



16732/El Toro II
29 July 1994

From: Investigating Officer
To: Commandant (G-MMI-1)
Via: Commander, Fifth Coast Guard District (m)

Subj: SINKING OF THE SMALL PASSENGER VESSEL EL TORO II,
O.N. 285617, IN THE CHESAPEAKE BAY ON 5 DECEMBER 1993,
WITH LOSS OF LIFE

FINDINGS OF FACT:

Summary: The Coast Guard certificated small passenger vessel EL TORO II took on water through sprung bottom planks and sank at 1400 EST on 5 December 1993, approximately 5 miles SSE of Point Lookout, Maryland in the Chesapeake Bay. All 23 persons on board were recovered by Coast Guard and U.S. Navy helicopters and a Coast Guard 41 foot utility boat. Two passengers and one crew member died as a result of the casualty. All of the persons on board and 3 Coast Guard personnel suffered varying degrees of hypothermia. The vessel was salvaged at Point Lookout Marina and declared a total loss.

The Vessel

1. Vessel Data:

Name: O.N.:	EL TORO II
Service:	285617
Gross Tons:	Passenger vessel, sport-fishing
Net Tons:	17
Length:	12
Breadth:	58 ft.
Depth:	16.5 ft.
Propulsion:	4.7 ft.
Horsepower:	Diesel Reduction
Homeport:	310
Built:	Norfolk, VA Deltaville, VA 1961
Owner:	Chesapeake Bay Fishing Parties Inc. State Route 252, Box 21 Ridge, MD 20680 President: Joseph C. Lore II Vice President: Clayton S. Lore Secretary-Treasurer: Anna M. Lore
Operator:	Joseph C. Lore II State Route 252, Box 21 Ridge, MD 20680

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Master: Clayton S. Lore
License: Master Inland Steam or Motor
Vessels of not more than 25 gross
tons, issue 2-2
dated 14 April 1989
Certificate of Inspection: Issued 30 April 1991
by MSO Baltimore, MD
Last Coast Guard Inspection: Second Reinspection
completed 26 April 1993
by MSO Baltimore, MD
Last Drydock Examination: Completed 25 March 1993
by MSO Baltimore, MD

2. Deceased Personnel Data:

Name: Edgar C. Phillips Jr.
Age: 19
Address: Route 249
Piney Point, MD 20674
Position on vessel: Deckhand
Next of Kin: Edgar C. Phillips Sr. (father)

Name: Robert B. Shipe
Age: 45
Address: 3865 Crescent Lane
Mechanicsville, MD 20659
Position on vessel: Passenger
Next of Kin: Teresa M. Shipe (wife)

Name: Horace I. Smith Sr.
Age: 64
Address: 6420 14th Street NW
Washington, DC 20011
Position on vessel: Passenger
Next of Kin: Deborah Smith (daughter)

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3. The EL TORO II was built by Price Boatyards in Deltaville, Virginia for Coast Guard inspected service as a small passenger vessel. The details of construction were to plans for a single engine Price 58 foot well deck vessel. The vessel was fitted with a narrow wheelhouse forward of a long narrow passenger cabin, with a bench seat between the bulwark and the cabin to facilitate passengers fishing.

4. The vessel was built of wood with transverse bottom planking and longitudinal side planking. Bottom planking was 1 5/8 inch thick pine and varied in width from six to ten inches. Each bottom plank was nailed to the underside of the keelson (interior keel), longitudinal battens (stringers, sister keelsons in local parlance) and a longitudinal 2 3/8 inch by 8 inch chine board. Proper terminology for structural members can be found in "Boatbuilding" by Howard I. Chapelle.

5. Fasteners consisted of steel keel and chine bolts and square cut and galvanized, ferrous boat nails. The nails were tapered with smooth shanks along four edges and had half round heads. Nails in bottom planks were five inches long in way of the chine and keel and four inches long in way of longitudinal battens. Typically, two rows of five inch nails, five to seven nails, were used at the chine and three rows of five inch nails, eight to ten nails, were used at the keel. Typically, a single row of four inch nails, two or three nails, were used in each batten.

6. Item 4.42 of Project H-7 in "Standards and Recommended Practices for Small Craft," published by the American Boat and Yacht Council, recommends against the use of smooth-shank nails in primary hull structure. Similarly, Coast Guard Navigation and Vessel Inspection Circular (NVIC) No. 1-63, "Notes on Inspection and Repair of Wooden Hulls," recommends against the use of cut nails due to a lack of holding power in some circumstances. Both recommendations were published within two years after the delivery of this vessel. Item 3.1 of Project H-7 recommends against the use of ferrous fasteners. Both references recommend ferrous fasteners be hot dip galvanized.

7. The vessel was built with four transverse bulkheads, dividing the hull into five compartments. The bulkheads were located 5.5, 15.6, 31.6, and 44.9 feet aft of the stem at deck level. The compartments from the stem were a forepeak void, a void, a void with two cylindrical independent fuel tanks located outboard and aft, the engineroom with battery boxes aft of the engine on the port side and a lazarette containing steering gear.

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8. The transverse bulkheads were not watertight due to holes cut for drainage and electrical wiring. The vessel was fitted with watertight bulkheads and fixed bilge piping at the time it was built. The piping was removed prior to 1989, when the owner purchased the vessel. A small piece of the bilge piping remained in the forward engineroom bulkhead.

9. For the 49 passengers and the Lakes, Bays and Sounds route authorized by the Certificate of Inspection, none of the transverse bulkheads were required to be watertight. (current regulation 46 CFR 171.040(b)(2))

10. The vessel was fitted with two battery powered electric motor driven bilge pumps, each with a 2000 gph capacity, located in the forward end of the engineroom. Both pumps took suction from this low point in the vessel and were controlled by a single switch in the wheelhouse. Discharge hose for these pumps was plastic. Automatic level switches and run indicator lamps were not fitted and were not required by regulation.

11. The vessel was carrying two portable hand pumps which could be used to pump bilges. The regulations required one portable hand pump with a capacity of at least 5 gpm.

12. A fixed bilge piping system was not required by 46 CFR 182.25-5(a) since the vessel did not have watertight compartments. The fixed and portable bilge pumps on board met regulatory requirements.

13. The vessel was not equipped with bilge level alarms, such as described in proposed regulation 46 CFR 182.530, published 30 January 1989.

14. The vessel was fitted with a single engine and propeller, with a maximum calm water speed of approximately 9 knots.

15. The vessel's primary lifesaving equipment consisted of a single aluminum buoyant apparatus made by Welin Davit & Boat in 1959, having a capacity for 20 persons and bearing Coast Guard approval number 160.010/38/0. This apparatus had serial no. 183 and is the same one on board when the vessel was built in 1961.

16. For the Lakes, Bays and Sounds route authorized by the Certificate of Inspection and the 53 total persons allowed on board, 46 CFR 180.15 required that the vessel be provided with primary lifesaving equipment for at least 16 persons. The buoyant apparatus on board met this requirement.

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17. The buoyant apparatus was stowed on top of the cabin and connected to the vessel with a painter and weak link. The apparatus was fitted with a carbide-type water light. The apparatus was not fitted with retroreflective tape, as shown for new buoyant apparatus in 46 CFR 160.010(p). NVIC 1-87, "Installation of Retroreflective Material on Lifesaving Equipment," indicates that retroreflective tape is not required on buoyant apparatus built before 20 March 1983.

18. The vessel was fitted with a variety of styles of lifejackets, including cork, foam and kapok. The predominant cork style lifejackets bore a 160.003 Coast Guard approval number and remained acceptable under 46 CFR 180.25-1(c) because their 1961 manufacture date preceded July 1965.

19. The vessel was fitted with cabinets inside the cabin, Just aft of the wheelhouse. The lifejackets were stowed in these cabinets. The port cabinet had a small shelf allowing segregation of child-size and adult-size lifejackets. The child size lifejackets were intended to be stowed on this shelf. Markings for the lifejacket stowage were written with a marker, rather than being engraved in a placard. The markings were not completely clear at the time of the casualty but indicated that six child-size lifejackets were stowed in the port cabinet.

20. Emergency instructions similar to those given in 46 CFR 185.25(a) were posted with other material, such as pollution placards, next to the port cabinet which contained Lifejackets.

21. Coast Guard NVIC 7-91, "Determination of Cold Water Areas," identifies appropriate geographic locations for requiring immersion suits for personnel on board commercial vessels. The basic criterion is a water temperature less than 59 degrees Fahrenheit. The regulations applicable to small passenger vessels do not require immersion suits for any waters. Proposed regulations published in the Federal Register on 30 January 1989 do not address immersion suits or propose changes to the required types or amount of primary lifesaving equipment for vessels in a Lakes, Bays and Sounds service with a maximum of 49 passengers.

22. All electrical power was provided by batteries located in the engineroom. On 5 December 1993, one battery was not secured in the battery boxes at the aft end of the engineroom. It was located on structural members near the keel.

23. Project E-1 of ABYC's "Standards and Recommended Practices for Small Craft" and 46 CFR 183.05-50(d) indicate low voltage

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direct current electrical systems are to be negative ground. Both references indicate that non-current carrying metal parts, such as enclosures and frames of electrical equipment, on wood vessels are to be bonded together electrically. ABYC specifically provides for electrically isolated through-hull fittings to not be connected to the bonding system.

24. In the spring of 1993, the electrical system was changed from a positive ground system to a negative ground system by the owner, to comply with a Coast Guard requirement issued 27 April 1992. The owner provided written notification of this work to MSO Baltimore on 7 May 1993. MSO Baltimore did not reply or acknowledge receipt of the letter prior to the casualty. The Chief, Inspection Department at MSO Baltimore stated that the letter was not properly handled due to personnel injuries and leave.

Inspections and Surveys Prior to the Casualty

25. The vessel was initially certificated on 2 June 1961 at Wildwood, NJ for a coastwise route with a maximum of 49 passengers and 2 crew. For that service, the vessel was required to have a watertight collision bulkhead.

26. On 29 March 1988, LT W. Hunt completed a routine triennial inspection for certification of the vessel. He noted in internal reports "minor leakage from stbd chine between fr 2 and 3 in NR 2 compartment. All satisfactory." No requirements pertaining to the hull structure or integrity were issued at that inspection, except one pertaining to rudder stock packing. The leak at the chine was not noted in subsequent inspection reports.

27. On 14 April 1988, CW03 D. Darcy completed a drydock examination of the vessel. He noted in internal reports that wood around chine fasteners showed signs of damage from electron flow. He recommended fastener removal for specific evaluation at the next drydock examination. He also noted the vessel was painted prior to the examination, making it difficult to locate potential problem areas. A "special inspection note" (MISN) was entered into the Coast Guard nationwide computer Marine Safety Information System (MSIS) to call the chine fasteners to the attention of future inspectors. The note expired on 29 March 1993. Paragraph 3.S.1 in volume II of the Coast Guard Marine Safety Manual states "When conditions are discovered during an inspection that should be highlighted for scrutiny at later inspections, a MISN should be filed."

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28. On 4 April 1989, LCDR W. Hunt conducted the annual reinspection of the vessel. He noted in internal reports that he "conducted underway exam with no excessive working or leaking of hull noted." However, he noted 'some working of keel and water seepage in mid-portion of fuel tank compartment (stbd side of keel). I examined transverse keel bolts and drift pins in this area which appeared satisfactory. Recommend these bolts and pins be monitored at next drydock." No requirements pertaining to the hull structure or integrity were issued at that inspection. A MISN was entered into MSIS to call the area to the attention of future inspectors. The area was not noted in subsequent inspection reports. The note expired on 31 December 1990, not extended in conjunction with a 26 December 1990 drydock examination due date extension, for undetermined reasons.

29. Mr. J. Lore and his family obtained the vessel in early 1989, as part of their purchase of the five vessel company Chesapeake Bay Fishing Parties Inc. from Mr. Norman Bishop. This was their first experience in owning Coast Guard inspected vessels.

30. Mr. J. Lore stated that for information about the vessel's condition at the time of purchase, he relied heavily on a 1987 survey of the vessel by marine surveyor Mr. M. McCook, and the fact that the vessel held a Coast Guard issued Certificate of Inspection. The 1987 survey included no recommendations concerning the hull. An independent survey was not made at the time of purchase and detailed maintenance records from the prior owner were not available. Mr. J. Lore stated that he had requested maintenance records from Mr. Bishop, who could provide none.

31. Each spring from 1989 to 1992, Mr. J. Lore had the vessel drydocked without Coast Guard examination. He was primarily responsible for maintenance of the vessel and never hired a marine surveyor to examine the vessel. His single page summaries of maintenance for each calendar year show that he cleaned and painted the bottom at each drydocking. Other than the application of a few stainless steel fasteners in 1990 and recaulking near the propeller, no structural work was performed at these drydockings. Mr. J. Lore did not consider the work performed to be major items affecting the seaworthiness of the vessel and therefore did not report the same to the Coast Guard, as permitted by 46 CFR 176.15-10.

32. Mr. C. Lore stated that the bilges were cleaned on an annual basis prior to Coast Guard inspections.

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33. On 8 March 1990, Mr. J. Lore requested in writing an extension of the Coast Guard drydock examination due date since a drydock examination was due prior to putting the vessel into service for the season. On 21 March 1990, LCDR S. Sharpe of Marine Safety Office Baltimore, as the Chief of the Inspection Department, replied in writing that his inspectors would specifically address the vessel's suitability for extension at the scheduled reinspection on 10 or 11 April 1990.

34. On 11 April 1990, BMC R. Howerter conducted the annual reinspection. In internal reports he stated "check all internals and steering during u/w (underway) test. Vsl does qualify for D/D (drydock) extension until April 91." No requirements pertaining to the hull structure or integrity were issued at that inspection. On an informal note dated 11 April 1990 in the vessel's file, he wrote "D/D can be extended until 14 April 1991 and then D/D inspection should be completed due to age of vsl. n His note is followed by a note from LCDR Sharpe stating "we need a freshwater letter from him before we grant an extension." An extension was granted as part of the reinspection case, to a date that cannot be determined, although 14 April 1991 would be consistent with the then current local extension policy.

35 On 5 December 1990, Mr. J. Lore requested in writing an extension of the drydock examination due date "for a five year period", noting the vessel "has been operated and will be operated between Smith Point, VA and Cove Point, MD in the Chesapeake Bay." On 26 December 1990, LCDR Sharpe replied in writing that the extension request was granted and the drydock examination due date was changed to 14 April 1993. The reference in his letter to 46 CFR 176.15-1(a)(2) is a clerical error since that sub-paragraph addresses a maximum drydock interval of three years, which would have extended the due date only to 14 April 1991.

36. The drydock examination extensions granted on 11 April 1990 and 26 December 1990 were based on Coast Guard examinations of the vessel while afloat. The drydock examination was extended for a total of 3.5 years. The result was that the vessel was not examined on drydock by the Coast Guard between 14 April 1988 and 25 March 1993.

37. The drydock examination extensions granted on 11 April 1990 and 26 December 1990 were made in conjunction with local policy reflected in MSO Baltimore Instruction 16711.2A of 13 December 1990. The instruction revised previous written local guidance and propagated a brackish water category not addressed in 46 CFR 176.15-1(a). The policy makes no provision for the age of a vessel.

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38. LCDR Stephen Ciccalone, the Chief, Inspection Department at MSO Baltimore in 1993 stated he determined local policy for drydock extensions on vessels operating north of Smith Point, Virginia on the Chesapeake Bay to have existed for about 20 years, without a known loss of a single inspected vessel. LCDR Ciccalone could not identify the basis for defining brackish waters in this geographic area. The waters identified as brackish are generally recognized in the maritime community to be salt water, in that they are not fresh.

39. LCDR Ciccalone stated that no specific actions have been planned at MSO Baltimore to evaluate local policy on drydock extensions relative to G-MVI-1 policy letter 16-93 of 13 July 1993, based on the rationale that the letter does not address brackish waters. That letter reinforces Marine Safety Manual guidance that limits local drydock extension authority to 12 months for vessels in salt water service. It indicates extensions are normally six months in length. The guidance does not address services other than salt water.

40. On 30 April 1991, LTJG K. McAvoy and LCDR Sharpe conducted an inspection for certification. No requirements pertaining to the hull structure or integrity were issued at that inspection. Internal records contained no mention of prior areas of concern and show the inspectors found hull structure and integrity "all satisfactory." LTJG McAvoy stated it was "standard practice" to read previous files prior to inspecting a vessel. Paragraph 3.C.2 in volume II of the Coast Guard Marine Safety Manual states "Previous inspection reports covering the same vessel should be used for reference purposes at any such inspection."

41. At the 30 April 1991 inspection for certification, difficulty was experienced in getting the painter for the buoyant apparatus to freely pay out from its container. The cause was found to be a thick section in the painter catching on the edge of the hole at the end of the container through which the painter led. The item was resolved with verbal advice from the inspector LTJG McAvoy to the owner representative, about stowing the painter. LTJG McAvoy did not find a problem with the painter the following year.

42. On 27 April 1992, LTJG McAvoy conducted the annual reinspection. He noted "excessive evidence of stray current or exhaust leakage in engine compartment." This was "angel hair", also informally called stringy wood but formally called dry rot, and wood around fasteners turning white from electron flow. No special attention was given to the 1988 drydock examination notes

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about pulling fasteners, but a discussion with LCDR Sharpe led to a note not recommending drydock extension. However, the decision to extend the drydock examination to April 1993, made prior to 30 April 1991, was not reversed.

43. At the 27 April 1992 reinspection, inspector LTJg McAvoy had CWO Steinberger, previously an electrician in the U.S. Navy, examine the electrical aspects of the vessel. CWO Steinberger noted the electrical system to be positive ground in contradiction to 46 CFR 183.05-50(d). LTJg McAvoy noted an ineffective bonding system. He stated that nothing was bonded as far as through-hull fittings, indicating he expected them to be bonded together. A circumspect written requirement to overhaul the entire electrical system and provide drawings for review was issued to include these items and a poorly maintained system. Due to white wood around chine bolts, he suspected stray currents at fasteners in the engineroom and entered a special note in MSIS, to check fasteners at the next drydock examination.

44. The electrical system overhaul requirement was effectively extended by MSO Baltimore personnel a number of times from 4 June 1992 to 1 June 1993, in part due to delays in obtaining new alternators. The due date in MSIS was not updated beyond November 1992.

45. BMCM Dale S. Moore completed a drydock examination of the vessel on 25 March 1993. The exam lasted 4.5 hours, 1.5 hours being spent examining the exterior of the hull. All available previous inspection records were reviewed in preparation, including reports from the 1988 drydock examination and the subsequent inspections when the vessel was afloat. BMCM Moore had no knowledge of any fastener renewals. Mr. J. Lore was likewise unaware of any fastener renewals, or structural problems in the life of the vessel. Mr. J. Lore told BMCM Moore that plank fasteners were galvanized spikes.

46. BMCM Moore intended to have fasteners removed for examination and directed the removal of plugs with that in mind. However, due to the good appearance of hull structure, internally and externally, no fasteners were required to be removed for examination. Four wooden plugs, most near the wind and water line, were removed and the nails which attached planking were evaluated. The nails were sounded using a nut driver and a hammer and found to be in good condition, without movement or wastage. BMCM Moore stated his focus on the wind and water line was a result of training received at the Inspection Department Course at Reserve Training Center Yorktown, VA and a wood boat

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course in San Diego. One location was in the third plank up from the chine on the starboard side of the transom, one in the first starboard side plank above the chine amidship in the engineroom, one in the fifth starboard side plank above the chine forward and one in the first port side plank above the chine at the stem.

47. The head of one of the four fasteners was visually examined by BMC Collins, an inspector with more experience in the Baltimore inspection zone. He briefly examined the exterior of the hull and concurred with BMCM Moore that the hull was in very good condition, tight and sound. BMC Collins testified he thought the vessel had been refastened with stainless steel or money based on the head of the single plank fastener he saw.

48. BMCM Moore Internally examined every compartment and sounded all accessible chine bolts with a hammer. He found the hull to be very tight and well put together. He found nothing to give him concern to pull plank fasteners, being aware of inspection notes to check fasteners. He stated he felt his actions met the intent of the special note to check fasteners, especially in his focus on chine bolts. He stated that he believed removal of plank fasteners would destroy planks. At the time he issued a requirement to clean the engineroom bilges.

49. BMCM Moore left the special inspection notes about fastener evaluation in the files to continue attention to fasteners. The 31 December 1999 expiration date for the notes in MSIS reflected an intent for lone term retention of the notes.

50. General guidance on inspecting wood hulls is provided in NVIC 1-63, published 18 January 1963. No guidance is given on when fasteners should be removed for examination when indications of wastage are not present. Local Marine Safety Offices have a wide variety of written and verbal policies for random removal of plank fasteners. One policy requiring removal of fasteners near the keel is that applied by MSO San Francisco. MSO Baltimore had no written or verbal policy prior to the casualty. Other than NVIC 1-63, Coast Guard inspectors obtain experience with wood vessels on the job and at a five day introductory course on wood sandal 9 which in contracted through Captain Franke in San Diego.

51. On 26 April 1993, BMCM Moore completed the annual reinspection on the vessel. He found the bonding to be satisfactory and signed the requirement off. His inspection report indicates he rejected no lifejackets, although he remembered rejecting about four lifejackets due to rotted straps. He noted minor dry rot in the canvas covering of some lifejackets

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but found them in generally good condition. He found batteries to be properly stowed. At the time, Mr. J. Lore requested an extension on the electrical system requirement. BMCM deferred the issue to the Assistant Chief Inspection Department as directed by telephone.

52. On 17 November 1993, Kim L. MacCartney as a senior marine specialist in the Insurance Company of North America (INA), the property and casualty branch of CIGNA, surveyed the four other vessels of Chesapeake Bay Fishing Parties Inc at Ridge, MD, the HONEY BEE, EVA MARIE, LUCKY LADY and OLYMPUS I. Mr. J. Lore was nearby but not on board. Mr. J. Lore did not appear concerned with adverse findings relayed by Mr. MacCartney, who was conducting condition and value surveys for the underwriters, surveys not requested by the owner. Mr. Lore stated he doesn't remember Mr. MacCartney telling him his vessels were in poor condition.

53. On 30 November 1993, Mr. J. Lore's insurance agent, Mr. Eric C. Olson of The Loomis Company, notified Mr. J. Lore in writing of the reduction in insurance on the four surveyed vessels to port risk only. Port risk means insurance is not effective when the vessel operates. The letter followed verbal notification made a couple of days previously. Mr. J. Lore was not overly concerned since the vessels were out of service for the winter.

54. On 24 November 1993, Mrs. Lore and Mr. MacCartney arranged for a survey of the EL TORO II on 29 November 1993. Mrs. Lore stated she told him the vessel would be operating weekends in Virginia waters until 19 December 1993. Mr. MacCartney stated he understood the vessel was out of service for the season. He did not record details from the conversation. He noted that Maryland boats had generally ended their season since the Maryland rockfish season closed the third week in November 1993. He also stated he was unaware of an extension in insurance coverage until 19 December 1993. Mr. J. Lore previously had the insurance coverage for the vessel extended to 19 December 1993 to cover the vessel until the end of the rockfish season in Virginia.

55. At about 0945 on 29 November 1993, Mr. MacCartney met Mr. J. Lore as he arrived to survey the vessel in Ridge, MD. Mr. J. Lore told him the vessel was left open for him and then continued on his way with Mr. C. Lore. Mr. J. Lore stated he told Mr. MacCartney the vessel would be fishing on weekends until 19 December 1993. He also stated signs near the vessel indicated such. Mr. MacCartney completed his survey in about two hours then determined that Mr. J. Lore had not returned. He left no

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conclusions concerning his survey for the owner's use, following his normal practice when an owner is not present during the survey. Additionally, he felt Mr. J. Lore would not be interested, especially since he showed little interest in the survey results for the other four vessels.

56. Mr. MacCartney stated he told Ms. English of INA on 2 December 1993 that the EL TORO II was the worst of the five vessels, to which she responded that she would wait to see his report. He stated that he wrote and signed his written report on 2 December 1993, with the intent to mail the report to INA the following week, with reports of other recent surveys. The report was not provided to INA prior to the casualty.

57. Mr. MacCartney's survey report included 21 recommendations and reflected that he understood the vessel was out of service for the winter. It was accompanied by an internal memorandum which stated "this may be the worst Coast Guard inspected vessel I have ever seen" and indicated this vessel may have been relocated from the Philadelphia area to the Chesapeake Bay to avoid regulatory enforcement. He stated that none of the recommendations individually was sufficient to draw his conclusion that the vessel was not safe for the carriage of passengers. He felt the combination reflected a problem with care and maintenance on the part of the owner, and in the absence of his recommendations not pertaining to structures, he would have concluded the vessel was safe to carry passengers.

58. Mr. MacCartney indicated he believed most of the unsatisfactory conditions he noted came to that state subsequent to the Coast Guard inspection in 1993. He found the electrical system to be negatively grounded and opined that bonding of through-hulls was detrimental to the surrounding wood. In his experience with uninspected vessels, wood problems often cease to develop when bonding is removed. He estimated the leak in way of a structural bolt below the helm to be about one quart per hour. He tested four chine bolts with a wrench and found them in good condition.

59. At no time prior to the casualty was Mr. J. Lore or Mr. C. Lore made aware of the conclusions of Mr. MacCartney's survey. Both stated they would not have taken the vessel out if they were aware of Mr. MacCartney's conclusions.

60. There is no regulatory requirement for an insurer, or a surveyor acting on the insurer's behalf, to report survey results to the Coast Guard. Mr. MacCartney stated he would normally

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notify the Coast Guard when he found an inspected vessel to be in imminent danger, if it were to operate moon thereafter. He stated that if he knew this vessel was to operate the following weekend, he would likely have notified the Coast Guard.

61. LCDR Ciccaglione stated that a marine inspector would have visited the vessel had MSO Baltimore known of Mr. MacCartney's survey results and determined that the vessel was to operate in December 1993. He opined that more training at wood boat courses would result in better Coast Guard inspections.

62. Mr. MacCartney observed vessels with money and Everdur fasteners normally do not need refastening but those with ferrous fasteners do at some point. He also observed that most boat owners rely on boat yard personnel for structural advice. Further, he opined that fewer wood vessels are being examined by less experienced personnel in the industry. BMC Collins also opined in this regard, finding the wood boat industry to be dying and some owners operating on limited budgets.

Personnel Qualifications

63. LTJg Kyle McAvoy, who attended the 1991 inspection for certification and the 1992 reinspection, reported to his first assignment in the marine safety field in April 1990. In 1991 he was assisting LCDR S. Sharpe who as Chief, Inspection Department had to help conduct inspections during the spring, when most small passenger vessels undergo required inspections to prepare for the operating season. In 1992 LTJG>g McAvoy was the lead inspector, having obtained his small passenger vessel qualification in 1991. In October 1990, he attended a five day wood boat course taught by Captain Franke of Marine Surveyors Inc in San Diego. The course included hands-on exposure to wood boats.

64. BMCM Dale S. Moore, who was lead inspector at the 1993 drydock examination and the inspector at the 1993 reinspection, had 8.5 years of marine safety experience. From 1979 to 1982 he served as an assistant inspector at the Marine Inspection Office in Chicago. From 1988 to 1992 he served in the Inspection Department at the Marine Safety Office in Philadelphia. On 22 June 1989, he obtained his letter of designation as a small passenger vessel inspector. While assigned to MSO Philadelphia, he inspected vessels in Delaware, some similar in size and design to the EL TORO II. He attended Captain Franke's five day wood boat course in San Diego in 1989. He conducted drydock

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examinations on approximately 75 wood vessels while stationed in Philadelphia, about 10 to 15 having cross bottom planking. He reported to the Inspection Department at MSO Baltimore in June 1992. His first spring inspection season there started in 1993.

65. BMC Charles Collins had 7 years of marine inspection experience, all in the Baltimore area, from 1980 to 1984 and 1990 to September 1993, when he retired from the Coast Guard. He obtained his letter of designation as a small passenger vessel inspector and attended Captain Franke's five day wood boat course in San Diego in 1990. He had attended about 125 drydock examinations on wood boats in the Baltimore area, making him one of the most experienced wood boat inspectors at MSO Baltimore. About 50 to 75 of these examinations were on cross bottom planked boats.

66. Mr. Kim I. MacCartney had 17 years of experience as a marine surveyor. He had prior experience as a Coast Guard marine inspector at the Marine Inspection Office in Philadelphia. He has continued service in the Coast Guard as a Reservist. He is the national Secretary of the National Association of Marine Surveyors and a graduate of the Coast Guard Academy. In his work as a marine insurance specialist, he was a direct employee of the Insurance Company of North America. He estimated that he now annually surveys about 10 wood small craft generally similar to the EL TORO II and 90 pleasure craft.

67. Mr. Joseph C. Lore II and his son Mr. Clayton S. Lore worked as watermen on the Chesapeake Bay until obtaining their Coast Guard licenses 14 April 1984, upon passing written examinations. Mr. J. Lore's license, #622772, is for service as master of inland steam or motor vessels of not more than 100 gross tons and was renewed on 14 April 1989 for a five year period. Mr. C. Lore's license, #622773, is for service as master of inland steam or motor vessels of not more than 25 gross tons and was renewed on 14 April 1989 for a five year period. On 19 April 1984, both men completed a two week preparatory course titled Captain's Course, taught by Houston Marine Training Services. Mr. C. Lore had no other formal training pertaining to his employment.

The Voyage

68. On 4 December 1993, evening weather reports indicated predicted winds of 22 to 30 mph for Chesapeake Bay at the mouth of the Potomac River. Television reports were seen by Mr. C. Lore and Mr. J. Lore.

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69. The storm warning system operated by the National Weather Service of the National Oceanic and Atmospheric Administration (NOAA) went into effect on 1 January 1958. It includes four categories, starting with small craft warning and followed by gale warning. Small craft warning means winds to 38 mph and/or sea conditions dangerous to small craft. No definition of small craft is provided in texts describing the system. Gale warning means winds 39 to 54 mph. The system is described in well known texts such as "Piloting, Seamanship and Small Boat Handling" by C. F. Chapman, "Knight's Nautical Seamanship" and the "NYNEX Boaters Directors."

70. There are no regulations which require masters of small passenger vessels to monitor radio weather broadcasts. The master is responsible for the safety of the vessel and it is good marine practice to keep oneself aware of all useful information. The NYNEX Boaters Directory lists one weather rule for safe boating as "check radio weather broadcasts for latest forecasts and warnings."

71. At 0339 on 5 December 1993, the NOAA released a small craft warning for Chesapeake Bay, predicting 20-25 knot winds and 6 foot seas.

72. At about 0630, Mr. Greg Madjeski departed Smith Creek, Maryland with passengers aboard his Coast Guard inspected 40 foot long fiberglass sport-fishing boat TEMPLE M. He observed the weather to be calm with light rain and checked VHF channel weather 2. Along with the vessels POOR BOY and PLAN B. he arrived in Virginia waters about 0745.

73. At about 0730 on 5 December 1993, Mr. C. Lore listened to VHF channel weather 2 and heard the forecast and the small craft warning. He made the decision to take the vessel fishing, able to see conditions in the Bay from the dock. He stated that twice in 1993 fishing trips were canceled due to weather. Passenger comfort was an important consideration in making such decisions.

74. At about 0800, 20 passengers boarded the EL TORO II to go fishing for Striped Bass, commonly called rockfish. Fishing had been good recently. Most of the passengers resided in the Washington DC metropolitan area. Some of the passengers had fished from this vessel on prior voyages. Some were on this vessel for the first time.

75. The crew of the vessel consisted of the Master (Captain) Mr. C. Lore, deckhand (called mate) Mr. Edgar C. Phillips Jr. and the

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owner Mr. J. Lore. Mr. C. Lore and Mr. Phillips were the crew required by the vessel's Certificate of Inspection. Mr. C. Lore held a valid and appropriate Coast Guard issued license. Mr. C. Lore had routinely been serving as master but there was no designation in writing. Mr. J. Lore was on board to assist passengers with fishing, as a crew member not required by the Certificate of Inspection. No specific actions were taken to clarify the various positions of the crew to the passengers. A brief conversation between a passenger and Mr. J. Lore, the elder Mr. Lore, left the impression in a couple passengers' minds that he was the master.

76. Typical of his voyage preparation, Mr. C. Lore energized the power driven bilge pumps for about one minute, until they lost suction. The discharge was normal for having been dockside.

77. The only log kept on board the vessel was the radio log.

78. At about 0815, the vessel departed St. Jerome Creek, Maryland in calm weather. At about 0845, Mr. C. Lore spoke to the Maryland vessels near Smith Point and heard of calm weather at his destination. He proceeded south across the mouth of the Potomac River to 37-54 N latitude 76-11 W longitude, almost due east of Smith Point, Virginia and about half a mile south of the Maryland - Virginia border. The vessel arrived in the area about 1015 and found TEMPLE M, POOR BOY and PLAN B fishing in the area. Radio conversation ensued, principally concerning fishing.

79. At no point in preparing for departure from the dock or in route to the fishing grounds did the crew provide the passengers with a safety briefing such as that prescribed in proposed 46 CFR 185.506, published 30 January 1989. Mr. C. Lore stated he would give safety briefings on some trips but had no criteria to identify which trips. A posted emergency checkoff list would meet the applicable requirements of 46 CFR 185.25-1(d) for safety orientation.

80. A list of passengers and crew was not made or left ashore as described in proposed 46 CFR 185.502. No similar requirement existed at the time. The record of persons on board consisted of ticket stubs held by Mr. J. Lore, one of which a passenger put his name on for mailing list purposes.

81. At 0853 and 0933, gale warnings for Chesapeake Bay were released, predicting 30-35 knot winds and 6 foot average seas for the afternoon. Mr. C. Lore did not monitor VHF weather channels subsequent to departing port and was not aware of the gale

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warnings. He stated the vessel was not a small craft with respect to small craft warnings and he would not have taken the vessel out if he believed winds of 35 mph were likely. He -expected to become aware of any important weather information from working channels. It was common practice for fishermen in the area to discuss fishing and weather on the radio.

82. The TEMPLE M, POOR BOY and PLAN B departed the area about 1045, having caught legal limits of rockfish. One of the vessels in Mr. MadJeski's group made arrangements to receive weather observations that day by cellular phone from land located about 20 miles to the northwest, feeling that source of information to be better than NOAA broadcasts. Mr. Madjeski observed calm conditions while fishing near Smith Point and first noted adverse weather about 1200, near the end of his voyage in Smith Creek, Maryland at 1220. He noted a rapid degrading of conditions, typical of cold front passage from the northwest. Wave heights increased from one foot to six to eight feet. He unsuccessfully attempted to contact Mr. C. Lore by radio, to warn him of the weather.

83. By about 1220, rain had dampened passenger enthusiasm for fishing on the EL TORO II, still near Smith Point. Some passengers remained in the cabin. Mr. C. Lore consulted with Mr. J. Lore and decided to get underway for St. Jerome Creek. Although the wind had increased to a light breeze, conditions were not adverse. Mr. C. Lore stated he ran the bilge pumps briefly at that time. The vessel departed the fishing grounds about 1245. Three Virginia vessels headed home then as well.

84. While enroute to St. Jerome Creek, wind speed and wave heights increased. Mr. C. Lore navigated a northwesterly course using a Loran unit which read speed and used way points in memory. To maximize passenger comfort, he operated the vessel at approximately 4.5 knots, half speed, and changed propeller rpm as the vessel rode over the confused wave pattern at the mouth of the Potomac River. Winds and waves were predominantly from the northwest. He stated that he did not find the weather conditions so bad that diversion to a safe refuge was necessary, having experienced heavy weather before, even 65 mph winds in one case.

85. At about 1345, Mr. C. Lore directed Mr. Phillips to check on passengers and the engineroom bilges. Passengers saw him open the engineroom hatch and express no concern with what he saw. He did not have a flashlight in hand. Passenger Dr.-Barton saw into the space and noted liquids in the bilges, four to five inches below the top of the engine mounts. Mr. Phillips reported to Mr.

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C. Lore that all was well. Based on his employment in 1993, Mr. C. Lore trusted Mr. Phillips. By this time, seas had built to 5 to 7 feet but the vessel was taking only spray over the bow.

86. At about 1355, Mr. C. Lore personally checked the engine room through the hatch, noting the vessel had been responding sluggishly in the seas and specifically noting a change in engine speed. Just prior to checking, he pulled back on the throttle and the engine stopped. He found the engine room flooded to the point that water was entering the air intake for the engine, about one foot below the deck. He verbally responded with words to the effect "Jesus Christ!" and immediately directed donning of lifejackets.

87. Mr. C. Lore then directed Mr. J. Lore to radio the Coast Guard for rescue and subsequently assisted passengers with the donning of lifejackets. Mr. Phillips verified that each passenger had a lifejacket. Some confusion existed in passing out lifejackets since they were not found to be well segregated, child-size and adult-size being stacked on the floor of the port closet. Some passengers were surprised to find the straps were not quick-connect fittings, requiring knots to be tied. They felt quick-connect fittings would have improved rapid and effective donning of lifejackets.

88. Mr. C. Lore led Mr. Phillips and passengers in bailing out the hull with five gallon fishing buckets. Passenger Robert Shipe was a leader in bailing efforts at the aft hatch. As people became fatigued, they rotated bailing duty. No specific attempts were made to locate the source of flooding. Mr. J. Lore stated he energized the bilge pumps from the wheelhouse and he assumed they were working since they worked upon departing the fishing grounds.

89. At 1400, Mr. J. Lore broadcast a distress call on VHF channel 16, reporting preparations to abandon ship because the vessel was taking on water and had a dead engine. Coast Guard Station St. Inigoes, Maryland responded, directing the donning of lifejackets, remaining with the vessel as long as it was deemed safe and keeping people together. The vessel name, number of persons on board and danger of sinking were relayed. Mr. C. Lore decided against deploying the anchor, fearing it might drag the vessel under the water surface. Mr. J. Lore remained with the radio until abandoning the vessel, fearful that the flooding would short-circuit the battery power source.

90. At about 1405, a Coast Guard 41 foot utility boat, 41311, departed St. Inigoes with nine active duty and Reserve Coast

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Guard personnel on board. All personnel wore foul weather suits called mustang suits. The coxswain, petty officer in charge of the boat, was BM2 Warner. The vessel was able to make 20 knots in the Potomac River.

91. At 1406, Mr. J. Lore reported water on deck. At 1410 he broadcast a mayday on VHF channel 16, noting there were 23 persons on board and the vessel was located at Loran coordinates 273787 and 420053, about 5 miles SSE of Point Lookout. This location is at 37-59.8 N latitude 76-15.8 W longitude and the charted water depth is 37 feet.

92. At 1419, Coast Guard Group Baltimore requested Coast Guard air support and at 1422 requested Maryland State Police air support. At 1425, a Coast Guard 41 foot utility boat was deployed from Crisfield, Maryland.

93. At 1425, the seaward bound tug GULF COAST, with a barge in tow, sighted the second red flare ignited by Mr. C. Lore and first sighted the EL TORO II. The GULF COAST took station about 1/2 mile NE of the EL TORO II to mark the location, unable to render immediate assistance at the scene due to its tow.

94. At 1430, Maryland State Police helicopters were enroute to the El Toro II and Point Lookout. T And Paint

95. Mr. J. Lore remained with the radio from 1400 to 1436, talking to the Coast Guard and the tug GULF COAST. He had used the radio exclusively on channel 16. It remained functional the entire time. Mr. J. Lore told Mr. C. Lore the Coast Guard estimated time of arrival was about 30 minutes from his first call. Mrs. Shipe felt Mr. J. Lore appeared unconcerned for passenger safety when he did not proceed to deploy the buoyant apparatus at her suggestion. Mr. C. Lore assured passengers the Coast Guard was coming and directed their movement to control vessel heel.

96. At about 1430, the buoyant apparatus was moved by passengers, with some assistance from Mr. C. Lore, from the cabin top immediately aft of the pilothouse to the starboard side of the vessel. Mr. C. Lore stated that he had never before seen the apparatus deployed. A knife was used by passengers in its deployment. Which lines were cut in haste is not certain.

97. At 1436, the vessel was abandoned. Mr. C. Lore made the decision to abandon the vessel, noticing waves inside the cabin. All passengers and crew, other than the three passengers who

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remained on the cabin top during the rescue, abandoned the vessel. The three passengers on the cabin top were Mr. L. Eubanks, Mr. C. Falk and Mr. A. Mills. Only one person did not remain with the vessel or the buoyant apparatus.

98. Initially, the buoyant apparatus was tied to a cleat on the starboard side of the EL TORO II with an anchor line. When passengers attempted to board the apparatus it submerged, readily indicating that it was not intended to keep people out of the water. Its lack of a bottom in the center and its 20 person capacity concerned some passengers as being insufficient for use in cold water, especially for the greater number of persons permitted by the Certificate of Inspection.

99. The water and air temperatures were about 50 degrees Fahrenheit. Water temperature was indicated on the depth finder on board. Seas were 6 to 8 feet. Winds were from the northwest at about 35 knots. Visibility was about 1/2 mile.

100. At 1441, Coast Guard helicopter CG 6576 from Cape May, New Jersey was enroute to the scene.

101. At 1450, UTB 41311 had the buoyant apparatus in sight. The coxswain thought it to be an inflatable raft at first, not being familiar with commercial buoyant apparatus. The EL TORO II was about 1/4 mile south of the single person in the water and the buoyant apparatus was about 1/4 mile north of that person.

102. At 1455, UTB 41311 recovered the only person seen alone. The coxswain set priorities for rescue to individuals and small groups of people first, applying his training and experience. He stated he did not see Mr. C. Lore at the buoyant apparatus pointing to the person alone in the water.

103. At 1500, the liferaft from UTB 41311 was deployed with a line to recover persons from the cabin of the EL TORO II, which was breaking up in the seas. The 8 foot seas precluded safe contact between UTB 41311 and the EL TORO II.

104. While the three persons were being recovered, a Maryland State Police helicopter arrived on scene. The UTB 41311 coxswain, acting as on scene commander, had the pilot search for individuals in the water rather than start rescues from the buoyant apparatus. Again the coxswain applied his understanding of appropriate rescue priorities by finding and rescuing individuals, before members in a group. He had been unable to identify 23 persons, principally due to the seas. The nearby

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sailboat BLUE STAR remained down wind, also searching for persons in the water among the flotsam.

105. All communications with UTB 41311 on scene were made on channel 16.

106. The U.S. Navy helicopters Rescue 70 and Rescue 75 from Naval Air Station Patuxent River arrived, deploying two inflatable rafts and rescue swimmers. The rescue swimmers determined medical priorities for evacuation.

107. Mr. C. Lore boarded one raft with a rescue swimmer on it, to help others get on board. Mr. Phillips clasped the rescue swimmer's suit below his chin and would not release his grip until his arm was knocked free. Passengers Dr. Barton and Bill Enos eventually boarded that raft.

108. At 1535, CG 6576 deployed a rescue swimmer. By 1545, it recovered the single female passenger Mrs. T. Shipe, Mr. J. Lore and the swimmer. The pilot of CG 6576 had assumed on scene commander from the coxswain of UTB 41311. The three children were the first persons recovered by Rescue 70.

109. By 1554, Coast Guard and Navy helicopters recovered 10 persons. They were taken to a triage center set up at Point Lookout State Park where numerous ambulances waited.

110. UTB 41311 recovered a total of 13 persons. Mr. Phillips and Robert B. Shipe were evacuated from UTB 41311 by CG 6576. Horace I. Smith and a Navy rescue swimmer were evacuated from UTB 41311 by Rescue 75. Only Mr. Phillips was unconscious at the time. Emergency medical technicians, not a normal part of UTB boat crews, determined the other recovered persons should be taken ashore by boat rather than be exposed to down draft and spray. At 1557, UTB 41311 departed under escort of other recently arriving Coast Guard boats and Navy helicopter to Point Lookout.

111. At 1618, the tug GULF COAST departed the scene with barge in tow. The coxswain of UTB 41311 had directed the tug to remain on station about 1/2 mile from the rescue scene but not to participate directly in the rescue effort, to keep the barge safe and provide a nearby platform if needed.

112. At 1638, all persons had been accounted for. Seventeen were taken to St. Mary's County Hospital, including Mr. J. Lore and Mr. Phillips. Six persons were taken to NAS Patuxent River.

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All passengers and crew suffered from hypothermia, being in the water from 20 to 80 minutes. Many were physically rigid when rescued.

113. At 1815, CG 6576 reported seeing about two feet of the cabin of the EL TORO II above water at 37-54.5 N latitude and 76-09.9 W longitude.

114. At 1830, three Coast Guard personnel from UTB 41311 were taken to the hospital for hypothermia. None of the three entered the water during the rescue.

115. At 2045, a blood sample was taken from Mr. C. Lore, for the purpose of testing for alcohol as a post accident measure. The laboratory results indicated no alcohol in the blood. Similarly, a urine sample was taken on 6 December 1993 to comply with 46 CFR 16. The National Center for Forensic Science's urine sample test results for five common drugs were negative.

116. Robert B. Shipe died at 1852 on 5 December 1993. The Certificate of Death shows the cause of death to be hypothermia complicated by near drowning.

117. Edgar C. Phillips Jr. died at 2122 on 5 December 1993. The Certificate of Death shows the cause of death to be hypothermia.

118. Horace I. Smith Sr. died at 2051 on 12 December 1943 in Washington, DC. Mr. Smith was in a coma prior to his death. The Certificate of Death shows the cause of death to be cardiac arrhythmia due to hypothermia associated with occlusive coronary atherosclerosis.

The Salvage and Post Casualty Examinations

119. At 1113 on 6 December 1993, Coast Guard Cutter MORRO BAY found the EL TORO II with her bulwarks awash at 37-48.38 N latitude, 76-09.45 W longitude. The wheelhouse was on its side inside do the bullworks and the hull was on an even heel.

120. At 1230, Seatow of the Southern Potomac, a rescue and salvage firm, was on scene to evaluate the situation for towing of the vessel. Seatow had been contracted by Mr. Michael McCook.

121. At 1600, Maryland Natural Resources Police divers arrived on scene with marine surveyor Mr. McCook, who was hired by CIGNA to handle relations with regulatory bodies, to oversee the

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vessel's salvage and to assist counsel hired by CIGNA to represent the Lores and Chesapeake Bay Fishing Parties Inc.

122. The divers finished examining the vessel by 1700. They noted a gap in the bottom planking amidship, 5.5 feet in length and two inches wide at the keel. They found no evidence of damage to piping and hoses in the engineroom. CDR Anderson, as investigating officer, authorized Mr. McCook to commence towing of the vessel to remove it from the shipping lanes prior to adverse changes in excellent weather for towing. Towing was performed by Seatow. Average speed was less than two knots.

123. At 1730, a Coast Guard 41 foot UTB relieved the MORRO BAY. Coast Guard Cutter CHOCK relieved the 41 foot UTB later and remained in attendance until hauling out of the EL TORO II on a marine railway at Point Lookout Marina, Ridge, Maryland at about 1200 on 7 December 1993.

124. On the afternoon of 7 December 1993, investigators from the Coast Guard, the NTSB and the Maryland Natural Resources Police examined the vessel on the railway. The consensus was that the hull was in remarkably good condition except for three sprung bottom planks on the port side immediately forward of the forward engineroom bulkhead. The inboard end of the planks had dropped about four inches from their normal position, leaving a gap in way of the keel of about two inches. With the exception of a single nail, all nails connecting these planks to the sister keelson had wasted totally through at the faying surface with the keelson. The bilge pump switch in the wheelhouse was found in the on position. Twenty-two lifejackets were examined at Coast Guard Station St. Inigoes, twenty being of the cork style and two being of the foam style.

125. On 7 December 1993, Coast Guard marine inspector LT Studebaker from MSO Hampton Roads examined the buoyant apparatus at Coast Guard Station Milford Haven, Virginia. The painter and the water light were missing. Retroreflective tape was not applied to the apparatus.

126. On 8 December 1993, Mr. J. Lore was discharged from St. Mary's County Hospital, having suffered a collapsed lung.

127. On 10 December 1993, investigators from the Coast Guard, the NTSB and the Maryland Natural Resources Police accompanied marine surveyors representing parties in interest; Mr. McCook and Mr. Harry Langley, in examining fasteners as six bottom planks were removed.

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128. The six planks removed included the three sprung planks (labelled A, B, C forward to aft), one on the starboard side opposite plank B. one six feet aft of the forward engineroom bulkhead on the port side below the batteries in the engineroom and the starboard side bottom plank eight inches aft of the second transverse bulkhead.

129. The four planks removed amidship showed extreme wastage of fasteners in way of the keel, with only 1 of 17 fasteners present for planks A, B and C. The planks themselves were in excellent condition, free of visible deterioration. Fasteners were progressively better toward the chine, with most chine nails like new. Fasteners in the two planks removed forward and aft had some necking but were substantially intact and apparently effective, even at the keel. A copper grounding plate, 18 inches by 36 inches, was centered just forward of plank A, about 18 inches from the keel. The plate had zincs attached, considered an unusual detail by those present. There was no indication of any refastening in these areas subsequent to delivery in 1961.

130. On 13 December 1993, marine electrical specialist Mr. Robert Fleury examined the electrical system, metals in the hull and fasteners. He had the two bottom planks Just forward of plank A and the one just aft of plank C removed. He concluded that the electrical grounding issue and bonding had no substantial impact on the wasted fasteners. He attributed wastage of fasteners in planks A, B and C to 32 years of galvanic corrosion, aggravated by the use of a variety of metals in the hull. He noted in the port midbody: a bronze depth finder head, steel plate with galvanized bolts, zinc anodes on steel plate, bronze through hull fitting, and a copper radio grounding plate with money nails, zinc anodes and bronze screws. Nails under six planks beneath the aft half of the copper sheet sustained damage.

131. Mr. Fleury noted the electrical system to be a mess. He stated that this condition is quite common on such vessels.

132. Mr. MacCartney visited the vessel on the railway and stated that picking planks A, B and C for fastener removal to find wasted fasteners during a drydock examination would have been a "crap shoot" since no external or internal evidence of a problem existed. He stated that he would have focused on the engineroom based on his experience and internal indications on this vessel, such as the angel hair noted in his survey report.

133. Of approximately 100 fasteners in the six planks removed on 10 December 1993, about 30 were wasted to the point of being

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totally ineffective, about 20 were wasted to be marginally effective and about 50 were like new or had minimal wastage.

134. Generally, all marine surveyors and Coast Guard inspectors testifying on the feasibility of removing nails for examination felt removal of a plank was more prudent than individually removing nails, due to plank damage caused by removing nails.

135. The marine surveyors and Coast Guard inspectors testifying on appropriate intervals for removal of fasteners, and refastening in general, had widely varying opinions. None identified written guidance or even alluded to written guidance.

136. The fuel tanks were supported with transverse saddles. The aft saddle supports had failed, allowing the weight of the tanks to be partially supported by a bottom transverse plank. The wear on those planks indicates this condition existed for some time. There was no evidence as of the drydock examination in March 1993 that this circumstance had any affect on the integrity of the hull.

Administrative Details of the Investigation

137. Legal counsel was provided by Commander, Fifth Coast Guard District (dl) to assist Coast Guard witnesses and to provide advice to the investigating officer regarding evidence, legal procedures, witnesses, releases of information under the Freedom of Information Act and liaison with civilian attorneys.

138. The following were designated parties in interest:

The Estate of Edgar C. Phillips, Jr. c/o
Mr. Edgar C. Phillips, Sr.
P.O. Box 105
Piney Point MD 20674

The Estate of Robert B. Shipe
c/o Mr. Philip H. Dorsey III
P.O. Box 530
Leonardtwn, MD 20650

Mr. Horace I. Smith, Sr.
c/o Mr. Thomas Tate
10602 Old Barn Road
New Market, MD 20650

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Mr. Joseph C. Lore II c/o
Mr. J. Paul Mullen
800 One Center Plaza
120 W. Fayette Street
Baltimore, MD 21201-3700

Mr. Clayton S. Lore c/o
Mr. J. Paul Mullen
800 One Center Plaza
120 W. Fayette Street
Baltimore MD 21201-3700

Chesapeake Bay Fishing Parties Inc c/o
Mr. J. Paul Mullen
800 One Center Plaza
120 W. Fayette Street
Baltimore. MD 21201-3700

CONCLUSIONS

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1. The proximate cause of the casualty was failure of fasteners in planks A, B and C in way of the keel. The relatively severe seaway provided the forces that worked the planks loose, resulting in flooding of all compartments, through non-watertight transverse bulkheads.
2. The planks of the vessel had never been refastened to any substantial degree during the vessel's 32 year life.
3. The variety of metals used in fastenings, through-hull fittings and grounding plates contributed to galvanic corrosion. Bonding of through-hull fittings and grounding plates at different times in the vessel's life may have accelerated this corrosion by increasing electron flow in those areas.
4. The 1988 observation of leaking at the starboard chine forward, the 1988 observation of wood condition around chine bolts, and the 1989 observation of working/seepage at the starboard side of the keel, mid-length in the fuel tank compartment, all indicate the vessel was not in an optimal condition. However, the circumstances were not severe enough to result in issuance of requirements or supervisory direction for actions beyond the special inspection notes recommended by the inspectors. The degree to which inspectors specifically paid attention to notes in past records about these items cannot be

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determined from written records. However, each inspector evaluated the integrity and structural condition of the hull without comment on areas mentioned in previous records, and found the vessel acceptable for service at every inspection. Successful operation for four seasons after 1989, with a lack of repeated observation from a variety of inspectors, suggests the noted items were not indicative of serious structural defects.

5. The wastage of fasteners in planks A, B and C was a localized problem with no direct evidence of that wastage from outside or inside the hull prior to the casualty. The location was subject to abnormal corrosion rates due to being a low point where bilge water would collect, to the variety of nearby dissimilar metals and to the design of the vessel in the garboard area. The in-line end of bottom planks is conducive to working that would allow the joint to become loose and water to enter the joint.

6. The unintended support of the fuel tank aft transverse saddle by a bottom plank may have placed forces on the garboard Joint over time, contributing to the entry of water and the abnormal corrosion rate in the area. However, corrosion of fasteners in other planks and battens indicates that other factors were more significant.

7. BPCM Moore applied his experience and judgment in exercising his discretion to focus on fasteners at the wind and water interface, limiting his examination of fasteners to that area.

8. BPCM Moore had considerable experience with wood vessels and received all routine training in the area offered by the Coast Guard to its marine inspectors. He was familiar with Coast Guard guidance on removing fasteners and his decisions were consistent with applicable policy concerning fasteners which show no signs of wastage.

9. Had BPCM Moore required fasteners to be removed, it is unlikely he would have discovered bad nails at the keel in planks A, B and C. Based on training given to Coast Guard marine inspectors, he would likely have had fasteners removed at the wind and water interface.

10. There is no well-known published guidance in the marine industry on when and to what extent metal fasteners in wood vessels should be removed for examination, and when and to what extent vessels should be refastened in general. Much of the available guidance on fastener examination typically assumes indications of wastage are present to suggest examination.

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11. Painting of the hull just before the 1988 drydock examination reduced the effectiveness of that examination. However, the regulations in 46 CFR Subchapter T do not preclude painting a hull prior to its examination.

12. Had the transverse bulkheads been watertight, only one of five compartments would have flooded and the vessel would have maintained power and not sunk. Subdivision calculations under 46 CFR 171.043 do not reflect buoyancy of a wood hull and are not an accurate indicator of a wood vessel's ability to stay afloat with one main compartment flooded. This vessel remained near the surface of the water, indicating its wood construction provided nearly enough buoyancy to keep it afloat without any watertight subdivision.

13. The use of five gallon buckets to de-water was more efficient than use of five gallon per minute portable pumps would have been. It can not be determined if the power bilge pumps worked after the flooding was discovered. Their capacity would not have been able to overtake the rate of ingress. An engine driven bilge pump or bilge injection valve would have been more effective than any portable or fixed pump on board at the time, potentially capable of keeping up with progressive flooding through holes in the forward engine room bulkhead.

14. The lack of bilge level alarms and automatic float switches contributed to the casualty in that de-watering efforts were delayed until substantial flooding had already occurred, precluding timely efforts to locate the source of flooding and stop it.

15. The buoyant apparatus and lifejackets functioned satisfactorily during the incident. Although there may have been some difficulty in deploying the buoyant apparatus, that did not contribute to the casualty. One of the lines cut with a knife in deploying the buoyant apparatus was likely the carbide-activated water light, which is typically secured at each end by a line.

16. The use of lifesaving equipment would have been more effective if a passenger safety orientation as described in proposed 46 CFR 185.506 were given.

17. The lack of quick-connect fittings on straps for the cork lifejackets made no difference in this casualty due to the time available to don the lifejackets. It may have been a substantial factor if the vessel had to be quickly abandoned, likely the case if the vessel were not constructed of wood. It did not meet the expectations of passengers familiar with more modern Lifejacket designs.

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18. Markings for Lifejacket stowage and the stowage of the lifejackets themselves were poor and contributed to confusion and time delays in donning lifejackets. However, the delays did not contribute to the casualty.

19. The lack of retroreflective tape on the buoyant apparatus made no difference in this casualty due to rescue operations during daylight hours. It may have been a substantial factor if rescue occurred during non-daylight hours. Its minimal cost and ease of application warrant its presence regardless of the buoyant apparatus manufacture date.

20. The emergency instructions were not used during the casualty. The experience and training of the crew in combination with radio response by the Coast Guard substituted in large part for the failure to use posted emergency instructions.

21. A buoyant apparatus is not designed for protection against hypothermia. The use of an inflatable liferaft or inflatable buoyant apparatus on this vessel would have substantially reduced hypothermia, by allowing people to get out of the water. Requirements for primary lifesaving equipment have not kept up with technology. It is likely that many more lives would have been lost if the vessel had more passengers on board, because many of the additional passengers would not be able to use the 20 person buoyant apparatus for support.

22. It is likely that no lives would have been lost and hypothermia would have been only a minor problem if the vessel were provided with immersion suits for all persons on board.

23. The use of a passenger and crew list as detailed in proposed 46 CFR 185.502 may have assisted rescue efforts by increasing the confidence of rescue personnel that the number of persons given to them was accurate.

24. The use of a written policy on fastener removal for examination at drydock examinations would increase the probability of finding and correcting defective fasteners in wood vessels. However, it may not result in finding all local wastage areas which have no external indications of fastener wastage.

25. Although Coast Guard marine inspectors are sensitive to the time, material and labor costs imposed on owners of wooden boats caused by requiring the removal of fasteners, there is no evidence that this sensitivity directly contributed to this casualty. These costs can be substantial for owners of small

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vessels, especially those which carry few passengers and have low value. The impact of removing many fasteners could drive some owners out of business and result in some boats being taken out of inspected service.

26. The MSO Baltimore policy of extending drydock due dates to permit five years between consecutive drydock examinations for vessels not operating in fresh water is in contradiction to the intent of the regulations and reduces examinations to an inappropriate frequency. More frequent examinations may have uncovered the wasted fasteners and prevented this casualty although that is unlikely, due to the location of the wasted fasteners and the lack of wastage indications.

27. This casualty may not have occurred if the conclusions of Mr. MacCartney's report had been communicated to the owner or the Coast Guard prior to 5 December 1993.

28. Mr. J. Lore as owner of the vessel relied primarily on Coast Guard inspection to ensure the vessel's safe structural condition. He saw no reason to hire marine surveyors. He further concentrated maintenance in preparation for the operating season, thereby presenting the vessel in its best condition of the year at the time of Coast Guard inspections. This condition was not maintained throughout the operating season. Although the condition of the vessel degraded during the season, most maintenance needs did not jeopardize the safety of the vessel.

29. This casualty may not have occurred if the Maryland rockfish season did not end before the Virginia season. The vessel would likely have fished much closer to St. Jerome Creek, enabling return to port before substantial degradation in weather conditions.

30. The crew was reasonably trained to handle the casualty and took appropriate actions, although exercise with realistic drills would increase their proficiency.

31. Coast Guard inspectors do not receive sufficient training and experience to compensate for the progressive decrease in expertise with wood vessels that is occurring in the marine industry. The safety of the aging wood vessel fleet is diminishing as a consequence, especially when owners with stressed finances and inexperience with Coast Guard requirements are involved.

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32. There is evidence of negligence on the part Of Mr. C. Lore in that he failed to monitor weather forecasts throughout the voyage, despite his awareness of small craft warnings heard prior to the voyage. If he was aware Of the gale warnings, he may have terminated the voyage sooner, resulting in a safe return to the dock

33. There is evidence Of a violation Of Title 46 Code Of Federal Regulations section 183.05-20 on the part of Mr. C. Lore in that he operated the vessel with a battery not secured against shifting. There is no evidence that this deficiency contributed to the casualty.

34. There is no evidence of negligence or misconduct on the part of any other government employee or person holding a license or document issued by the Coast Guard.

35. The availability and services of legal counsel was helpful to the investigation. The Law Specialist provided, CDR J. J. Vallone, had experience as a marine inspector and investigator. He provided consistently sound advice regarding evidentiary matters, legal procedures, witnesses and release of information to the press. His liaison and interface with the civilian counsel enabled the investigating officer to devote more time to factual matters rather than expending time researching legal or procedural issues.

RECOMMENDATIONS

1. Further investigation should be taken into the possible negligence on the part of Mr. C. Lore for failure to check weather forecasts throughout the voyage.

2. A Copy Of this report should be provided to G-N, recommending familiarity training on commercial lifesaving equipment be given to crews of rescue craft.

3. A Copy of this report should be provided to the National Association of Marine Surveyors and the Society of Accredited Marine Surveyors, recommending their members be encouraged to report conclusions when a vessel is found not safe to operate, to the owner without delay and to the Coast Guard if the vessel is certificated.

4. A copy of this report should be provided to Captain Franke for use in his wood boat course.

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5. A copy of this report should be provided to G-MVI-2 for consideration in regard to proposed regulations for safety orientation, passenger/crew lists, bilge level alarms and automatic bilge pumps.
6. The Coast Guard should assess local policies on fastener removal for examination and publish Coast Guard wide guidance in a form readily accessible to industry, preferably as a change to NVIC 1-63 in order to minimize the number of references that must be checked for complete and proper application of Commandant expectations. An industry study group may be needed to determine cost effective techniques for fastener evaluation. Specific action should be taken to record in MSIS data such as type of wood, type of fasteners, scope and dates of refastenings and scope and dates of fastener examination. Consideration should be given to having this type of information on the Certificate of Inspection through such MSIS product sets as MISD.
7. MSO Baltimore should re-evaluate its drydock extension policy, with specific attention to G-MVI policy limiting OCMI extension authority.
8. The Coast Guard should evaluate appropriate drydock intervals for vessels operating on brackish water and publish policy to ensure consistency throughout the country.
9. The Coast Guard should publish guidance to the marine industry and its inspectors to clearly indicate that hull examinations are to be completed prior to painting the hull.
10. The Coast Guard should evaluate the type and amount of formal training marine inspectors are afforded concerning the inspection of wood vessels, with specific emphasis on funding such that all inspectors of wood vessels receive at least the equivalent of Captain Franke's wood boat course.
11. The Coast Guard should provide state of the art information on wood vessels to all Marine Safety Offices with a wood vessel fleet. A revision of NVIC 1-63 and a subscription to Wood Boat magazine should be considered.
12. The Coast Guard should consider revising regulatory requirements for primary lifesaving equipment and immersion suits on small passenger vessels such that the effects of hypothermia are minimized, with special attention to recent application of cold water policy in NVIC 7-91, "Determination of Cold Water Areas." If necessary, legislative authority should be sought to allow requiring immersion suits on other than ocean waters.

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13. The Coast Guard should pursue revising regulatory requirements to provide quick-connect fittings on main securing straps for all type I lifejackets, including grandfathered cork and balsa models.
14. The Coast Guard should require retroreflective tape be applied to all lifesaving equipment, regardless of manufacture date.
15. MSO Baltimore should re-evaluate conducting emergency drills as part of routine inspections as recommended in 19.C.3 of volume III of the Marine Safety Manual.
16. The Coast Guard should study the appropriateness of bonding different metal components and publish clear guidance for industry and inspectors to ensure bonding is not required in circumstances that actually contribute to wastage of metals or deterioration of wood structure. Consultation with Mr. E. McClave of Connecticut should be made in this matter.
17. The Coast Guard should pursue regulatory changes and/or other methods to clearly communicate to vessel owners and the public, the responsibilities of owners, insurance companies and the Coast Guard toward *ensuring* the safety of commercial vessels.
18. This casualty investigation be closed.


G. W. ANDERSON

Encl: (1) Exhibit list with exhibits