule 80.1);
- e. failure to reduce speed or stop the vessel (Inland Rules, Article 29);
- f. failure to ensure that the position of his vessel at each fix was plotted on a chart of the area [Title 33 Code of Federal Regulations, Part 164.11(c)];
- g. failure to evaluate the danger of each closing contact [Title 33 Code of Federal Regulations, Part 164.11(f)];
- h. failure to keep a proper lookout by instructing him not to report well lighted vessels in the channel (Inland Rules, Article 29) and
- i. failure to require that no more than 25% of the required Able Seaman on board be Able Seaman-12 Months [Title 46 Code of Federal Regulations Part 12.05-7(a)(1)(iv)]

on the part of George P. McShea, Jr. for his conduct in this casualty. This matter has been forwarded to Commander, Seventh Coast Guard District for further investigation under the provisions of Revised Statutes 4450.

RECOMMENDATIONS

It is recommended that:

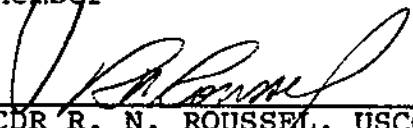
1. Consideration be given to require all Coast Guard officers assigned to deck duty to demonstrate, by a centrally prepared written examination, a comprehensive knowledge of the applicable Rules of the Road prior to their certification for such duty.
2. Consideration be given to amending U. S. Coast Guard Regulation 4-2-2A(14), in order to provide that all cutters suitably equipped with radar be required to maintain both shipping and navigational plots whenever operating in restricted waters, in or near areas of reduced visibility, or when it is otherwise necessary for the safety of the vessel.
3. Operational commanders review training standards in order to insure that cutters do not sail unless ship's personnel have demonstrated satisfactory proficiency at all hands emergency drills. Further, that new personnel be familiarized with the location and use of abandon ship equipment prior to sailing.
4. Greater emphasis be given to instruction in survival swimming and use of shipboard survival equipment at boot camp.
5. Inflatable liferaft policies be reviewed for adequacy and/or compliance with specific attention to the areas of:
 - a. Shipboard stowage.
 - b. Servicing and inspection at authorized facilities with monitoring for quality control.
 - c. Types of rafts in use.
 - d. Use of rigid stowage containers.
 - e. Format of instructions disseminated to the field with a view toward consolidation of the several references into one manual.
 - f. Hydrostatic releases or float free installation.
6. An evaluation be made concerning the problems involved in donning currently issued Coast Guard lifejackets in the water at night.
7. Commander, Seventh Coast Guard District, initiate a study concerning the aids to navigation and marine traffic flow in Tampa Bay to include:
 - a. Replacing unlighted with lighted buoys in Mullet Key Channel.
 - b. Establishing a traffic control system to prohibit vessels meeting or overtaking at certain channel junctions.
 - c. Determining the utility of shallow draft auxiliary channels adjacent to the main ship channel where feasible.

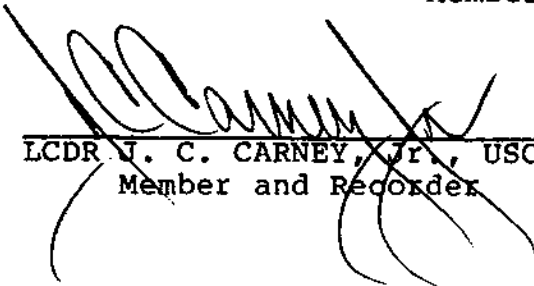
- d. Marking extremities of certain channel bend wideners.
 - e. Reviewing adequacy of Chart 11414. The scale is relatively small for navigational purposes. Additionally, there is a discrepancy between the Mullet Key Channel buoy line marking the actual northern extremity of dredging, and the channel line plotted on the chart.
8. The following items be reviewed to ascertain whether or not they represent either substantial or widespread problems requiring corrective action:
- a. Useability of ship's stability book appears limited due to complexity of presentation and lack of descriptive examples.
 - b. Adequacy of training in stability provided to cadets and officer candidates and the need of a refresher for seagoing personnel assigned as Commanding Officer, Executive Officer and Engineer Officer.
 - c. Ability/necessity for all cutters, especially 180' WLB's, to rig out a boat for sea as required by USCG Regulation 4-2-15A(1).
 - d. Failure of merchant vessels to fully comply with Navigation Safety Regulations in 33 CFR 164, as is the case presently in Tampa Bay.
 - e. Bridge-to-Bridge radiotelephone interference due to overpowering.


RADM N. C. VENTZKE, USCG
Chairman

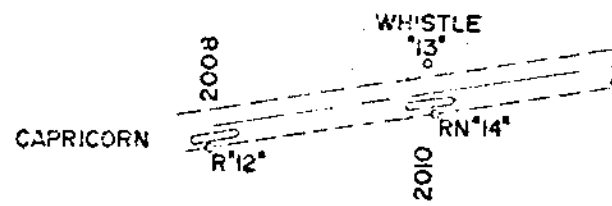

CAPT B. E. JOYCE, USCG
Member


CAPT J. B. EKMAN, USCG
Member


CDR R. N. ROUSSEL, USCG
Member


LCDR J. C. CARNEY, Jr., USCG
Member and Recorder

Copy to:
COMLANTAREA
CCGD7
CCGD8





TAMPA

BAY

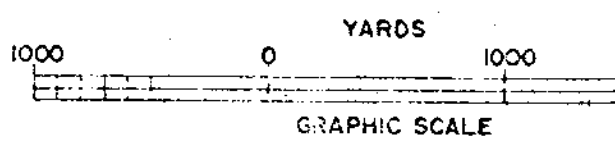
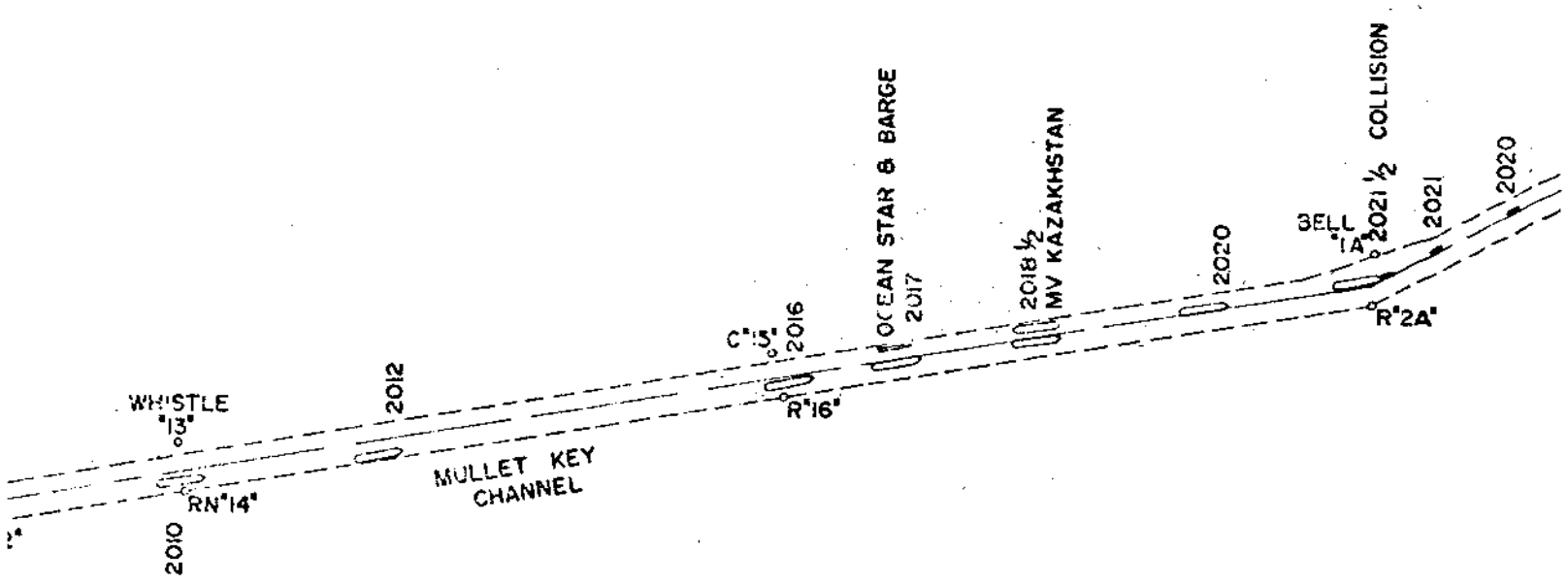
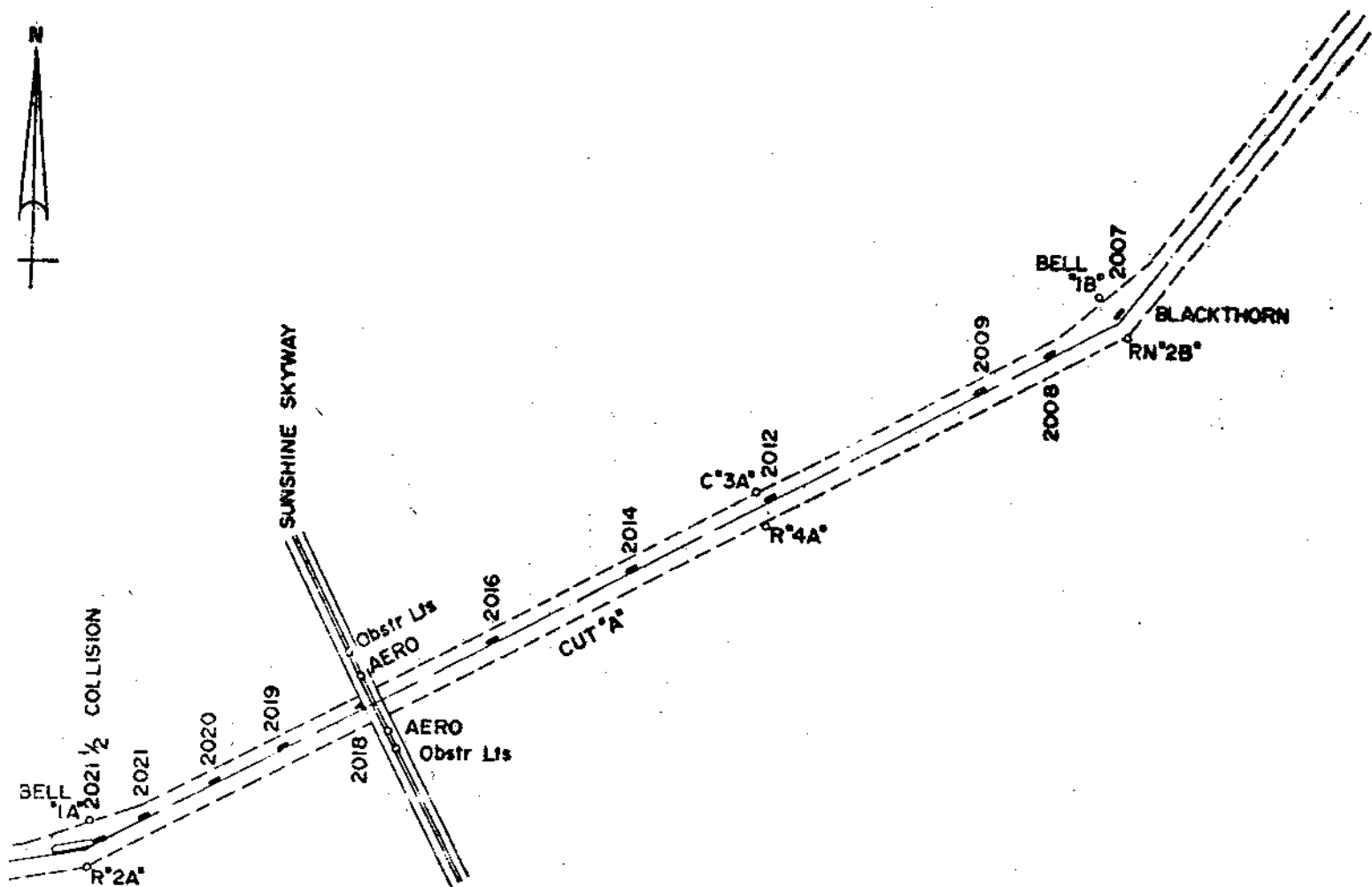


CHART A



TAKEN FROM CHART 11414
 OUTER BOUNDARY LINES OF
 THE CHANNELS ARE APPROX-
 IMATE DUE TO THE DISTORTION
 OF CHART 11414 IN THIS AREA

YARDS
 1000 2000
 GRAPHIC SCALE

ART A

ALL POSITIONS ARE ESTIMATES
 BASED ON EVIDENCE, EXCEPT
 USCGC BLACKTHORN'S POSITIONS
 AT 2007, 2009 & 2018 WHICH ARE
 BASED ON ACTUAL FIXES.

Figure 6