



# UNITED STATES COAST GUARD

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INVESTIGATION INTO THE CIRCUMSTANCES  
SURROUNDING THE LOSS OF THE COMMERCIAL  
FISHING VESSEL

## CAPE FEAR

THREE NM SW OF CUTTYHUNK, MASSACHUSETTS  
ON JANUARY 9, 1999 WITH THE LOSS OF TWO LIVES





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FEB 15 2001

**COMMANDANT'S ACTION  
ON THE FORMAL INVESTIGATION INTO THE  
CIRCUMSTANCES SURROUNDING THE LOSS OF THE**

**COMMERCIAL FISHING VESSEL CAPE FEAR, O.N. 655734,**

**THREE NM SW OF CUTTYHUNK, MASSACHUSETTS ON JANUARY 8, 1999  
WITH THE LOSS OF TWO LIVES**

**ACTION BY THE COMMANDANT**

The report of the Investigation into the subject casualty has been reviewed. The investigative report, including the findings of fact, conclusions, and recommendations, is approved.

**ACTION ON RECOMMENDATIONS**

**Recommendation #1:** That the Coast Guard considers undertaking a regulatory project that requires licensing of masters and mates for certain types/class/size of Commercial Fishing Vessels that operate beyond the boundary line including oceangoing Clam Vessels. This would ensure that they would have a good understanding of stability regarding their vessels. It would also ensure, that the vessel, its equipment and lifesaving gear are maintained and operated properly in accordance with applicable regulations. Licensed masters and mates would additionally have an understanding of human factors and would be held accountable with drug and alcohol testing regulations.

**First District Commander's Endorsement:** I Concur with recommendations 1 and 2. The topics of licensing masters and mates, and issuing Merchant Mariner Documents to crew members of commercial fishing vessels was discussed by the Fishing Vessel Casualty Task Force convened in 1999 and adopted for proposal for future rulemaking.

**Commandant's Action on Recommendation #1:** We concur with the intent of this recommendation. Requirements for the licensing and certification of commercial fishing industry vessel operators and crewmembers would provide the Coast Guard with the ability to oversee their qualifications, knowledge, and skills. This belief was supported by the Fishing Vessel Casualty Task Force in its March 1999 report. Congress, however, has not authorized the Secretary of Transportation to prescribe licensing regulations for uninspected fishing vessel

operators. We do not expect that authorization to be given in the foreseeable future. Therefore, we continue to explore other options, including the possible development and implementation of a training-based certificate program that would include training and certification of fishermen in vital areas such as damage control, firefighting, and rescue of persons in the water. Comments are being solicited from the industry on what would be involved in such a program, including the types of training and which operators and crewmen would require certification. In the meantime we will continue to look for every opportunity to obtain the authority necessary to require that operators of certain commercial fishing vessels be licensed because we believe it is a significant initiative that would have a positive impact on fishing vessel safety.

**Recommendation #2:** That the Coast Guard considers undertaking a regulatory project that requires crews aboard certain types/class/size of Commercial Fishing vessels that operate beyond the boundary line including oceangoing Clam vessels to hold merchant mariner documents. This would provide them a foundation with safety at sea and would hold them accountable with drug and alcohol testing regulations.

**First District Commander's Endorsement:** Concur with recommendations 1 and 2. The topics of licensing masters and mates, and issuing Merchant Mariner Documents to crew members of commercial fishing vessels was discussed by the Fishing Vessel Casualty Task Force convened in 1999 and adopted for proposal for future rulemaking.

**Commandant's Action on Recommendation #2:** We concur with the intent of this recommendation. Requiring crews of commercial fishing industry vessels to obtain merchant mariner documents, or an equivalent type of certification, would increase their overall level of competency with respect to the operation of these vessels. This concept was supported by the Fishing Vessel Casualty Task Force in its March 1999 report. Congress, however, has not authorized the Secretary of Transportation to require merchant mariner documents for the crews of uninspected fishing vessels. We do not expect that authorization to be given in the foreseeable future. Therefore, we continue to explore other options, including the possible development and implementation of a training-based certificate program that would include training and certification of fishermen in vital areas such as damage control, firefighting, and rescue of persons in the water. Comments are being solicited from the industry on what would be involved in such a program, including the types of training and which operators and crewmen would require certification. In the meantime we will continue to look for every opportunity to obtain the authority necessary to require that crews of certain commercial fishing vessels be licensed because we believe it is a significant initiative that would have a positive impact on fishing vessel safety.

**Recommendation #3:** That the Coast Guard considers undertaking a regulatory project to perform a major revision and/or amendment with 46 CFR Part 28 Requirements for Commercial Fishing Industry Vessels to include the following:

- (a): That certain types/class/size of Commercial Fishing Vessels that operate beyond the boundary line including oceangoing Clam Vessels be required to have mandatory annual or biannual inspections conducted by the Coast Guard or third party certified by the Coast Guard.

**First District Commander's Endorsement:** I concur with recommendation 3(a) to consider biennial Coast Guard or third party (certified by the Coast Guard) inspection of commercial fishing vessels.

**Commandant's Action on Recommendation #3 (a):** We concur with the intent of this recommendation. We agree that mandatory, periodic examination of commercial fishing industry vessels by the Coast Guard, or a certified third party, would improve the safety of these vessels by ensuring compliance with minimum safety standards. However, the Coast Guard does not have the legal authority to establish such requirements at this time. In its March 1999 report, the Fishing Vessel Casualty Task Force recommended that the Coast Guard obtain such authority. This recommendation has been implemented into the Coast Guard's Commercial Fishing Vessel Safety Action Plan. In that plan, we envision the development of a requirement for mandatory examinations similar in scope to the current voluntary examinations, but less detailed than typical vessel inspections for certification. The details of this program will be developed in consultation with the Commercial Fishing Industry Vessel Advisory Committee, taking into account comments received from seven regional listening sessions. The ultimate success of this program will hinge on our ability to convince Congress to provide the authority to enforce such a program once it has been developed. In the meantime, the Coast Guard will continue its voluntary dockside examination program and seek ways to increase the number of fishing vessels that participate.

- (b): That certain types/class/size of Commercial Fishing Vessels that operate beyond the boundary line including oceangoing clam vessels be required to have stability instructions and stability letters regardless of keel laying dates or any conversions or alterations. Stability letters should be required to be posted in the wheelhouse. Coast Guard Headquarters should review and approve the Stability instructions that are provided by the qualified individual and issue the stability letter. Stability instructions should be required to be on the vessel and to be followed by the master and the mate. Stability instructions and the stability letter should be required to contain easily understood liquid, cargo, fish catch, on deck loading restrictions with simple do's and don'ts. Should there be any changes to the vessel affecting its stability calculations, the qualified individual should be required to be contacted. The vessel owner should be required to ensure all the above is adhered to.

**First District Commander's Endorsement:** I concur with 3(b) and 3(c) which are the subject of subcommittee action by the Coast Guard Fishing Vessel Advisory Committee.

**Commandant's Action on Recommendation #3(b):** We concur with the intent of this recommendation. We agree that there is a need to expand the stability requirements for commercial fishing industry vessels. Current stability regulations only apply to vessels greater than 79 feet in length built after September 15, 1991. A regulatory project that includes the development of stability requirements for new fishing vessels less than 79 feet in length is

underway. A cost-benefit analysis of such requirements for existing vessels is included in the project. If the results of the analysis support their inclusion, we will submit a request to Congress for the authority to establish stability requirements for existing vessels as well. At the same time, district offices and field units are using several "hands-on" training devices, including stability trainers and a "user-friendly" stability booklet, drafted by Coast Guard Headquarters, CFIVAC and the Seventeenth Coast Guard District, to educate commercial fishermen on the importance of vessel stability.

- (c): That 46 CFR sections 28.555 and 28.565 regarding freeing ports, watertight and weathertight integrity and water on deck be applicable to certain types/class/size of Commercial Fishing vessels that operate beyond the boundary line including oceangoing clam vessels regardless of its build, construction, keel laying or any type of conversion/alteration date.

**First District Commander's Endorsement:** I concur with 3(b) and 3(c) which are the subject of subcommittee action by the Coast Guard Fishing Vessel Advisory Committee.

**Commandant's Action on Recommendation #3 (c):** We concur with the intent of this recommendation. We agree that there is a need to review the requirements regarding freeing ports and water on deck for commercial fishing industry vessels. Current regulations only apply to vessels greater than 79 feet in length built after September 15, 1991. A regulatory project that includes the development of stability and watertight integrity requirements for new fishing vessels less than 79 feet in length is underway. A cost-benefit analysis of such requirements for existing vessels is included in the project. If the results of the analysis support their inclusion, we will submit a request to Congress for the authority to establish stability requirements for existing vessels as well.

- (d): That 46 CFR 28.250 specifically require high level alarms in fish holds.

**First District Commander's Endorsement:** I do not concur with 3(d) to require high level alarms in fish holds, due to the likelihood of false alarms from commonly wet characteristics and shifting ice, slush, melted ice, and cargo in typical fishing vessel holds.

**Commandant's Action on Recommendation #3 (d):** We concur with the intent of this recommendation. The discussion regarding 46 CFR 28.250 in the Final Rule, published in the Federal Register on August 14, 1991, does indicate that the expected effect of the regulation as drafted was to exclude cargo, or fish, holds on fishing vessels from the requirement for high water alarms. However, as written, the discussion indicates that this was based on the assumption that these spaces would not meet one or more of the descriptions found in subparagraphs (a), (b) and (c) of the regulation and; therefore, not have to comply. It does not state the intent that all cargo holds, regardless of their design or condition should not have to comply. With this clarification, we believe it is consistent within the intent of

the regulations to require high water alarms for certain cargo holds that fall under the definitions in 46 CFR 28.250(a), (b) and (c). However, given the characteristics of some fish holds, the sometimes liquid-like nature of their cargo and the operational practices of fishing vessels it would not be appropriate or practical to impose a requirement for high level alarms on all fish holds that fall under the definitions in 46 CFR 28.250(a), (b) and (c). We will examine this issue in consultation with CFIVAC and appropriate Coast Guard technical and legal staffs to develop policy to clarify the applicability of 46 CFR 28.250 to fishing vessel cargo holds. Since the regulations in themselves do not explicitly exclude cargo holds from compliance, it appears that no amendment of 46 CFR 28.250 is necessary."

- (e): That Coast Guard Headquarters make any major conversion or substantial alteration determinations, that the definitions and determinations be more distinctive or remove those specific applicability provisions.

**First District Commander's Endorsement:** I concur with 3(e) to promote nationwide consistency in application of regulations and utilize naval architecture and stability expertise at Headquarters level to the best advantage. Further, concur that clarification is needed for definitions of major conversion or substantial alteration for application to fishing vessels. During the course of this investigation, it was determined that the F/V CAPE FEAR's stability tests in 1992 and 1996 were conducted without the presence of the vessel's owner, thus limiting the Naval Architect's background information. As a result, calculations were made based on assumptions related to the layout and purpose for the vessel's tanks. In order to promote uniformity of the stability test, recommend that Coast Guard Headquarters promote standardization of testing by encouraging Naval Architects to comply with the American Society for Testing and Materials (ASTM) Standard F1321, guide for conducting a stability test to determine the light ship displacement and centers of gravity of a vessel.

**Commandant's Action on Recommendation #3(e):** We do not concur with this recommendation. We believe it would be impractical to assign Coast Guard Headquarters the responsibility to review all plans for conversions/alterations on fishing vessels in an attempt to determine whether they are considered substantial alterations or major conversions. Since these are uninspected vessels, there are no requirements for inspection, plan review, or other Coast Guard oversight. Without such requirements, and with the significant increase in workload that would be associated with the implementation of such a process, Coast Guard Headquarters would lack the ability to effectively carry out such a responsibility. With respect to the clarity of the definitions for major conversion and substantial alterations, the implication of the recommendation is that the addition of a 21 foot mid-body to the CAPE FEAR in 1996 must fall exclusively under one or the other. We disagree. Nothing in the regulations prevents a change to a vessel from falling under both definitions. We believe that the addition of the mid-body section to the CAPE FEAR met the definitions of both a substantial alteration and a major conversion. In such a case, as with other situations where there are

different tiers of applicability, the correct action would have been to apply the strictest requirements to which the vessel met the applicability criteria. Applied as such, we believe the definitions and guidance contained in the current regulations regarding major conversions and substantial alterations are sufficiently clear and do not intend to amend or delete them.

- (f): That requirements or industry standards be developed and added to the regulations regarding the material condition of the vessel, watertight integrity, seaworthiness, construction and frequency of dry-dock exams

**First District Commander's Endorsement:** I concur with recommendations 3(f) through 3(i), each of which will serve to enhance current requirements for watertight integrity, drills and log keeping.

**Commandant's Action on Recommendation #3(f):** We partially concur with this recommendation. We agree that there is a need to address issues such as watertight integrity, seaworthiness and subdivision requirements for commercial fishing industry vessels. Current regulations only apply to vessels greater than 79 feet in length built after September 15, 1991. A regulatory project that includes the development of watertight and subdivision requirements for new fishing vessels less than 79 feet in length is underway. A cost-benefit analysis of such requirements for existing vessels is included in the project. If the results of the analysis support their inclusion, we will submit a request to Congress for the authority to establish similar requirements for existing vessels as well. However, unless Congress provides authority to require inspection of commercial fishing industry vessels, we do not anticipate including requirements regarding frequency of inspections or examinations.

- (g): That 46 CFR 28.270, the regulations requiring monthly drills be conducted as actual emergencies, be amended to include those drills be logged, and that the log be maintained on board the vessel. That these same regulations be amended to include that the Coast Guard witness these drills during the annual or biannual inspection.

**First District Commander's Endorsement:** I concur with recommendations 3(f) through 3(i), each of which will serve to enhance current requirements for watertight integrity, drills and log keeping.

**Commandant's Action on Recommendation #3 (g):** We concur with this recommendation. We believe improvements in the conduct of drills and new requirements for documentation of drills will improve the ability of fishing vessel crews to respond to actual emergency situations, resulting in a decrease in the number of vessels and lives lost. In response to recommendations from the March 1999 report of the Fishing Vessel Casualty Task Force, we have included emergency preparedness drill enforcement as part of an Action Plan to improve fishing vessel safety. We have already implemented a program of underway enforcement of drills along with drill reviews during voluntary dockside exams.

As a long-term action we intend to pursue legislative authority to require the documentation of emergency preparedness drills conducted under existing regulations.

- (h): That 46 CFR 28.270 (e) and (f), the regulations requiring new crewmembers to receive a detailed safety orientation prior to getting underway, be amended to require the completion of this orientation to be logged and that the log be maintained aboard the vessel.

**First District Commander's Endorsement:** I concur with recommendations 3(f) through 3(i), each of which will serve to enhance current requirements for watertight integrity, drills and log keeping.

**Commandant's Action on Recommendation #3 (h):** We concur with this recommendation. We consider the detailed safety orientations required by 46 CFR 28.270(e) and (f) to be a form of emergency preparedness drill and should be documented accordingly. In response to recommendations from the March 1999 report of the Fishing Vessel Casualty Task Force, we have included emergency preparedness drill enforcement as an action area in our overall Action Plan to improve fishing vessel safety. Included in this action area is an initiative to require documentation of drills, including safety orientations, that fishing vessel operators and their crews are required to conduct under existing regulations. As the first step toward completing this initiative, we intend to pursue the legislative authority necessary to establish such a requirement.

- (i): That 46 CFR 28.140 include specific requirements to wax zippers on immersion suits every 4 months and that an entry for the required servicing of all lifesaving equipment be made in the vessel's log and that log be maintained aboard the vessel.

**First District Commander's Endorsement:** I concur with recommendations 3(f) through 3(i), each of which will serve to enhance current requirements for watertight integrity, drills and log keeping.

**Commandant's Action on Recommendation #3 (i):** We concur with the intent of this recommendation. We do not believe specific maintenance requirements for zippers on immersion suits should be in the regulations. Manufacturers should and usually do provide care and maintenance requirements to purchasers with the suit. 46 CFR 140(b)(3) already requires that immersion suits be inspected, cleaned and repaired at least annually in accordance with the manufacturer's guidelines. Additional guidance on the maintenance of immersion suits, including specifics on zipper lubrication, is also provided in the Immersion Suit Care and Inspection Booklet published by the US Marine Safety Association and Navigation and Vessel Inspection Circular (NVIC) 1-92, Appendix 3. We conclude that the current requirements and guidance available regarding the maintenance of immersion suits and their zippers is sufficient and readily available.

**Recommendation #4:** That the Coast Guard considers undertaking a regulatory project to amend lifesaving regulations to include the following:

- (a): That a strobe light be installed on every life raft that is automatically activated once a life raft is deployed and is readily seen from the surface of the water by survivors and is sufficiently illuminated for search and rescue purposes.

**First District Commander's Endorsement:** I concur with recommendation 4(a) in that all liferafts should be equipped with self-activating lights, such as required by SOLAS Regulation III/39, to aid in location of the raft by survivors and rescue assets.

**Commandant's Action on Recommendation #4 (a):** We do not concur with this recommendation. A light on the liferaft canopy is required under Regulation III/39.6.2 of the Safety of Life at Sea Convention (SOLAS), incorporated by reference in 46 CFR 160.151-7(c). This light comes on automatically when the liferaft inflates, and although not a strobe light, is required to have a luminous intensity of at least 4.3 candela, making it visible for well over a mile in clear dark conditions. In less favorable conditions, it is sufficient for persons near the liferaft to locate it. Since it is unknown when the liferaft deployed, no conclusion can be made as to whether the light on the liferaft could have been seen by the crew from the water. We believe the current regulations are sufficient.

- (b): That a certain size (size to be determined) toggle handle be added to the zipper tabs on all immersion suits based upon research conducted by the Coast Guard Research and Development Center in partnership with immersion suit manufactures.

**First District Commander's Endorsement:** I concur with 4(b) and recommendation 5(a) and 5(b) in that further research and development of survival suit technology is highly desirable.

**Commandant's Action on Recommendation #4 (b):** We concur with the intent of this recommendation. As part of the testing of an immersion suit for approval, the suit must be donned successfully by nine out of ten persons in two minutes. Ease of zipper operation is a critical component of this test, and as a result, all immersion suits are provided with toggles or lanyards on the zippers to ensure the testing standards are met. We believe these testing requirements are adequate to ensure that appropriately sized toggles or lanyards are provided to the zippers of immersion suits.

- (c): That strobe lights on all immersion suits and personal flotation devices be watertight and capable of operation in an oil/water environment. That water activated homing devices be required on all immersion suits.

**First District Commander's Endorsement:** I concur with 4(c) and 5(c) in that, as required by regulation, personal flotation device lights should be capable of operation in a hostile marine environment and the addition of a regulatory requirement for personal EPIRB while involved in high risk fishing operations is highly desirable.

**Commandant's Action on Recommendation #4 (c):** We concur with the intent of this recommendation. We do not agree that a regulatory change is necessary in that 46 CFR 161.012-11(c) already requires personal flotation device lights and lifejacket lights used on immersion suits be waterproof and tested for underwater operation. Lifejacket lights approved to the standards of the International Safety of Life at Sea Convention (SOLAS) (approval series 161.112) are also required to pass an oil resistance test. Personal flotation device lights (approved series 161.012) do not undergo an oil resistance test, but all approved products are constructed from plastics which should not be affected by oil. In addition, it would be premature to require water activated homing devices on all immersion suits in that, while such devices already exist and are available on the market, there is no standard for them. However, the Radio Technical Commission for Maritime Services (RTCM), at the request of the Coast Guard, has formed an ad hoc subcommittee to develop just such a standard. Once completed, the standard could be incorporated by reference into the rules of the Federal Communication Commission. The Coast Guard could then consider a regulatory project to establish a requirement for these devices on immersion suits.

**Recommendation #5:** That the Coast Guard considers undertaking research projects and tasking the Coast Guard Research and Development center with the following:

- (a): Research various manufactured immersion suits in partnership with the manufacturers to determine what if any problems exist with the operation of the zippers in and out of the water under emergency conditions that can be expected requiring their use. If problems are found to exist, research suitable alternatives including but not limited to a recommendation regarding the size and material of a toggle handle for the zipper tab that eases the zipper operation.

**First District Commander's Endorsement:** I concur with 4(b) and recommendation 5(a) and 5(b) in that further research and development of survival suit technology is highly desirable.

**Commandant's Action on Recommendation #5 (a):** We concur with the intent of this recommendation. While we agree that the ease of zipper operation is an important safety aspect of immersion suits, we also believe that there would be little that a government-funded project could contribute to the improvement of this product. However, we will bring this case, and others involving immersion suit zipper problems, to the attention of the U.S. Marine Safety Association and its immersion suit subcommittee for their consideration.

- (b): Research the feasibility of a thermal protection suit for crewmembers that can be worn as a work suit so their duties can be performed without restrictions from the suit yet provides a minimum of two-hour survival protection in frigid waters.

**First District Commander's Endorsement:** I concur with 4(b) and recommendation 5(a) and 5(b) in that further research and development of survival suit technology is highly desirable.

**Commandant's Action on Recommendation #5 (b):** We concur with the intent of this recommendation. No research is necessary in that such suits already exist as approved products. They are approved as Type V anti-exposure work suits, and can be found in the Coast Guard list of approved products ("Equipment Lists") under the 160.053 approval series.

- (c): Research the feasibility of water activated homing devices that can be installed on immersion suits.

**First District Commander's Endorsement:** I concur with 4(c) and 5(c) in that, as required by regulation, personal flotation device lights should be capable of operation in a hostile marine environment and the addition of a regulatory requirement for personal EPIRB while involved in high risk fishing operations is highly desirable.

**Commandant's Action on Recommendation #5 (c):** We concur with the intent of this recommendation. We believe that such research is not necessary in that such devices already exist and are available on the market. The only issue preventing the Coast Guard from considering a requirement for the use of the devices on immersion suits is the lack of a standard for them. To address this, the Coast Guard made a request to the Radio Technical Commission for Maritime Services (RCTM) for the development of a standard for such devices. In response, the RCTM has formed a new subcommittee to develop that standard. Once the standard is established and incorporated into the rules of the Federal Communications Commission, the Coast Guard will be in a position to consider requiring the devices for use on various vessel classes.

**Recommendation #6:** That the Coast Guard considers launching a major public outreach campaign conducted by the Coast Guard Marine Safety Offices with the commercial fishing community to publicize the lessons learned from this casualty. Outreach should include such items as the maintenance of lifesaving equipment, actual drills, waxing immersion suit zippers, stability, watertight integrity, launching of liferafts, mayday procedures, and damage control.

**First District Commander's Endorsement:** I concur with recommendation 6 to support an outreach campaign and emphasize the importance of the lessons-learned from this casualty.

**Commandant's Action on Recommendation #6:** We concur with the intent of this recommendation. As part of its overall Commercial Fishing Vessel Safety (CFVS) Action Plan, the Coast Guard has launched several initiatives over the past year aimed at publicizing the

dangers inherent in fishing vessel operations, including the lessons learned from this casualty. Two in particular, Operation Safe Catch and Operation Safe Return, were aimed at the fishing industry and directed Marine Safety Offices to publicize lessons learned from casualties directly to fishermen. In addition, we have also submitted monthly articles providing lessons learned for publication in the National Fishermen, providing safety newsletters and alerts to the commercial fishing community. G-MOC has developed a national fishing vessel safety web page for use by both Coast Guard and the fishing industry. We believe these initiatives and the ongoing implementation of the CFVS action plan satisfy the intent of this recommendation.

**Recommendation #7:** That the Coast Guard initiate a program with the National Fisheries Service to conduct joint dockside boardings with the local Marine Safety Office and determine if clam vessels are overloaded, and if the number of Individual Transferable Quotas (ITQ39s) per trip correspond with stability instructions.

**First District Commander's Endorsement:** I do not concur with recommendation 7. Dockside monitoring of fishing vessel loads and Individual Transferable Quotas (ITQ's) are the responsibility of the National Marine Fisheries Service (NMFS). While stability instructions only apply to certain vessels, joint dockside boardings may prove detrimental to the Coast Guard's Voluntary Dockside Examination initiative.

**Commandant's Action on Recommendation #7:** We concur with the intent of this recommendation. The Coast Guard has recently undertaken safety initiatives intended to focus on high risk vessels for increased boarding or attention. We will present these concepts to the National Marine Fisheries Service (NMFS) and invite them to consider the possibility of conducting joint operations that could address issues of clam vessels safety while not proving detrimental to the Coast Guard's Voluntary Dockside Examination initiative.

**Recommendation #8:** That the Coast Guard emphasizes to Coast Guard Search and Rescue units the importance of deploying the nearest capable CG vessel resource that can arrive quickest on-scene after a distress call has been received.

**First District Commander's Endorsement:** I concur with recommendation 8 with the following comments. Response by the Coast Guard asset able to arrive on scene quickest is normally expected. At the time of notification of the F/V CAPE FEAR's distress, the Search and Rescue Mission Coordinator (SMC) was aware that the F/V MISTY DAWN was in the immediate vicinity, and intended to assist the F/V CAPE FEAR. In fact, the F/V MISTY DAWN rescued the survivors within 20 minutes of their entering the water. The SMC anticipated that the helicopter from Air Station Cape Cod and the 44' MLB from Station Menemsha would both arrive on scene first. While the CGC JUNIPER responded to the Urgent Marine Information Broadcast, it was not inappropriate for the SMC to task other Coast Guard vessels to proceed to scene and assume On Scene Commander (OSC) duties. The cutters POINT JACKSON and HAMMERHEAD had reasonably similar transit times, and were both well suited to relieve the smaller units of OSC duties. Even though severe weather conditions hindered an immediate response by the helicopter, it still arrived on scene sooner than any other Coast Guard unit would have been able to. With a rescue swimmer aboard, it was also the most capable asset to affect a rescue of any additional survivors. Diverting the CGC JUNIPER to assist would not have changed the outcome in this case.

**Commandant's Action on Recommendation #8:** We concur with this recommendation. We believe that the Search and Rescue Mission Coordinator (SMC) should always endeavor to deploy first the Coast Guard asset able to arrive on scene quickest. We agree with the comments from the First District Commander with respect to the decisions made by the SMC in response to this casualty in that they were appropriate under the circumstances and in keeping with this ideal. To ensure that future responses to casualties are made in a similar manner, we will emphasize this ideal to all Coast Guard Search and Rescue units.

**Recommendation #9:** That the Coast Guard distributes the lessons learned from this casualty to all Coast Guard units involved with Commercial Fishing Vessel Safety including; those units that perform boardings, exams, law enforcement, voluntary dockside exams and/or search and rescue. Further, pending the implementation of new regulations discussed in above recommendations of this report, that the CG considers implementing a rigorous at sea boarding with a dockside follow-up program to reduce the likelihood of commercial fishing vessel casualties from unsafe conditions that were found as lessons learned in this casualty.

**First District Commander's Endorsement:** I concur with recommendation 9 to distribute lessons-learned to Coast Guard field units that interact with the commercial fishing vessel industry. I also concur with the recommendation to focus the dockside exam program on lessons-learned from this casualty, and pursue an aggressive at-sea boarding program, provided new regulations from prior recommendations are implemented.

**Commandant's Action on Recommendation #9:** We concur with this recommendation. Actions to distribute the lessons learned from this casualty to all Coast Guard units involved in commercial fishing vessel safety (CFVS) have already begun. The First District CFVS Coordinator has published and distributed a "lessons learned" article to all Coast Guard Marine Safety Units and to the commercial fishing industry. The lessons learned have also been incorporated into the curriculum for boarding officers at the Regional Fisheries Training Center. We will distribute copies of this investigation to all other units involved in CFVS activities through the other District CFVS Coordinators. In addition, we are will be taking steps to implement our CFVS Action Plan, including the development of measures to focus our at-sea boardings on "high-risk" vessels and increase the number of voluntary dockside examinations. Concurrent with those initiatives is the development of a mandatory examination program.

**Recommendation #10:** That the Coast Guard considers establishing policy or undertake a regulation project such that any hospital or clinic are approved to conduct post-casualty drug testing of fishermen.

**First District Commander's Endorsement:** I do not concur with recommendation 10. While the intent was to simplify the drug-testing program, the uncertainty of locating a site that employs DOT collection procedures can be remedied through an aggressive education campaign. However, there are instances when locating a site in remote locations is unlikely. Therefore, rather than lose the opportunity to rule out the use of drugs or alcohol, recommend that Coast Guard Headquarters consider a policy to permit non-DOT testing in limited circumstances.

**Commandant's Action on Recommendation #10:** We do not concur with this recommendation. 46 CFR 4.06-40 and 4.06-50 clearly state that the Department of Transportation (DOT) testing procedures in 49 CFR Part 40 must be followed. Hospitals and clinics can collect samples according to 49 CFR Part 40, but the analysis of the samples must be done at one of the Department of Health and Human Services (DHHS) certified labs and a medical review officer must evaluate the results. However, we will explore the possibility of allowing non-DOT testing in some very limited circumstances during our upcoming project to revise 46 CFR Parts 4 and 16.

A handwritten signature in black ink, appearing to read "W. D. Rabe", with a stylized flourish at the end.

**W. D. RABE**  
**By direction**

U.S. Department  
of Transportation

United States  
Coast Guard



Commander  
First Coast Guard District

408 Atlantic Ave.  
Boston, MA 02210  
Staff Symbol: (m)  
Phone: (617) 223-8243  
FAX: (617) 223-8094

16732

**DEC - 7 2000**

From: Commander, First Coast Guard District  
To: Commandant (G-MOA)

Subj: SINKING OF THE FISHING VESSEL (F/V) CAPE FEAR (O.N. 655734) ON 8  
JANUARY 1999 WITH THE LOSS OF TWO LIVES

1. The report is approved, subject to the following comments.
2. I concur with the conclusions of the investigating officer that the cause of the capsizing and sinking of the F/V CAPE FEAR was downflooding from following seas and associated human factors relating to the safety, stability, and seaworthiness of the vessel.
3. I concur with recommendations 1 and 2. The topics of licensing masters and mates, and issuing Merchant Mariner Documents to crew members of commercial fishing vessels was discussed by the Fishing Vessel Casualty Task Force convened in 1999 and adopted for proposal for future rulemaking.
4. I concur with recommendation 3(a) to consider biennial Coast Guard or third party (certified by the Coast Guard) inspection of commercial fishing vessels. I concur with 3(b) and (c) which are the subject of subcommittee action by the Fishing Vessel Advisory Committee. I do not concur with 3(d) to require high level alarms in fish holds, due to likelihood of false alarms from commonly wet characteristics and shifting ice, slush, melted ice, and cargo in typical fishing vessel holds. I concur with 3(e) to promote nationwide consistency in application of regulations and utilize naval architecture and stability expertise at Headquarters level to best advantage. Further, I concur that clarification is needed for definitions of major conversion or substantial alteration for application to fishing vessels. During the course of this investigation, it was determined that the F/V CAPE FEAR's stability tests in 1992 and 1996 were conducted without the presence of the vessel's owner, thus limiting the Naval Architect's background information. As a result, calculations were made based on assumptions related to the layout and purpose for the vessel's tanks. In order to promote uniformity of the stability test, recommend that Coast Guard Headquarters promote standardization of testing by encouraging Naval Architects to comply with the American Society for Testing and Materials (ASTM) Standard F1321, Guide for Conducting a Stability Test to Determine the Light Ship Displacement and Centers of Gravity of a Vessel. I concur with recommendations 3(f) through 3(i), each of which will serve to enhance current requirements for watertight integrity, drills and log keeping.
5. I concur with recommendation 4(a) in that all liferafts should be equipped with self-activating lights, such as required by SOLAS Regulation III/39, to aid in location of the raft by

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survivors and rescue assets. I concur with 4(b) and recommendation 5(a) and 5(b) in that further research and development of survival suit technology is highly desirable. I concur with 4(c) and 5(c) in that, as required by regulation, personal flotation device lights should be capable of operation in a hostile marine environment and the addition of a regulatory requirement for personal EPIRB while involved in high-risk fishing operations is highly desirable.

6. I concur with recommendation 6 to support an outreach campaign and emphasize the importance of the lessons-learned from this casualty.

7. I do not concur with recommendation 7. Dockside monitoring of fishing vessel loads and Individual Transferable Quotas (ITQs) are the responsibility of the National Marine Fisheries Service (NMFS). While stability instructions only apply to certain vessels, joint dockside boardings may prove detrimental to the Coast Guard's Voluntary Dockside Examination initiative.

8. I concur with recommendation 8 with the following comments. Response by the Coast Guard asset able to arrive on scene quickest is normally expected. At the time of notification of the F/V CAPE FEAR's distress, the Search and Rescue Mission Coordinator (SMC) was aware that the F/V MISTY DAWN was in the immediate vicinity, and intended to assist the F/V CAPE FEAR. In fact, the F/V MISTY DAWN rescued the survivors within 20 minutes of their entering the water. The SMC anticipated that the helicopter from Air Station Cape Cod and the 44' MLB from Station Menemsha would both arrive on scene first. While the CGC JUNIPER responded to the Urgent Marine Information Broadcast, it was not inappropriate for the SMC to task other Coast Guard vessels to proceed to scene and assume On Scene Commander (OSC) duties. The cutters POINT JACKSON and HAMMERHEAD had reasonably similar transit times, and were both well suited to relieve the smaller units of OSC duties. Even though severe weather conditions hindered an immediate response by the helicopter, it still arrived on scene sooner than any other Coast Guard unit would have been able to. With a rescue swimmer aboard, it was also the most capable asset to affect a rescue of any additional survivors. Diverting the CGC JUNIPER to assist would not have changed the outcome in this case.

9. I concur with recommendation 9 to distribute lessons-learned to Coast Guard field units that interact with the commercial fishing vessel industry. I also concur with the recommendation to focus the dockside exam program on lessons-learned from this casualty, and pursue an aggressive at-sea boarding program, provided new regulations from prior recommendations are implemented.

10. I do not concur with recommendation 10. While the intent was to simplify the drug testing program, the uncertainty of locating a site that employs DOT collection procedures can be remedied through an aggressive education campaign. However, there are instances when locating a site in remote locations is unlikely. Therefore, rather than lose the opportunity to rule

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out the use of drugs or alcohol, recommend that Coast Guard Headquarters consider a policy to permit non-DOT testing in limited circumstances.

11. I concur with recommendation 11, that the findings and lessons learned from this investigation be made available at the earliest opportunity to the owner.

12. I concur with recommendation 12 with the following comment. Considering the seriousness with which I view this matter, further investigation has been initiated for possible violations of law and regulation on the part of the owner, master, and mate of the F/V CAPE FEAR.

  
**G.N. NACCARA**

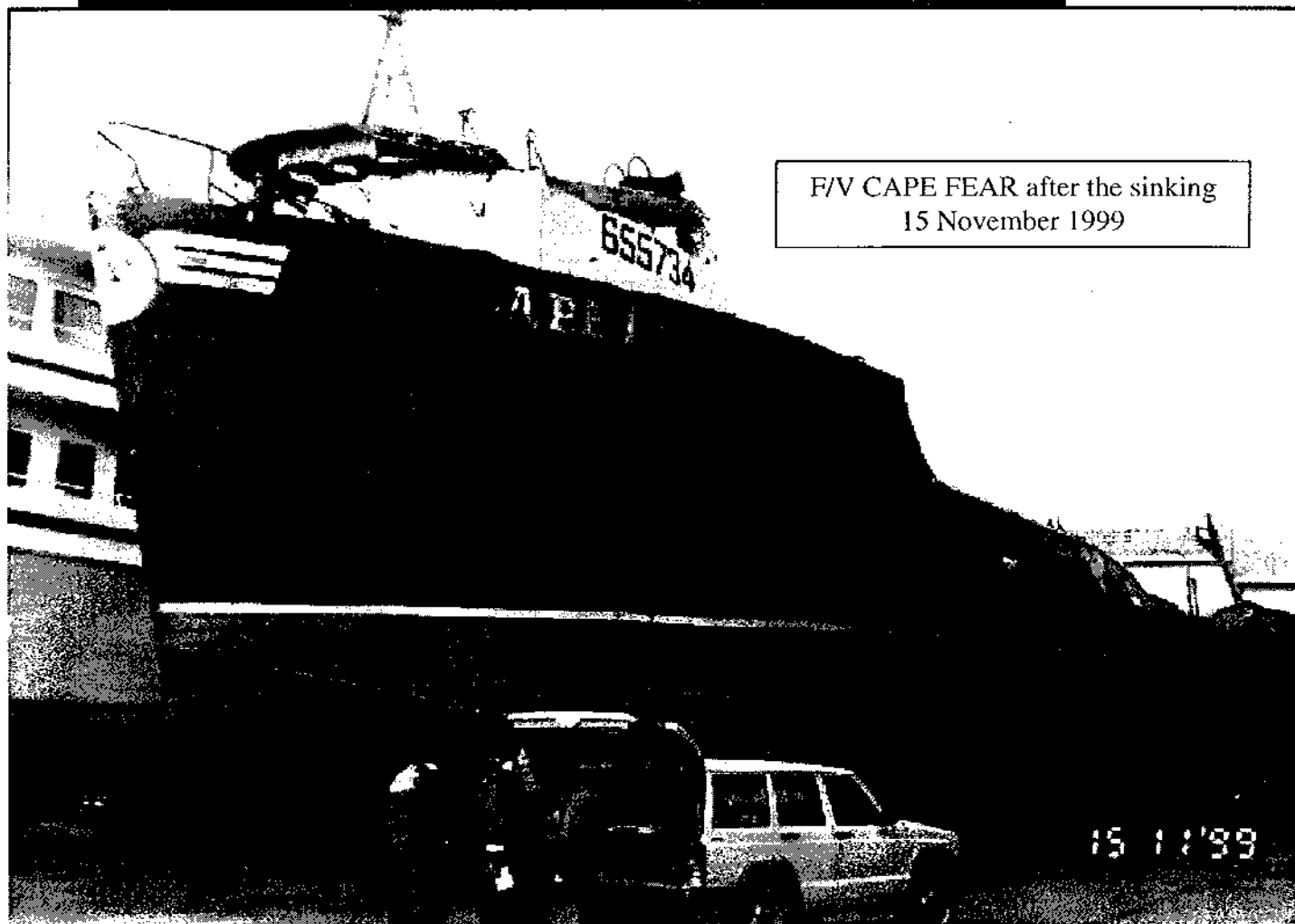
Encl: (1) Investigation Report into the loss of the Fishing Vessel CAPE FEAR  
(2) Coast Guard Exhibits 1 - 103 and CAPE FEAR, Inc. Exhibits A & B  
(3) Hearing Transcripts Volumes I - VIII

Copy: MSO Providence

# INVESTIGATION REPORT INTO THE LOSS OF THE FISHING VESSEL CAPE FEAR



F/V CAPE FEAR before the sinking



F/V CAPE FEAR after the sinking  
15 November 1999

15 11'99

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SINKING OF THE F/V CAPE FEAR, O.N. D655734, ON 8 JANUARY 1999 WITH THE LOSS OF  
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## EXECUTIVE SUMMARY

The Fishing Vessel (F/V) CAPE FEAR departed Sea Watch International Terminal, New Bedford, MA, on a clamming trip at 3:15 P.M. on 7 January 1999, with 5 people on board (All times are EST + 5 Zone Time). After a 3 hour and 45 minute transit, the vessel clammed 14 miles southwest of the entrance to Buzzards Bay. The CAPE FEAR fished for 23 ½ hours, and departed the fishing grounds enroute Sea Watch Terminal, New Bedford, MA, at 6:30 P.M. on 8 January 1999, with a full load of clams in 130 cages. At approximately 8:15 P.M. on January 8, 1999, F/V CAPE FEAR capsized and sunk three miles southwest of Cuttyhunk Island, Massachusetts. Three of the five crewmembers including the Captain, Steven Novack, the Mate, James Haley, and a deckhand, Joseph Lemieux, were rescued by the F/V MISTY DAWN. Two deckhands, Paul Martin and Steven Reeves, died. Paul Martin's body was found on the Gooseberry Island portion of Horseneck Beach, Westport, MA, the next morning. Steven Reeves was never found, and he is presumed dead.

While the CAPE FEAR was transiting inbound, returning to port, the number 3 port clam tank hatch was open 3 to 6 inches, and the clam pump was left running taking a suction in the same clam tank. The CAPE FEAR traveled inbound on a northerly course of 025T when leaving the fishing grounds then 044T just before sinking. The winds were 20 to 30 knots from the south and the seas were 6 to 8 feet from the south. Gale warnings were in effect for later that evening. When the CAPE FEAR left the fishing grounds, the vessel began taking waves across the starboard aft quarter from the following seas, which broke over the stern and washed off the port side. Some of the waves splashed and washed across the aft portion of the CAPE FEAR in vicinity of the number 3 clam tank hatch covers throughout the inbound transit. The following seas continued to break over the stern eventually reaching the number 2 clam tank hatches at which time the vessel sank.

The captain of the CAPE FEAR called the F/V MISTY DAWN on VHF radio channel 08 at approximately 8:00 P.M., 8 January 1999. The MISTY DAWN was a nearby clam vessel from the same fleet as the CAPE FEAR which was also inbound to Sea Watch Terminal. The Captain of the CAPE FEAR spoke with the mate on the MISTY DAWN and told him that the CAPE FEAR had taken "two big ones" and that "she rolled hard two times". Ten to fifteen minutes later, the crew of the CAPE FEAR noticed that the waves were not shedding off of the CAPE FEAR'S stern, and the vessel was sinking evenly by the stern. The captain of the CAPE FEAR called the MISTY DAWN again at approximately 8:10 P.M., told them they were having problems and asked the MISTY DAWN to turn around. When the mate on the MISTY DAWN called back, asking "What's up?", the Captain of the CAPE FEAR responded saying "A lot of water. Call the Coast Guard."

The CAPE FEAR continued sinking by the stern, capsized to port and then sank within five minutes of the time the crew first noticed the water was not shedding off of the stern. During those five minutes, Paul Martin and Steven Reeves woke the mate, who was asleep in the berthing area. The entire crew began donning their survival suits. Just before the sinking, Captain Novack and deckhand, Joseph Lemieux, looked at the TV monitors located in the wheelhouse that view the engine room/portion of shaft alley and the hydraulic room and those spaces appeared dry.

The MISTY DAWN, which was two miles north of the CAPE FEAR, turned to the south and called the Coast Guard to report that the CAPE FEAR was taking on water. It was raining hard and visibility was poor. As the MISTY DAWN got close to the CAPE FEAR'S radar position, they lost the radar contact and did not see the CAPE FEAR'S lights. The MISTY DAWN spotted the strobe light on one of the survivor's immersion suits, and rescued the Captain, the Mate and one deckhand, Joseph Lemieux. While searching for survivors, the MISTY DAWN struck the partially submerged, upside down hull of the CAPE FEAR head on. A pipe in the MISTY DAWN'S engine room broke loose causing internal flooding from the force of the collision. The flooding was quickly brought under control, and no injuries were sustained from the collision.

The Coast Guard conducted a thorough search for the two missing crew members. Paul Martin's body was recovered the following morning, and Steven Reeves remains missing and is presumed dead.

The F/V CAPE FEAR was salvaged in August 1999. From August to November 1999, the F/V CAPE FEAR was moored at Sea Watch International terminal and was subsequently drydocked at Fairhaven Shipyard. On 8 March 2000, the F/V CAPE FEAR was donated to the New York Department of Environmental Conservation (DEC), and was towed to a position off Long Island and sunk as part of the Moriches Artificial Reef Project.

**The following witnesses provided testimony for this One Person Formal Investigation:**

Steven Novack  
Captain, F/V CAPE FEAR

James Haley, Jr.  
Mate, F/V CAPE FEAR

Joseph Lemieux, Jr.  
Deckhand, F/V CAPE FEAR

Doug Kelly  
Crewmember, F/V CAPE FEAR – was not aboard for the 7 – 8 January 1999 trip

John W. Mathis Jr.  
Captain, F/V MISTY DAWN

John W. Mathis, III  
Mate, F/V MISTY DAWN

William Karl Albert  
Deckhand, F/V MISTY DAWN

James VanHorn  
Deckhand, F/V MISTY DAWN

LT Owen, L. Gibbons III, USCG  
Commanding Officer, Coast Guard Cutter POINT FRANCIS

LT Christopher Perrone, USCG  
Operations Officer, Coast Guard Group Woods Hole

Eva Marie Cook  
Commercial Diver; President, Northeast Diving Services, Inc; surveyed the wreckage

Thomas Becica, Jr.  
Port Engineer, Southern Clam Company

CWO3 Charles R. Kipouras, USCG  
Marine Inspector, Marine Safety Office Providence; inspected the recovered survival equipment

John F. Koopman  
Naval Architect; President, Propulsion Data Services, Inc.; drafted CAPE FEAR'S stability booklet

Stephen Sperlak  
Marine Surveyor, issued a Commercial Fishing Vessel Safety decal to the F/V CAPE FEAR

John Fitzgerald  
Marine Fabricator; added a 21 foot mid-body section to the CAPE FEAR

Sherman Smith  
Marine Fabricator; added a 21 foot mid-body section to the CAPE FEAR

Warren J. Alexander, Sr.  
Owner, F/V CAPE FEAR (President, CAPE FEAR, Inc.)

John Miller  
Plant Manager, Sea Watch International (CAPE FEAR'S clam processing company)

Kevin G. Flanagan  
Special Agent, National Marine Fisheries Service, from New Bedford, MA

LT Patrick Joseph Maguire, USCG  
Staff Naval Architect, Coast Guard Marine Safety Center

CWO4 Timothy Stewart, USCG  
Marine Inspector, Marine Safety Field Office New Bedford; conducted post-salvage survey

## BACKGROUND OF PEOPLE KEY TO THE INVESTIGATION

Steven Novack, Captain, F/V CAPE FEAR: Captain Novack was 36 years old when the CAPE FEAR sank. He has been a fisherman since he was 17 years old and has served as the Captain of the F/V CAPE FEAR since the owner, Warren Alexander, bought the boat in 1994. Captain Novack has previously served as Captain or mate on seven other ocean quahog vessels (clam boats). Captain Novack attended a 16-hour Drill Conductor Workshop at Cape May Seafood Association, Inc., on January 6 & 7, 1995, and is certified in CPR and First Aid. Captain Novack has not had any other formal job related training, and has never held any Coast Guard license or merchant mariner's document.

James Haley, Jr., Mate, F/V CAPE FEAR: Mr. Haley was [REDACTED] years old when the CAPE FEAR sank, and had been a fisherman for 16 years. He has served on clam boats, scallop vessels and other types of fishing vessels, and was the mate and engineer on the CAPE FEAR for five and a half years. Mr. Haley has never attended any job related formal training or schools, and has never held any Coast Guard license or merchant mariner's document.

Joseph Lemieux, Jr., Deckhand, F/V CAPE FEAR: Mr. Lemieux was [REDACTED] years old when the CAPE FEAR sank, and has been a fisherman since October of 1997. During the one and a quarter years that he worked as a fisherman, he was primarily assigned to the CAPE FEAR, but occasionally made trips with other clam boats. Mr. Lemieux has never attended any job related formal training or schools, and has never held any Coast Guard license or merchant mariner's document.

Paul Martin, Deckhand, F/V CAPE FEAR: Deceased- body recovered 9 January 1999. Mr. Martin was 35 years old, and had worked as a fisherman for five years. He was hired in October of 1995 to work on the F/V MISS MERNA, a clam boat owned by Warren Alexander. During the three months prior to the sinking, Mr. Martin had made several trips with the F/V CAPE FEAR. He has never held any Coast Guard license or merchant mariner's document.

Steven Reeves, Deckhand, F/V CAPE FEAR: Body never recovered- presumed dead. Mr. Reeves was 30 years old, and had worked as a fisherman for 14 years. He was hired in February 1996 to work on the F/V JOHN N, a clam boat owned by Warren Alexander. Mr. Reeves had made several trips with the F/V CAPE FEAR over the last year. He has never held any Coast Guard license or merchant mariner's document.

Douglas Kelly, Crewmember, F/V CAPE FEAR: Mr. Kelly was not aboard for the 7 - 8 January 1999 voyage on the CAPE FEAR. He served as a regular deckhand and second mate aboard the CAPE FEAR for the past two years, and had been a fisherman off and on for 20 years. CAPE FEAR was the fourth vessel that Mr. Kelly worked on as a deckhand. He has never held any Coast Guard license or merchant mariner's document.

John W. Mathis Jr., Captain, F/V MISTY DAWN: Captain Mathis of the MISTY DAWN rescued Captain Novack, James Haley and Joseph Lemieux after the CAPE FEAR sank. Most of his 48 years of experience as a fisherman has been aboard clam vessels. Captain Mathis served as Captain aboard the MISTY DAWN, a clam vessel owned by Warren Alexander, for 11 years. Captain Mathis has never attended any job related formal training or schools, and has never held any Coast Guard license or merchant mariner's document.

John W. Mathis, III, Mate, F/V MISTY DAWN: Mr. Mathis, III, has been a fisherman for 25 years. He has been the mate of the MISTY DAWN for 11 years, and served on the clam vessel CORA JEAN SNOW for the previous eight years. Mr. Mathis, III, has attended CPR training and a two-day "survival" course that sounded similar to the Drill Conductor Workshop that Captain Novack attended. Mr. Mathis, III, has not had any other formal job related training, and has never held any Coast Guard license or merchant mariner's document.

Thomas Becica, Port Engineer, Southern Clam Company: Mr. Becica has been the port engineer for Southern Clam Company for three years, and did maintenance work for the company for the previous three years. Warren Alexander is the President of Southern Clam Company, so as port engineer, Mr. Becica works directly for Mr. Alexander and is responsible for the maintenance on Mr. Alexander's clam vessels – the CAPE FEAR, MISTY DAWN, JERSEY DEVIL, MISS MERNA and JOHN N. Mr. Becica's prior experience includes: five years working for a hydraulic company, a few years doing commercial fishing vessel maintenance and working as a deckhand and a mate on clam vessels from 1968 to 1985. Mr. Becica testified that he has attended some schools for winch repair, hydraulic systems and air systems. He does not have an engineering degree and has not had any other job related formal training or schools. He has never held any Coast Guard license or merchant mariner's document.

John F. Koopman, Naval Architect, President, Propulsion Data Services, Inc.: Mr. Koopman is the Naval Architect who drafted the CAPE FEAR's stability booklet. Additionally, during his testimony he provided some technical studies he had conducted regarding the CAPE FEAR's stability at the time of the casualty. Mr. Koopman has worked as a Naval Architect since he graduated from the University of Michigan in 1968 with a Bachelor of Science in Naval Architecture and Marine Engineering, and had been working in the field since 1962. On behalf of the owner of the CAPE FEAR, Mr. Koopman conducted a stability test on the CAPE FEAR that included an inclining experiment in 1992, and drafted a stability booklet for the CAPE FEAR. Then, after the vessel was lengthened in 1996, Mr. Koopman conducted a deadweight survey and drafted another stability booklet.

Stephen Sperlak, Marine Surveyor: In 1995 and 1997, Mr. Sperlak conducted Condition and Valuation Surveys on the CAPE FEAR at the request of the vessel's insurance company, and issued Commercial Fishing Vessel Safety decals to the vessel after both surveys. Mr. Sperlak is certified by the National Association of Marine Surveyors to conduct Commercial Fishing Vessel Safety Exams and issue decals. He has worked as a Marine Surveyor for 20 years. Prior to that, he served in the U.S. Navy for two years and the U.S. Coast Guard for 28 years, the last eight of which he worked as a Coast Guard Marine Inspector qualified to do hull and machinery inspections. Prior to becoming a Marine Inspector, he spent 19 years at sea as an engineer. He retired from the Coast Guard as a Chief Warrant Officer 4.

John Fitzgerald, Marine Fabricator: Mr. Fitzgerald was hired by Warren Alexander in 1995 to cut the CAPE FEAR in half, construct a 21 foot mid-body section and add it to the CAPE FEAR. He has worked as a Marine Fabricator for 28 years, and works at Limberg Marine in Fairhaven, MA.

Warren J. Alexander, Sr., President, CAPE FEAR, Inc. (Owner, F/V CAPE FEAR): Mr. Alexander, the managing owner, worked on fishing vessels for 20 to 21 years. Ninety-five percent of that time was spent on clam boats, and the rest was on lobster boats. He spent 4 years as a deckhand, a few years as a mate and was a captain the rest of the time. Mr. Alexander has been involved in the commercial fishing business for 28 years. He currently owns several clam boats including the CAPE FEAR, MISTY DAWN, JERSEY DEVIL, MISS MERNA and JOHN N, and has owned clam boats since 1985. Mr. Alexander has never served as a crewmember, mate or master of the F/V CAPE FEAR. Mr. Alexander has never attended any job related formal training or schools, and has never held any Coast Guard license or merchant mariner's document.

John Miller, Plant Manager, Sea Watch International, New Bedford, MA: Sea Watch International is the clam processing company used by Mr. Alexander's clam vessels. Mr. Miller had only been the plant manager there for approximately one month when the CAPE FEAR sank. Prior to that, he worked in Southern New Jersey in the food industry.

## DESCRIPTION OF THE FISHERY:

F/V CAPE FEAR was clamming for Ocean Quahogs. The vessel has a clam pump that supplies a large volume of water through an 8 inch clam hose to the dredge on the ocean floor. The water pushed through the dredge breaks up the sediment to loosen the clams, then the dredge rakes over the quahog beds. The dredge is towed roughly 10 to 30 minutes, then hauled back up into a ramp on the stern. A door is opened on the bottom of the dredge, which allows the clams to fall into a hopper. A conveyor belt moves the clams from the hopper, across a shaker which removes shells and debris, and then to chutes. The chutes are aligned by crew members to fill each of the 130 cages that were carried aboard the vessel.

The F/V CAPE FEAR operates year round. The F/V CAPE FEAR made 106 trips in 1998, for a total of 3,888 hours at sea. The average trip lasted 36.6 hours.

The clamming industry uses an Individual Transferable Quota (ITQ) system to regulate the amount of clams fished. ITQ Tags are issued to eligible owners and may be transferred, sold or leased out. Each cage must receive a new tag for every trip. Under the National Marine Fisheries Service (NMFS) regulations, vessels must have the cages tagged with ITQ tags prior to offloading and have their trip reports completed prior to landing. Clam vessels are required to submit their trip reports to NMFS. According to NMFS, ocean quahogs are plentiful, and therefore are not an enforcement priority. NMFS rarely boards clam vessels underway in New England and do not check the vessels for ITQ tags when they offload their clam cages.

## CHRONOLOGY:

### BEFORE THE ACCIDENT -

#### TANK LOADING INFORMATION

The F/V CAPE FEAR got underway on 7 January 1999 with the following tank loading (organized bow to stern and port to starboard):

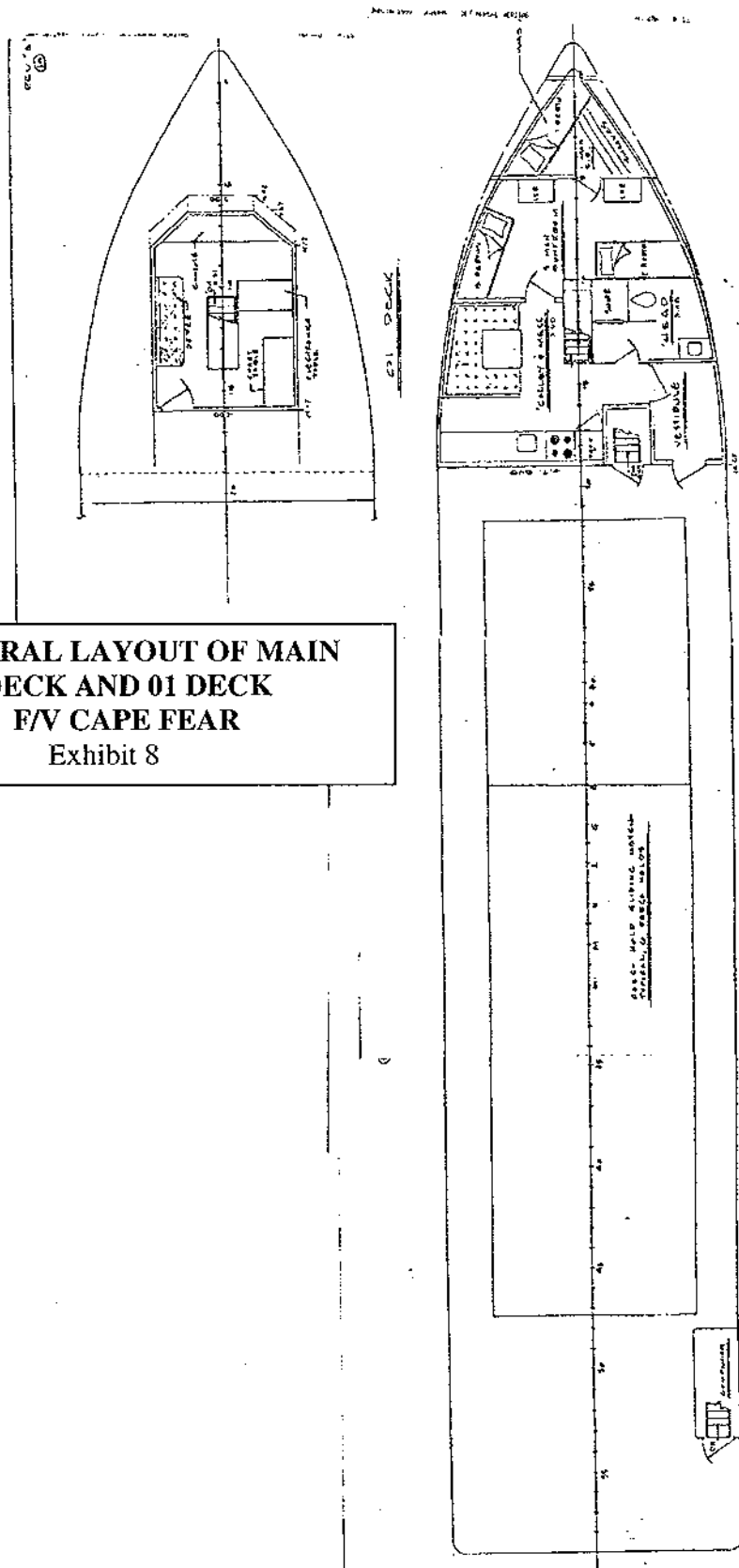
Forepeak Fresh Water tank	Full – 2900 gal
Hydraulic Oil tank (forward)	¾ Full - 2400 gal
Port Double Bottom Fuel Oil #1	Full – 3300 gal
Starboard Double Bottom Fuel Oil #1	Full – 3300 gal
Port Double Bottom Fuel Oil #2	Full - 6150 gal
Starboard Double Bottom Fuel Oil #2	Full – 6150 gal
Hydraulic Oil tank (Port side frame O)	¾ to 7/8 Full - (not shown on vessel drawings)
Port Double Bottom Ballast #1	Full – 3900 gal
Starboard Double Bottom Ballast #1	Full – 3900 gal
Port Double Bottom Ballast #2	Empty
Starboard Double Bottom Ballast #2	1/3 to ½ Full – 1000 gal (used to counter port list)
Port & Starboard Wing Void #1, 2 & 3	Empty
Port & Starboard Wing Void # 4	Did not exist on vessel, error in drawing
Aft three ballast tanks	Empty (treated as voids)

Tank Soundings were not conducted prior to departure. The fuel, ballast water and freshwater tanks were filled until they overflowed. Buckets were placed under the fuel tank overflow pipes when loading the fuel tanks to prevent spilling oil into the water. The Hydraulic Tank had a sight glass that showed how much oil was in the tank.

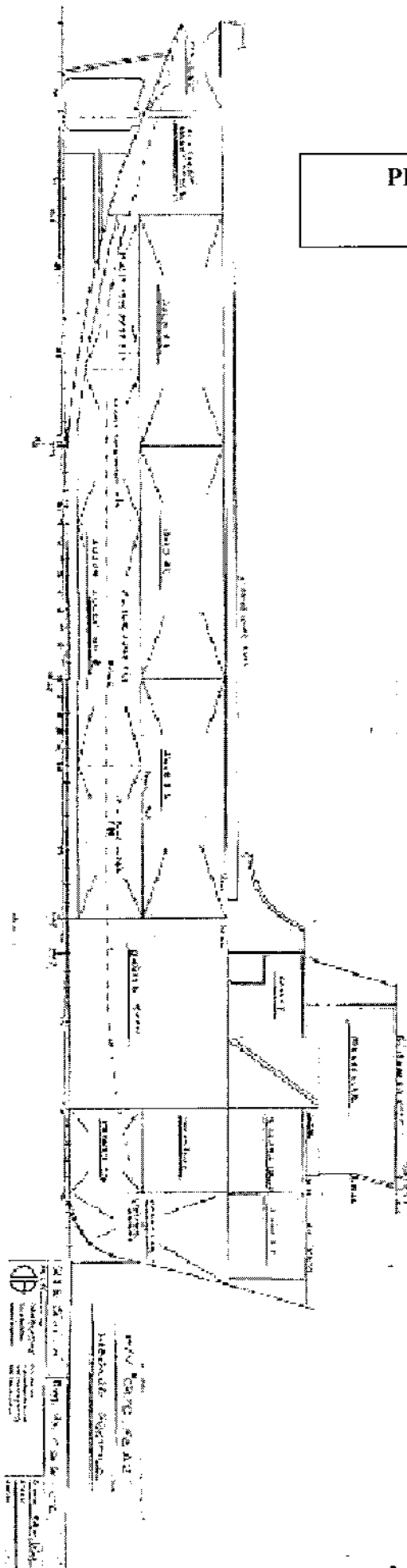
## Exhibit 7, Page 3



**GENERAL LAYOUT OF MAIN  
DECK AND 01 DECK  
F/V CAPE FEAR**  
Exhibit 8



## Exhibit 9



## CLAM LOADING INFORMATION

The F/V CAPE FEAR left the Sea Watch dock on 7 Jan 1999 with 130 empty clam cages.

There were fifteen cages in each of 6 clam tanks (number 1, number 2 and number 3 port and starboard clam tanks) for a total of 90 cages in the clam tanks, and 40 cages on deck. For purposes of this report the number 1, number 2 and number 3 clam tanks are often referred to as the forward, center and aft clam tanks/clam holds/fish holds respectively.

Of the 40 cages on the main deck, 24 were at the waist - 12 along the port rail and 12 along the starboard rail, and 16 were on the hatch covers. The 16 cages on the hatch covers were located as follows: 5 on the number 1 port hatch cover; 5 on the number 1 starboard hatch cover; 3 on the number 2 port hatch cover; and 3 on the number 2 starboard hatch cover. The clam cages on deck were between the bulwarks and the hatch coaming, which kept them in place. They were not tied down.

## SECURING FOR SEA

Three of the four watertight doors on board were left open.

- (a) The watertight door leading to the engine room was tied open.
- (b) The watertight door in the engine room leading to the shaft alley was left open so the entrance to the shaft alley could be viewed in the pilothouse through a camera in the overhead of the engine room.
- (c) The watertight door leading to the galley was open. These three doors remained open for the entire trip.

Two of six dogs on the watertight door in the doghouse leading to the Hydraulic Room were shut to keep the door closed. The normal practice aboard the CAPE FEAR was to close the middle and lower dogs on the side opposite the door's hinges.

The Captain checked the weather report and the forecast prior to getting underway.

## UNDERWAY

The F/V CAPE FEAR got underway on 6 January 1999, but the Captain decided to turn around because the weather was too severe. Captain Novack testified that he was concerned about the winds blowing from the south.

The F/V CAPE FEAR got underway from Sea Watch International terminal in New Bedford, MA, for its final voyage at 3:15 P.M. on 7 January 1999.

The Captain approximated that the draft when the CAPE FEAR left port was 10 to 11 feet forward and aft, and the freeboard was roughly 5 to 6 feet forward and 3 feet aft however there were no draft marks on the vessel.

## FISHING

The CAPE FEAR was traveling at a speed of 8 ½ to 9 ½ knots during its transit from the dock to the fishing grounds which took approximately 3 hours and 45 minutes. The CAPE FEAR made her first tow of the dredge at 7:00 P.M. on 7 January 1999.

The outriggers were down with stabilizers trailing approximately 20 feet in the water while they were fishing.

The CAPE FEAR clammed approximately 14 miles southwest of Buzzards Bay.

The crew set out the 8 inch clam hose. During this trip, the hopper was filled with clams every 2 to 3 tows of the dredge. The hopper holds roughly 4 to 6 cages worth of clams. They caught 2 – 3 cages worth of clams in the dredge each tow, which happened every 20 – 28 minutes. The crew was trying to get two drags within an hour, including the time to haul and set the dredge. The dredge was hauled up into the vessel's stern ramp using an A frame on the stern and a wire run through a hydraulically operated winch. Captain Novack was aware of the inclement weather forecasted. He intended to stop clamming early, before they had caught enough quahogs to fill all 130 cages. However, the clams were plentiful in the area they fished, and they were able to quickly catch a full load prior to departing the fishing grounds.

The F/V CAPE FEAR clammed for 23 ½ hours between 7 and 8 January.

#### WATCH SCHEDULE

The Captain stood watch for approximately 14 hours, from the time the CAPE FEAR got underway at 3:15 P.M., 7 January 1999, until approximately 5:00 A.M., 8 January. The Mate relieved the Captain and stood the watch for 10 to 12 hours, until roughly 3:00 to 5:00 P.M., 8 January.

The Mate went to the berthing area to sleep after he was relieved. The Captain kept the watch until the CAPE FEAR sank.

The deckhands worked 10 to 12 hours on - loading clam cages, pumping the clam tanks, maintaining the equipment on deck, and assisting as necessary - and 5 to 6 hours off during the 7 to 8 January voyage.

The crew loaded clams into the cages in the number 1 port and starboard clam tanks first. They alternated filling three cages in one side (port or starboard) and then three in the other side to keep the vessel from listing, until the number 1 port and starboard tanks were full. Each clam tank could hold 15 cages. They worked their way from forward to aft in a similar fashion, filling the number 2 port and starboard tanks next and then the number 3 port and starboard tanks, until all of the cages in the clam tanks were full.

Once all of the cages in each clam tank were full of clams the hatch to each clam tank was closed. The Mate closed the number 3 starboard aft hatch, using a line run through a winch controlled from the walkway behind the pilothouse, and testified that he heard the hatch slam shut against the aft hatch coaming. The number 3 port hatch cover was closed by one of the deckhands. A knot (used instead of a splice) in the line that was pulled using a block and tackle to shut the hatch, prevented the hatch from closing completely. The hatch was left open 3 – 6 inches which was not reported to the Mate who was on watch at the time. The same line was used to close the number 3 port and starboard hatch covers.

The Mate testified that there was an extra spool of line on deck that could have been run through the block and tackle to close the number 3 port hatch cover, but this was not done.

After all the clam cages in all six clam tanks were loaded, the Mate had Joe Lemieux go to the main deck clam pump manifold to pump out each of the clam tanks using the clam pump system. The Mate watched him pump each tank to ensure the valves were properly aligned. The Mate could see the large butterfly valve handles from the pilothouse, and knew based on their position (horizontal or perpendicular to the manifold) whether they were open or closed. Once each clam

tank was pumped dry, the clam tank valves were closed at the manifold so the clam pump was not pumping or filling any of the tanks.

Once all 90 cages in the 6 clam tanks had been filled with clams, the crew then loaded the cages on the main deck with clams. They started by loading 4 cages on one side of the waist, and 4 cages on the opposite waist moving forward to aft. Then they loaded the cages on the hatch covers with clams. They filled the two forward cages on one side of the hatch cover. Next they moved two empty cages forward so they sat on the inboard portion of the hatch cover, beside the two full cages, and filled them. They did the same thing on both the port and starboard hatch covers, working forward to aft, until 10 cages were full and on top of the number 1 hatch covers. Next, they filled the remaining cages on each side of the waist until all 12 cages on the port waist and 12 on the starboard waist were filled with clams. They finished by filling the rest of the cages on the hatch covers, sliding the empty cages forward prior to filling them, until they had a total of 16 full cages which covered the number 1 hatch covers and the forward portion of the number 2 hatch covers.

On 8 January, when the deckhands had approximately 10 cages left to fill, Captain Novack asked the deckhands to begin pumping all of the clam tanks and to watch the overboard discharge to ensure that they were all dry. Joe Lemieux began pumping the clam tanks, forward to aft, but became involved in loading the remaining clam cages with clams. So Steven Reeves pumped the remaining clam tanks and left the pump running and lined up by the manifold to take a suction on the number 3 port tank.

After the CAPE FEAR finished the last haul back on 8 January (approximately 6:30 P.M.), the dredge was pulled up the steel ramp on the vessel's stern and pinned in place in its steel frame. At approximately 7:30 P.M., after Steven Reeves backflushed the clam pump piping, Captain Novack asked him about the hatch covers. Steven Reeves told the Captain that the number 3 port hatch was not closed completely, and the number 3 starboard hatch was closed. This was the first time the open hatch was reported to the Captain.

The Captain testified he intended to have the deckhand close the number 3 port hatch using a "come along" however, this was not attempted, and the hatch was never fully closed.

#### RETURNING TO PORT

Between 6:30 and 6:45 P.M. on 8 January 1999, the CAPE FEAR departed the fishing grounds. on a northerly course of roughly 025T making 7 to 8.5 knots. The wind was 20 to 30 knots from the southeast and the seas were 6 to 8 feet from the southeast. It was snowing and raining sporadically. Visibility varied between 2 to 6 miles.

According to testimony, the CAPE FEAR did not pass over any shallow areas during the inbound transit and did not ground.

When the CAPE FEAR first departed the fishing grounds, the vessel was taking waves and green water across the starboard aft quarter from the following seas. The Captain testified that not every wave broke over the vessel, but sets of two to four waves broke over the vessel when they passed. The wave sets broke over the starboard aft quarter, splashed on the back deck, rolled forward, and washed off the port side. Some of the waves splashed and washed across the aft portion of the number 3 port and starboard clam tank hatch covers.

The Captain had the watch for the entire trip inbound, and the Mate was asleep in the berthing area.

There were approximately 3 cages worth of clams in the hopper when the CAPE FEAR left the fishing grounds, and the deckhands were still loading the last two to three cages. The Captain estimated the freeboard was approximately 12 to 18 inches aft and 4 to 5 feet forward.

Joe Lemieux, a deckhand who was on the stern loading the cages, estimated that the freeboard aft was 10 inches when the CAPE FEAR left the fishing grounds, and said that the freeing ports located at the stern were awash with the waves.

According to the Captain, CAPE FEAR had a slight (1 to 2 degree) port list. The number 1 port double bottom fuel tank was being drawn from. Captain Novack preferred the slight port list because he was taking wind and waves on the starboard side, and the port list kept the starboard side higher above the seas.

The 8 inch clam hose had been purged of water using pressure from the vessel's air compressor, and the clam hose floated and trailed behind the CAPE FEAR. To access the air compressor, Mr. Reeves passed through the watertight door in the doghouse leading to the hydraulic room. He was the last person to pass through that watertight door prior to the vessel sinking.

During the transit into port, the clam pump was running, and lined up to take a suction on the number 3 port clam tank. The clam pump suction/backflush piping was connected to the bottom of each clam tank via rose boxes with strainer plates over them. The pump was running at almost half of its capacity, or just under 3000 gallons per minute. The Captain decided to leave the pump on in case they were taking-on water from the seas washing up on deck and because the hydraulic pump on the front of the clam pump engine would be needed for the winches to haul in the clam hose once they were in calmer waters. He estimated it would have been 1-½ hours from the time they began the inbound transit until they should have been in calmer water.

Captain Novack told a deckhand that "if the boat starts listing to starboard, we are taking "X" amount of water in the hatch." If that occurred, Captain Novack wanted the deckhand to change the clam pump piping alignment using the manifold so it would take suction and pump from the number 3 starboard clam tank.

The Mate testified that it was not a normal procedure to leave the clam pump lined up to take a suction while transiting. When asked, "Is it typical to always have the suction lined up on a fish hold as you are on your way in?" The mate responded "No, sir. This thing is usually shut off on the way in. Not unless you feel the boat has a little list and you, just for GP, you go check, and that's how you check. You see if it's got water in it."

There were several other vessels owned by the same owner, Warren Alexander, which were transiting in the vicinity of the F/V CAPE FEAR. The F/V MISTY DAWN passed the CAPE FEAR on the way into port, and was approximately 2 miles north, ahead, of the CAPE FEAR when it sank. The F/V MISS MYRNA left the fishing grounds approximately an hour before the CAPE FEAR departed. The F/V JOHN N was clamming approximately 12 to 15 miles south of the CAPE FEAR.

Approximately 45 minutes after departing the fishing grounds, the Captain sent Mr. Reeves to the stern to backflush the clam pump piping for the number 3 port clam tank. The tank was being pumped using the clam pump, and the Captain could not see the discharge because of the seas. The overboard discharges through the hydraulic room just aft of the number 3 port clam tank. The Captain and Mr. Lemieux watched Mr. Reeves open and close the fill valve to backflush, and the Captain observed the pressure changes on a gauge in the pilothouse. Backflushing is a quick procedure, which pushes water back through the piping that leads into a tank to clean any debris that may be clogging the piping system. The procedure causes the pressure to drop when the fill valve is opened and then increase to its prior level (80 to 85 pounds) when the valve is closed. Mr. Reeves reported to the Captain that he could not see the discharge, but, based on the sound

of the water discharging over the side, it sounded as though water was being pumped from the tank.

At approximately 7:55 P.M., a low-level visual and audible alarm sounded in the pilothouse for the hydraulic room. The alarm only sounded for a "second" and then cleared itself. This alarm was reportedly set off anytime there were a few gallons of water sloshing around in the bilge. The Captain looked at the television monitor showing the hydraulic room, and did not see any flooding. The Captain estimated that he would have seen the water on the monitor if there had been more than 50 gallons in the space.

When the alarm sounded for the hydraulic room bilge, the Captain went down to the engine room to start an electric bilge pump to take suction and pump out the hydraulic room as a precaution. While in the engine room, the Captain glanced into the shaft alley, which was dry. The Captain opened the bilge pump sea chest valve half way to prime the bilge pump so water would still circulate through the pump once the hydraulic room was pumped dry, and opened another valve on the manifold labeled hydraulic room. Then, he hit the start button for the number 2 electric bilge pump. The Captain checked the electric pump discharge coming out of the hull, starboard side in vicinity of the engine room, on his way back to the pilothouse. He saw a steady stream of discharge which was from the water being pumped out of the hydraulic room and the water entering through the sea chest valve which was priming the pump. The alarm had cleared itself prior to Captain Novack aligning the bilge pump, and did not sound again.

Captain Novack testified that the seas seemed to be getting calmer as they approached Buzzard's Bay. Then, just before 8:00 P.M., two large waves hit the stern of CAPE FEAR.

Approximately 15 minutes before the CAPE FEAR sank, Captain Novack called MISTY DAWN on VHF radio channel 08, and told John Mathis, III, the mate, that they had taken "two big ones", and that "she rolled hard two times."

At this time, around 8:00 P.M., the seas were 6 to 8 feet and the winds were 20 to 30 knots, both from the south. Water was washing  $\frac{1}{4}$  to  $\frac{1}{3}$  of the way up the aft hatch covers at various angles with the waves approximately in vicinity of the after portion of the number 3 clam tank hatches.

The outriggers were down with the stabilizers in the water, and were not raised prior to the sinking. Captain Novack intended to raise them once they were inside the hurricane barrier at the entrance to New Bedford.

The F/V CAPE FEAR was carrying a total of 130 cages full of ocean quahogs at the time of the casualty along with approximately  $\frac{1}{2}$  of a cage worth (16 bushels) of clams in the hopper.

The clam pump was lined up to take a suction on the number 3 port clam tank for approximately 3 hours prior to the CAPE FEAR capsizing and sinking. At approximately 8:10 P.M., Captain Novack put the clam pump in idle. During those 3 hours, the Captain and crew never noticed the clam pump discharge shooting foam and air bubbles out 20 to 30 feet or making a hissing sound, as it did when a space was pumped dry.

ACCIDENT TIMELINE  
(All times are approximate)

6 January 1999	F/V CAPE FEAR got underway, then returned to port due to the weather
3:15 P.M., 7 January	F/V CAPE FEAR got underway and departed port with Captain Novack on watch
7:00 P.M., 7 January	Arrived at fishing grounds and began fishing
5:00 A.M. (roughly), 8 January	The Mate assumed the watch
Between 3 – 5:00 P.M.	The Mate was relieved by the Captain with 16 cages left to load.
5:00 P.M.	With 10 cages left to be filled with clams, a deckhand lined up the clam pump to take a suction in each clam tank, one at a time, to ensure the tanks were dry. Steven Reeves left the clam pump lined up to take a suction and pump out the number 3 port clam tank.
6:30 P.M.	Departed fishing grounds; number 3 port clam tank hatch was left open 3 – 6 inches.
7:30 P.M. (roughly)	Backflushed number 3 port clam tank piping.
7:55 P.M. (10 – 15 min before sank)	Low-level bilge alarm sounded for hydraulic room, then cleared itself.
8:00 P.M.	Captain Novack called MISTY DAWN, took “2 big ones” and “she rolled hard twice.”
8:10 P.M. (roughly)	Captain and crew of CAPE FEAR notice water from breaking seas was not shedding off the stern.
8:13 P.M. (roughly)	Captain Novack called the Captain of the MISTY DAWN, told him they were having problems and asked MISTY DAWN to turn around.
8:14 P.M. (roughly)	The mate of the MISTY DAWN called Captain Novack back and asked what was up. Captain Novack replied, “A lot of water. Call the Coast Guard.
8:15 P.M.	MISTY DAWN called the Coast Guard, and reported that the CAPE FEAR was taking on water and they were enroute to assist.
8:16 P.M.	CAPE FEAR capsized.
8:38 P.M.	MISTY DAWN called USCG reporting 3 crewmen rescued, and confirmed that the CAPE FEAR had sunk.

## ACCIDENT DESCRIPTION -

8 January 1999

At 8:00 P.M., the CAPE FEAR was on autopilot, steering a course of 044 degrees true, speed 7 ½ to 8 ½ knots near the entrance to Buzzard's Bay.

Just prior to realizing the CAPE FEAR was taking on water, the Captain and all three deckhands were in the pilothouse together watching television, joking around and horse playing. The four were sitting facing each other. The Captain was sitting sideways, in the forward starboard part of the pilothouse. He was facing the group, but could see the radars and the TV monitors displaying the engine room and the hydraulic room. Steven Reeves was sitting on a desk in the aft starboard portion of the pilothouse, facing forward. Joseph Lemieux and Paul Martin were sitting next to each other in chairs on the port side of the pilothouse, facing inboard.

At approximately 8:10 P.M., Captain Novack and the deckhands noticed one wave, which crossed over their stern, washed up on the back (number 3) hatch covers, and did not recede. The CAPE FEAR'S stern started sinking evenly at first, not listing to port or starboard. The CAPE FEAR capsized and sank within five minutes of the crew noticing this problem.

The rest of the events in this section happened very quickly, between approximately 8:10 P.M. and 8:15 P.M.:

Upon seeing that the water was not receding and the CAPE FEAR was sinking evenly by her stern, Captain Novack sent Paul Martin below to wake up the Mate who was sleeping in crew berthing on the main deck level. Steven Reeves and Joe Lemieux also briefly went below to check on the Mate.

Captain Novack throttled the main engine back to idle, attempting to raise the freeboard at the stern. The Captain testified that stopping the main engine causes the stern to rise. The Captain left the engine in idle, and never changed course. At the position of the sinking, the nearest shallow water was to the east south east approximately 1 mile away.

Captain Novack throttled the clam pump engine back to idle. The Captain did not know where the flooding was occurring. Because he had no idea where the flooding was coming from, he became concerned that the clam pump may have been filling the number 3 port clam tank instead of pumping it.

The Captain asked a deckhand to go to the stern and check the alignment of the valves on the clam pump manifold, then immediately told the deckhand to forget it, because there was too much water on the stern. The Captain told Joe Lemieux, a deckhand who could not swim, to don his survival suit. At this point, the water was covering the entire number 3 port and starboard hatch covers. During the testimony, both the Captain and the Mate expressed concern that Mr. Lemieux could not swim. All of the other members of the crew could swim.

Mr. Lemieux testified that he saw the clam hose floating after the CAPE FEAR had began taking on water.

The Captain told the rest of the crew to don survival suits and began donning his own suit. The Captain got his survival suit from the pilothouse. He put his legs in his suit and then made a radio call to the F/V MISTY DAWN, which was 2 miles north of them.

Captain Novack called on channel 08 and told the captain of the MISTY DAWN that they were having problems and asked MISTY DAWN to turn around. Captain Novack used channel 08 because that channel had been used for previous communications with the MISTY DAWN. The

Captain of the MISTY DAWN, John Mathis, Jr., had his mate, John Mathis, III, called Captain Novack back on channel 08.

Steven Reeves grabbed a suit from the walkway by the galley, and went to the pilothouse to don it.

By the time the Mate climbed the ladder from crew berthing to the pilothouse, the water was starting to cover the number 2 port and starboard clam tank hatch covers. The Mate estimated the CAPE FEAR sank within 3 minutes of when he was woken up.

The Mate, James Haley saw Captain Novack and Steven Reeves with their survival suits half on and Joe Lemieux with his suit completely on when he came up the ladder. When the Mate saw the Captain thigh deep in his survival suit no words were exchanged, but the Mate understood that he needed to don a survival suit. He went back down to the berthing area to grab his sweatpants and glasses, and then went aft through the galley to get a survival suit.

The Mate saw Paul Martin grab a suit from the walkway by the galley, and enter the galley to don it. The Mate then got his suit from the walkway, after Mr. Martin, and began donning it out on deck between the galley watertight door and the engine room watertight door. This was the last time Paul Martin was seen alive.

The Mate did not have any problems donning his survival suit, and estimated it took him less than a minute to completely don the suit.

Captain Novack and Joe Lemieux testified that the CAPE FEAR's stern sank evenly at first. Once approximately 1/3 of the stern was underwater and the water was halfway over the number 2 port and starboard hatches, the CAPE FEAR began to list to port.

When the Mate went on deck to don his survival suit, the entire port quarter of the CAPE FEAR was submerged and the vessel had a 20-degree port list.

Captain Novack looked at the TV monitors in the pilothouse several times, including just before abandoning ship. The monitors indicated that the hydraulic room, the engine room and the shaft alley were dry. No bilge alarms were sounding while abandoning the vessel.

The Mate of the MISTY DAWN called Captain Novack on channel 08. The MISTY DAWN Mate asked Captain Novack what was up. Captain Novack replied, "A lot of water. Call the Coast Guard." The MISTY DAWN called the Coast Guard, and was unable to reach the CAPE FEAR on the radio after this.

Captain Novack threw down the radio microphone and said to Steven Reeves and Joe Lemieux, "We have got to get out of this wheelhouse now."

Captain Novack did not sound the general alarm, because he knew, once the Mate was awakened, that everyone was up and donning survival suits.

Captain Novack did not directly call the Coast Guard or send a MAYDAY.

The Captain testified that there was not enough time to deploy the life raft or do anything with the EPIRB.

After Captain Novack threw the radio microphone down and said they had to get out of the wheelhouse, the Captain, Steven Reeves and Joe Lemieux went out the pilothouse door (located on the port aft section of the pilothouse) and around to the starboard side of the 01 deck. The capsizing and sinking were imminent. The boat was rolling to port.

The Captain put his arms in his suit. He had his zipper half way up. He tried to zip it up fully and put his hood on, but he was not able to zip it up or put on his hood because the boat was rolling fast. Joe Lemieux reported that Steven Reeves had his survival suit on up to his waist. Joe Lemieux had completed properly donning his survival suit. The Captain, the Mate and deckhand Joseph Lemieux testified that they did not recall hearing anyone say that they were having difficulty donning their immersion suits.

As the boat rolled to port, the Captain climbed over the rail and slid down the starboard side into the water, with Steven Reeves sliding in after him. The Captain's survival suit was only zipped halfway and his hood was off.

Joe Lemieux was thrown to port as the CAPE FEAR rolled to port, and landed in the water with the vessel between him and the Captain and Mr. Reeves.

The Mate, who had completely donned his suit on the starboard main deck, was thrown to port as the CAPE FEAR rolled, and landed near Joe Lemieux. A chain from the starboard stabilizer struck the mate in the face, knocking his glasses off but not injuring him, as he attempted to jump off of the starboard side.

As the CAPE FEAR rolled over, the Mate saw the cages popping off the side of the rail over the hatch coaming, similar to a domino effect, and falling in the water. The cages had not shifted prior to the CAPE FEAR rolling over. The Mate had difficulty saying what the vessel's list was when the cages began popping off. But he did say the whole stern quarter was under water, the vessel was on its side rolling quickly, and that it was listed far enough that the cages popping off of the starboard side may have cleared the port side of the vessel as they fell. The CAPE FEAR rolled completely upside down.

#### IN THE WATER

The Captain and Mr. Reeves communicated by yelling to each other. The Captain estimated that they were approximately 20 to 30 feet apart. Mr. Reeves was calling for help. The Captain was having trouble zipping his suit up and putting his hood on in the cold water. He reported getting "ice cream headaches" and being disoriented.

The engines on the CAPE FEAR could be heard still running as the boat capsized, rolling completely upside down. The survivors reported hearing air shooting out of the boat and smelling diesel fuel. None of the survivors could see the CAPE FEAR due to darkness (overcast night, no moon). The Captain thought he saw lights underwater, but they disappeared.

The Captain asked Mr. Reeves if he had his survival suit on, and Mr. Reeves said no – that he was trying and needed help. The Captain told Mr. Reeves he was also having problems with his suit.

The Captain tried donning his hood and zipping his suit several different ways, unsuccessfully. Finally, he gave up and just held the neck together, trying to get the water out of his suit and holding his hood down.

The Captain did not hear Mr. Reeves yelling, and assumed he had calmed down.

As the Mate entered the water, he was struck by a board, which was previously used by the crew to put across the hopper to stand on while working on the vessel's dredge. The board was roughly 2 inches by 12 inches and 10 feet long, and did not injure the Mate. He used the board like a surfboard for floatation. The Mate turned on the strobe light on his survival suit in the water, and it worked.

The Mate heard the Captain yelling, then heard Joe Lemieux. The Mate yelled to the Captain that he was okay and had a board. He told the Captain he was helping Joe Lemieux, and would swim to him next.

The Captain swam towards the Mate's voice, using one hand to swim and holding his zipper with the other. He estimated that he was swimming north, because he could see what he thought was Cuttyhunk Light. The Captain could see 2 or 3 strobe lights in that direction.

The Mate swam to Joe Lemieux and had Mr. Lemieux hold onto the board he had found. The two of them, using the board for flotation, kicked over to the Captain.

Once the Captain, Mate and Joe Lemieux were together, they realized that no one had heard anything from Paul Martin.

The Mate tried to turn the Captain's survival suit light on, and found it did not work. The Mate pulled hard on the Captain's survival suit zipper, and was able to zip it up. The Captain's hood was on crooked, and he could not see. The Captain unzipped his suit a little so he could fix his hood and be able to see.

The Captain and Mate then heard Mr. Reeves for the last time. He was faintly hollering for help and said, "Oh, God." The Captain estimated from the sound of his voice that Mr. Reeves was approximately 5 to 10 feet from them. They tried to find him, but never heard from him again.

The three of them, the Captain, the Mate and Mr. Lemieux, floated hanging on the board for a while. Then, they saw the lights of the F/V MISTY DAWN. The survivors estimated they were in the water 20 to 30 minutes before being picked up by the MISTY DAWN.

None of the survivors ever saw the life raft in the water.

#### AFTER THE ACCIDENT -

##### MISTY DAWN RESCUE

The crew of the MISTY DAWN saw the light on the Mate's survival suit. They pulled alongside the survivors and threw them two life rings.

The Mate, Mr. Haley was able to grab one of the life rings while Captain Novack and Mr. Lemieux grabbed the second life ring.

The crew of the MISTY DAWN began pulling in the life rings with the three survivors holding onto them.

Captain Novack was not able to maintain his hold on the life ring and grabbed onto chaffing gear on the side of the boat.

The crew of the MISTY DAWN pulled Mr. Haley and then Mr. Lemieux onboard.

Finally, Mr. VanHorn, a deckhand on the MISTY DAWN, was able to pull Captain Novack onboard.

The survivors were taken into the galley of the MISTY DAWN, stripped of their wet clothes and given dry clothing, blankets and hot coffee.

Mr. Mathis III, the mate on the MISTY DAWN, stayed with the survivors while Mr. Albert and Mr. VanHorn, both deckhands on the MISTY DAWN, returned to the weather decks to search for the remaining crewmembers.

The MISTY DAWN remained on scene searching for survivors; however, during one pass she struck and went over top of the partially submerged hull of the CAPE FEAR.

This collision knocked the MISTY DAWN out of gear and ruptured a pipe in the engine room, which in turn caused flooding onboard the vessel.

A dive survey of the MISTY DAWN conducted 12 January 1999, revealed that the keel was scraped down to bare metal from bow to stern and the hull paint on both the port and starboard side of the keel was scraped from bow to stern. Those scrapes extended from the keel up a few feet and were near symmetrical on both the port and starboard sides.

The MISTY DAWN began heading back into New Bedford at this time, to assess the damage to their vessel and to transport the survivors to a medical facility. MISTY DAWN informed the Coast Guard that they were departing and going to the Sea Watch dock, and that the F/V JOHN N and the F/V MISS MERNA were in the area searching for possible survivors.

## COAST GUARD RESCUE EFFORT

### 8 January 1999

At 8:15 P.M. Coast Guard Group Woods Hole received a radio call on VHF channel 16 from the F/V MISTY DAWN.

The initial radio transmission from the MISTY DAWN was "We're right here at Buzzards Bay Tower. We got another clammer right here along side of us. It's the CAPE FEAR taking on water."

Group Woods Hole was the SAR Mission Coordinator (SMC), and the petty officer standing SAR Duty Officer (SDO) was coordinating the search and periodically briefing the Group Woods Hole Operation Officer, LT Perrone, via the telephone.

At 8:17 P.M., the SMC contacted Coast Guard Station Woods Hole and informed them that the CAPE FEAR was taking on water, and the MISTY DAWN was enroute to provide assistance.

At 8:19 P.M., the SMC issued an Urgent Marine Information Broadcast (UMIB), requesting all mariners within the vicinity to keep a sharp lookout for the CAPE FEAR, to assist as possible and to report all findings to the Coast Guard.

At 8:24 P.M., the Coast Guard Cutter JUNIPER responded to the UMIB and informed the SMC that they were approximately 20 miles south of the scene and were available if needed with an estimated time of arrival of approximately 1 ½ hours. The JUNIPER moored at Pier 2, U.S. Naval Station, Newport, RI, at 9:27 P.M., and was never used for this SAR case.

At 8:33 P.M., upon learning that the MISTY DAWN was on-scene and saw strobe lights but no vessel, the SMC directed the launch of a 44-foot MLB (CG 44339) from Coast Guard Station Menemsha and informed the First Coast Guard District Command Center of the situation. CG 44339 got underway at 8:37 P.M.

At 8:38 P.M., the MISTY DAWN arrived on-scene, rescued three crewmembers from the water, and discovered that the CAPE FEAR had sunk. They reported all of this to the SMC.

At 8:44 P.M., the First District Command Center directed the launch of a helicopter from Coast Guard Air Station Cape Cod.

At 8:48 P.M., the SMC obtained permission from the District Command Center to divert the Coast Guard Cutter POINT FRANCIS, which was already underway in Cape Cod Bay, to assist in the rescue. The POINT FRANCIS was diverted by the SMC at 8:50 P.M., with an estimated time of arrival (ETA) on-scene of 2 hours.

At 8:54 P.M., the Group Woods Hole SDO, performing the functions as SMC, contacted LT Perrone, the Operations Officer for Coast Guard Group Woods Hole, and updated him on the situation. LT Perrone concurred with all actions by the SDO and also directed the launch of the Coast Guard Cutter HAMMERHEAD.

The Air Station Cape Cod helicopter, an HH-60 Jayhawk, had been directed to launch at 8:44 P.M., but the launch was delayed until 9:24 P.M. due to icy conditions and also to allow for the installation of the night sun, a special search light. According to the testimony of LT Perrone, the installation of the night sun takes approximately five minutes, so the primary delay of the helicopter launch was due to weather.

At 9:03 P.M., a 44-foot MLB (CG 44397) from Coast Guard Station Woods Hole got underway enroute to assist in the search.

At 9:48 P.M., the first Coast Guard asset, the CG helo, arrived on scene and assumed On-Scene Commander (OSC).

The weather condition which included: heavy rain and snow mixed, 200 – 400 ft ceiling, 1 – 6 NM visibility, 6 – 10 foot seas, and 30 KT southerly winds; made the search difficult for the pilots and hampered visibility and detection for all of the search assets throughout the night. The CG helo had to fly close to the ground/water's surface, at only 125 to 300 altitude due to the low ceiling, which at times was as low as 125 feet. The helo also experienced wind gusts of up to 50 KTS.

The CG helo flew to the last known position of the CAPE FEAR and located a strobe light at 10:15 P.M. The strobe light was initially thought to be an EPIRB but was later correctly identified as the strobe attached to one of the life rings from the CAPE FEAR. The helo began to conduct harbor searches using the night sun and night vision goggles trying to locate any persons in the water. After completing their harbor searches the HH-60 began conducting racetrack searches between the strobe light and the last known position of the CAPE FEAR.

After completion of these search patterns, the CG helo conducted a sector search pattern, as directed by the SMC, with negative results. This type of search was used because it is designed to maximize the detection capabilities due to fewer turns, which means less banking for the helo. When the helo banks in a turn, the pilot and co-pilot lose good visibility out the window.

At 9:26 P.M., the CGC HAMMERHEAD was directed to get underway from Group Woods Hole to assist in the search.

At 10:33 P.M., CG 44339 from Station Menemsha arrived on scene and was directed to the position of the strobe light and ordered to begin an expanding square search pattern.

At 10:39 P.M., the CGC HAMMERHEAD got underway enroute the search area.

At 11:01 P.M., CG 44397 from Station Woods Hole arrived on scene and was directed to an area just west of the strobe light where they began an expanding square search.

At 11:14 P.M., the CGC POINT FRANCIS arrived on scene and proceeded to the last known location of the CAPE FEAR.

At 11:37 P.M., the CGC HAMMERHEAD arrived on scene and began to conduct a parallel search of the area.

At 11:50 P.M., the POINT FRANCIS located a Personal Flotation Device (PFD). They then proceeded to conduct a joint search of the immediate area with the CG helo from Air Station Cape Cod. The POINT FRANCIS launched ten parachute flares to illuminate the water's surface, allowing for better detection by the helicopter crew. No persons were seen.

The SMC was able to use the recovered debris to establish the approximate speed and direction of drift. That information was then used to adjust search patterns accordingly.

#### 9 January 1999

At 12:29 A.M., the CG helo was forced to return to Air Station Cape Cod because of deteriorating weather conditions and low fuel. No other aircraft were able to fly that evening because the weather had deteriorated beyond acceptable take-off standards. The visibility was reduced to ¼ mile and the ceiling was at 100 feet.

The cutters POINT FRANCIS and HAMMERHEAD continued to conduct search patterns throughout the evening with negative results. The POINT FRANCIS assumed OSC when the CG helo departed.

At 1:00 A.M., CG 44397 and CG 44339 were directed to return to their respective stations because their crewmembers were approaching their fatigue limits.

At 7:25 A.M., a helicopter was able to return to the search area because the weather had improved. They returned to the last known position of the CAPE FEAR and immediately identified a life raft that appeared to be tied to the sunken vessel.

The cutter HAMMERHEAD launched its inflatable boat and crewmembers visually inspected the life raft finding the raft fully deployed and attached to a sunken object, however there were no people onboard it.

Once the HAMMERHEAD arrived on-scene the life raft, the CG helo proceeded to conduct a search track between Cuttyhunk and Gooseberry Neck. Arriving in the vicinity of Gooseberry Neck, the CG helo conducted a shoreline search between New Bedford and Westport Harbor.

At 9:10 A.M., the CG helo located an empty survival suit, off of Slocum's Neck.

The Massachusetts Environmental Police (MEP) recovered the empty survival suit.

At 9:21 A.M., the CG helo located a body wearing a partially donned survival suit in the surf off of Gooseberry Island (part of Horseneck State Beach).

A MEP Officer and a Westport Police Officer entered the water to recover the body, later identified to be that of Paul Martin, from the surf. Once on the beach, the officers noticed that Mr. Martin's survival suit zipper was not zipped up. A MEP officer attempted to move the zipper, and it started to move after much force was applied.

The CG helo departed the scene at 9:52 A.M. because of low fuel.

The HAMMERHEAD and the POINT FRANCIS continued to run search patterns, primarily concentrating along the coastline where the body of Mr. Martin and the survival suit had been recovered. They did not site any further debris during these searches.

At 11:35 A.M., another CG helo was launched and arrived on-scene at 12:00 P.M. to resume the shoreline search. During their search they located a PFD and a leather jacket on the beach between Gooseberry Neck and Slocum's Neck.

The CG helo departed the search area at 2:15 P.M. due to wind gusts in excess of 70 knots and forecasts of severe wind shear.

The HAMMERHEAD and the POINT FRANCIS continued their search efforts until they were released from the case at 4:00 P.M.

At 5:45 P.M., the search effort was suspended.

The water temperature reported from on-scene was 36 Degrees. LT Perrone testified that based on a figure from the Search and Rescue Manual called "Water Chill Without Antiexposure Suit", in the 36 degree Fahrenheit water, a person without a survival suit could survive 45 minutes to 2 ½ hours. The figure shows that a slim person would cool faster, and could only survive 45 minutes to 1½ hours. A person with a high body fat content could survive up to 2½ hours in the 36-degree water.

LT Perrone further testified that the Search and Rescue Manual specifies that a person with a survival suit properly and completely donned could survive 2 to 10 times longer than the amount of time specified on the "Water Chill Without Anti-exposure Suit" figure. And, that a person with a survival suit partially on or improperly donned would have the same survival time as a person without a survival suit due to the fact that water would still wash into the suit and the person's body would still be exposed to the cold water.

The search for survivors from the F/V CAPE FEAR covered approximately 180 square miles, not including the distances covered by the trackline searches conducted.

The probability of detection of crewmembers from the CAPE FEAR, based on the area searched and the conditions, was 68%. The Search and Rescue manual reference 78% as the goal for probability of detection. According to the Operations Officer from Group Woods Hole, 68% represents the minimum probability of detection, and does not include the searches conducted by the fishing vessels that were in the area and the trackline searches conducted by Coast Guard assets. LT Perrone testified that the poor weather conditions substantially reduced the probability of detection.

## DRUG TESTING

F/V MISTY DAWN took the survivors from F/V CAPE FEAR to the dock at Sea Watch International, New Bedford, MA. Crewmembers from the MISTY DAWN testified that they did not observe any evidence of drugs or alcohol behavior with the survivors from the CAPE FEAR. Two ambulances, medical personnel, and firemen met the MISTY DAWN when they arrived at the dock.

Warren Alexander, the owner of the F/V CAPE FEAR, and Tom Becica, the vessel's port engineer, were on the pier when F/V MISTY DAWN returned to port. Both men boarded the vessel at the dock.

Warren Alexander met with the three survivors. The only discussions he recalled having with the survivors were regarding their physical / medical conditions. He briefly asked Captain Novack what had happened, and the Captain said he did not know why the boat sank.

Mr. Alexander testified he was aware of chemical and alcohol testing requirements after a serious marine incident. He testified he was aware of this requirement from a previous incident aboard

one of his fishing vessels (JOHN N) that involved drug testing after a crewmember had died aboard that vessel.

The survivors were transported by ambulance to the St. Luke's Hospital, New Bedford, MA, where all three survivors were admitted on 8 January 1999, between 11:30 and 11:50 P.M. Mr. Alexander also went to the hospital.

After leaving the hospital, Mr. Lemieux, Captain Novack, and Mr. Haley were driven to Mr. Lemieux's house by Attorney Bob Collins (representing CAPE FEAR, INC.).

Captain Novack provided a urine sample at 11:20 A.M. on 9 January 1999 at the Metromedic Walk-In Medical Center, New Bedford, MA. The sample was shipped to Labcorp of Raritan, NJ for analysis and was determined to be [REDACTED]

On 13 January 1999, Mr. Novack was interviewed by the Medical Review Officer, Dr. Charles Lipson. Mr. Novack concurred that he had cocaine, but stated that he had used the cocaine in the interval between arriving on shore and coming to Metromedic for his urine test.

Captain Novack was aware that after certain Marine Casualties, the Coast Guard requires drug testing. He did not know what type of casualties required testing. He testified, "I am semi aware of it." Captain Novack was asked if he was aware that the employer and the person in charge after a post casualty are to have chemical testing done as soon as practicable. He replied, "I heard maybe you were supposed to anyhow. Yes, sir." Captain Novack asserted his Fifth Amendment rights when asked if any crew on F/V CAPE FEAR used drugs or alcohol on 8 January 1999.

James Haley provided a urine sample at 11:30 A.M. on 9 January 1999 at the Metromedic Walk-In Medical Center, New Bedford, MA. The sample was shipped to Labcorp of Raritan, NJ for analysis and determined to be [REDACTED]

On 18 January 1999, Mr. Haley was contacted by the Medical Review Officer, Dr. Charles Lipson. Mr. Haley stated that he could not make it to New Bedford for the interview. He stated that there was nothing he could add that would make a difference for his hearing.

During his testimony, James Haley did not answer when asked if he used any drugs or alcohol on CAPE FEAR on the 8th of January, due to the objections of counsel. Mr. Haley asserted his Fifth Amendment rights when asked if he had used any drugs or alcohol after he went ashore on the 8<sup>th</sup> or 9<sup>th</sup> of January.

Joe Lemieux provided a urine sample at 11:45 A.M. on 9 January 1999 at the Metromedic Walk-In Medical Center, New Bedford, MA. The sample was shipped to Labcorp of Raritan, NJ for analysis and determined to be [REDACTED]

Mr. Lemieux stated that there was no discussion at the dock or at the hospital regarding drug testing. When asked if there was any use of drugs or alcohol at his house, he replied that they had a couple beers to calm (their) nerves. He did not answer the question regarding drug use, due to objections of counsel.

On 10 January 1999, an autopsy was performed on crewman Paul J. Martin, by the Office of the Chief Medical Examiner, Southeast Regional Office. The cause of death was ruled as hypothermia and drowning. His face had suffered multiple abrasions; however, there was no evidence trauma to the head. The manner of death was ruled as an accident. A toxicology screen of a blood sample revealed the presence of benzoylecgonine at 74 NG/ML, indicating the ingestion of cocaine prior to death. The reporting limit of benzoylecgonine is 20 NG/ML.

All crewmembers aboard the CAPE FEAR were aware of the prohibition of alcohol and drug use aboard the vessel. They had all signed a contract of employment that stated this in the contract and there was also a drug and alcohol prohibition sign that was posted aboard the CAPE FEAR.

**DESCRIPTION OF VESSEL:****BASIC INFORMATION**

♦ Name	CAPE FEAR
♦ Official Number	D655734
♦ Service	Fishery
♦ Document / State Number	None
♦ IMO Number	L8306266
♦ Call sign	WBQ2660
♦ Involved Party Number	IP94004848
♦ Gross Tons	188; 230 ITC
♦ Net Tons	127; 69 ITC
♦ Deadweight	310 tons (approximately
♦ Lightship tonnage	217.75 tons
♦ Maximum loaded tonnage	530 tons
♦ Length	105.1 ft (Regulation)
♦ Length Overall	112.8 ft
♦ Breadth	24.0 ft
♦ Depth	13.5 ft
♦ Built	1983
♦ Lengthened	1996
♦ Hull	Steel
♦ Owner	CAPE FEAR, Inc.
♦ Operator	CAPE FEAR, Inc.

## VESSEL TIMELINE

Year built	1983
Re-rigged as a stern clammer	1992
Converted to a Refrigerated Sea Water (RSW) clammer	1993
Bought by CAPE FEAR, INC	1994
Drydock in Point Pleasant, NJ	1994
Condition & Valuation Survey, Safety Decal Issued	1995
Drydock in Fairhaven, MA, vessel lengthened 21 ft	1996, Feb - Apr
Stability Manual completed	1996, April
Tonnage Modifications made	1996, July
Shaft broke	1996, August
CG Boardings, no violations	1997, 24 Jan
CG Boardings, no violations	1997, 30 Jan
Drydock in Fairhaven, MA, keel cooler repair	1997, Feb
Condition & Valuation Survey, Safety Decal Issued	1997, July
Soft Grounding near dock in Atlantic City	1999, Jan 2
Vessel sank with the loss of 2 lives	1999, Jan 8
Northeast Diving Service dove on F/V CAPE FEAR	1999, Jan 13
MA State Police dove on F/V CAPE FEAR	1999, Jan 20
Northeast Diving Service dove on F/V CAPE FEAR	1999, Jan 21
Northeast Diving Service dove on F/V CAPE FEAR	1999, Feb 11
Salvage Operations	1999, Jun -Aug
Towed to Sea Watch International dock	1999, Aug 15
Drydocked	1999, Nov 12
Sunk as fishery reef project off Long Island	2000, Mar 8

## GENERAL ARRANGEMENT

General Description: A 105 foot, steel hulled, Western Stern Clammer with pilothouse forward with a mast and outriggers and an "A" frame on the stern. A 21-foot mid-body section was added to the vessel in 1996.

General Arrangement Plan: Freshwater and hydraulic oil tanks and engine room were located in the bow. A berthing area and galley were located on the main deck up forward. The pilothouse was located on the 01 Deck, above the aft portion of the berthing area and the galley. In the mid-ships portion of the vessel, there were six clam tanks, 3 port and 3 starboard; with 6 voids outboard of them, 3 port and 3 starboard. There were also 4 fuel oil double bottom tanks, 2 port and 2 starboard; a hydraulic oil tank and 4 double bottom ballast tanks, 2 port and 2 starboard, aft of the fuel tanks. Located in the stern section of the vessel was a hydraulic room and 3 voids, port, center and starboard. Access to the hydraulic room was through a main deck doghouse located on the stern starboard side.

Pilothouse arrangement. The pilothouse has large windows facing forward and a large picture window on the aft bulkhead. The console is up forward and there are three tables / desks against the side and aft bulkheads.

Vessel diagrams. Many diagrams which were entered as exhibits had to be created from memory by the Port Engineer, Captain and Mate for the hearing because bilge, ballast, clam pump piping system and many more diagrams did not exist.

## HULL

The F/V CAPE FEAR was built in 1983 at James K. Walker, Marine, Inc. yard in Moss Point, Mississippi. CAPE FEAR, Inc. purchased the vessel on 22 February 1994. It is unknown who owned the vessel from 1983 to 1989. John Mead of the American Original Corporation owned the vessel from 1989 to 1991. Gifford Marine, Inc., purchased the vessel in 1991. Leroy Truex owned the vessel from December of 1992 until it was sold to CAPE FEAR, Inc.

A 21 foot mid-body for carriage of clams was constructed at Limberg Marine (Fairhaven, MA) in 1996, and towed on two barges to Fairhaven Shipyard (Fairhaven, MA). The CAPE FEAR was cut just aft of frame 30 and the new mid-body was attached to the bow and stern sections using approved welding procedures. Work was completed in April of 1996 and the vessel's new length overall became 112.8 feet. The project was completed by a joint venture between John Fitzgerald of Fitzgerald Marine Fabricators, and Sherman Smith. Work was done in accordance with plans and specifications drawn by St. Michael's Ship Design.

The F/V CAPE FEAR's new mid-body consisted of:

- two new clam tanks (number 2 clam tanks port and starboard) covered by hatch covers,
- with voids outboard of them, port and starboard;
- and 2 double bottom fuel tanks, 1 port and 1 starboard.

All of the above was constructed by Fitzgerald and Smith. The vessel's shaft and bilge, fuel, ballast and clam pump piping were also lengthened in the process.

Aft Voids. There were three voids (port, center and starboard) in the aftmost section of the CAPE FEAR. The only access to the voids was through an access plate in the hydraulic room which led to the center void. From the center void, the port and starboard voids could be entered through access plates.

Valves in the aft voids. There were one-inch ball valves on the bottom of each void tank, which emptied into the hydraulic room. The valves were normally open to drain any water that accumulated in the voids.

Vents in aft voids. The Mate testified that there were two vents on the main deck, one for the port void and one for the starboard void. There was no vent for the center void.

Aft void doublers. Before the boat was lengthened, the center aft void developed cracks below the waterline on several separate occasions. The exact cause of the cracks was not determined but several possible sources were considered including stress, being struck by the dredge, and cavitation of the propeller. Doubler plates were put on the hull at Fairhaven Shipyard in the location of the cracks. After the CAPE FEAR was lengthened, a kort nozzle was put around the propeller to reduce the vibration, and a larger doubler was welded in place over the fractures. The crew testified they have not experienced any leaking in the aft voids since the vessel was lengthened.

Freeing ports. The CAPE FEAR had nine freeing ports cut through the bulwarks along the port side main deck and eight freeing ports cut through the bulwarks along the starboard side main deck, starting just aft of the galley and continuing aft every 6 to 8 feet to the transom. The freeing ports were approximately 6 inches high by 2 feet long open holes that were at the main deck level. The starboard side had one less freeing port because the doghouse was located on the starboard side. The center of the transom was an open ramp for the dredge.

Doghouse. A doghouse served as the entrance to the hydraulic room (also referred to as stern room, chiller room, clam cage hold refrigeration room and auxiliary machinery space). The doghouse, located on the starboard side approximately 2 – 3 feet aft of the number 3, starboard clam tank hatch cover. The starboard side of the doghouse formed part of the bulwark of the vessel on the starboard side.

The doghouse had a watertight door with six individual dogs on it. Normally, just the top and middle dog on the side opposite the hinge were closed. The doghouse had 17 ½ inch coaming under the watertight door. The coaming for the door and the doghouse was in good condition, with no rust, holes or damage noted.

Soft Grounding. The CAPE FEAR grounded at low tide near the dock in Atlantic City on or about 2 January 1999. The propeller was pushed upward when the vessel hit bottom, and caused the shaft packing to leak. At the time, Doug Kelly, a deckhand who was filling in for the Mate repacked the stuffing box. The shaft packing was leaking and Doug Kelly was unable to tighten the packing enough to stop the leak. This incident was not reported to the Coast Guard.

The Mate, James Haley, repacked the shaft on 5 January 1999, after returning from vacation. The Mate said the leak was a trickle when the shaft was not turning and the vessel was not under a load. The Mate found that the packing gland was rusted, which had prevented the other person from being able to tighten up the gland more. The Mate pulled the bolts out, pulled the packing gland off, put a row of packing in it, beat the rust off the gland put the packing gland back in, greased it, and tightened the lock bolts. He could only fit one packing ring on the gland, and did not remove any of the old packing. This stopped the shaft packing from leaking.

## TONNAGE MODIFICATIONS

Tonnage Modifications: Tonnage modifications were made to the vessel in June / July of 1996, roughly 3 months after the vessel was lengthened and the Stability Manual was completed. Fitzgerald Marine Fabricators installed 24 tonnage bulkheads in the number 1 port and starboard double bottom fuel oil tanks and the number 3 and 4 port and starboard double bottom ballast tanks at every other frame. This was done in accordance with verbal instructions and hand-drawn

sketch provided by the naval architect, Dan Blachly. The hand-drawn sketch was not available during the investigation, and Mr. Fitzgerald testified that he had previously thrown it away.

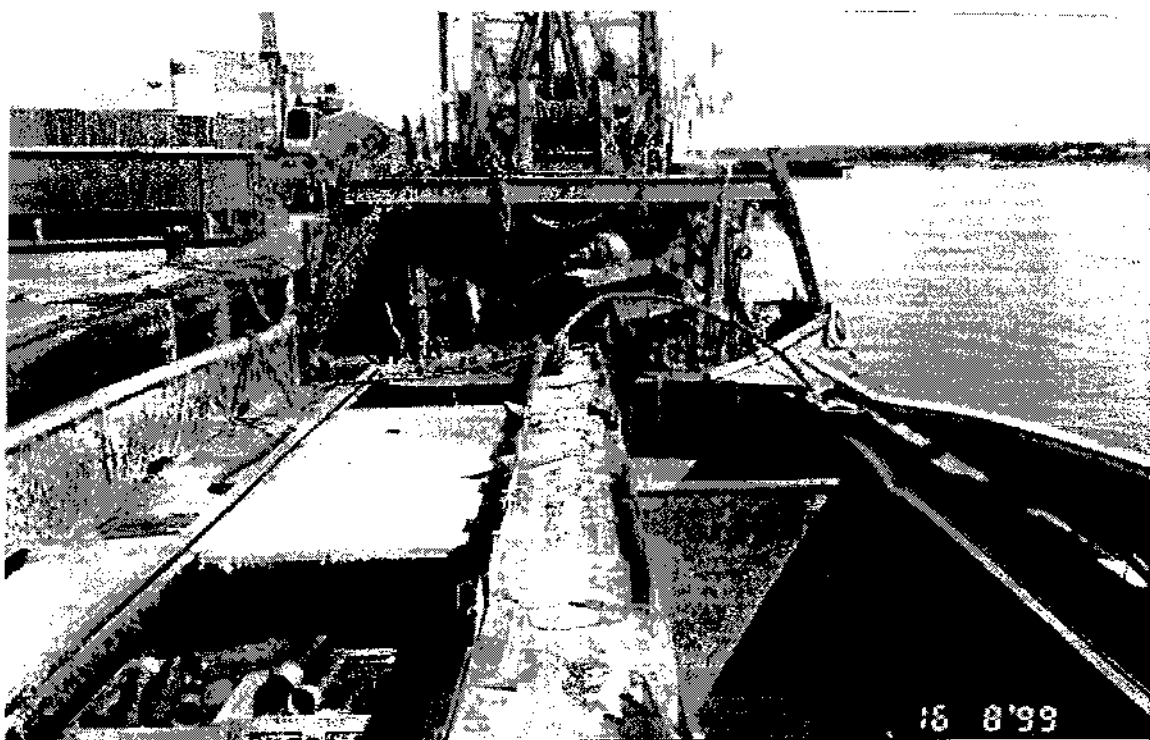
The tonnage modifications were made to keep the vessel under 200 GT.

The work was done at Sea Watch, International dock in New Bedford, MA.

Mr. Fitzgerald did not specifically recall installing the tonnage bulkheads in the fuel tanks. When shown a note in his handwriting referencing installing the tonnage bulkheads in the fuel tanks, he said that he must have done the work.

Mr. Fitzgerald testified that due to a time limit set by the Warren Alexander, he began making the modifications while the naval architect was conducting his tonnage analysis. The naval architect, Dan Blachly, later drafted plans for the Tonnage Modifications of the CAPE FEAR (undated), but the plans were not given to Fitzgerald Marine Fabricators. Those plans were modified by a letter dated 5 June 1996 which specified that holes would not be cut between the number 3 and 4 double bottom ballast tanks and wing voids as previously described on the modification plans. Fitzgerald Marine Fabricators did not cut the holes between these voids and double bottom ballast tanks.

#### CLAM TANK HATCH COVERS



F/V CAPE FEAR Clam Tanks & Hatch Covers on Main Deck facing Aft  
Photo Taken 16 August 1999

The clam tank hatch covers were made of steel. There were deck ribs running underneath the covers, which were not normally visible due to insulation that had been sprayed on the underside of the hatches to keep the clams cool. The forward and after edge of each hatch had a 3 inch steel lip on it.

The clam tank hatch covers slid on rails and were secured in place only by their weight and the tracks. There was no dogging method, and there were no gaskets or weather-stripping on the clam tank hatch covers.

The number 1 and the number 2 hatches ran on the same track, atop the hatch coaming. The number 3 hatch covers sat on a lower track in the hatch coaming. The hatch covers rested on the coaming via flat bar lip that was part of the hatch cover top plating. A teflon material was underneath this lip to facilitate the sliding action.

The forward and after edge of each hatch cover consisted of a 3 inch wide angle plating. The forward 3 inch edge of the number 1 hatches slid over a 2-3 inch angle inset (metal to metal contact) in the forward portion of the number 1 clam tank coaming when the number 1 hatches were fully closed. The after 3 inch edge of the number 1 and the forward 3 inch edge of the number 2 hatches butted against each other (metal to metal contact) when closed. The after 3 inch edge of the number 3 hatches slid over a 2-3 inch angle inset (metal to metal contact) in the after portion of the number 3 clam tank coaming when the hatches were fully closed.

The number 3 hatch covers ran on a lower track than the number number 1 and 2 hatch covers. When closed there was a  $\frac{3}{4}$  to 1  $\frac{1}{2}$ -inch vertical gap between the bottom of the number 2 hatch cover and the top of the number 3 hatch covers. The number 2 hatch covers overlapped the forward portion of the number 3 hatch covers by 2 to 4 inches.

The hatch covers were 18 feet long. The leading edge of the number 3 hatch covers, when closed, would sit directly above the transverse bulkhead separating the number 2 and 3 clam tanks. There was a 5  $\frac{1}{2}$ -inch vertical gap between the bottom of the number 3 hatch covers and the top of the transverse bulkhead separating these clam tanks.



F/V CAPE FEAR Number 1 & 2 Port Clam Tanks and Hatch Cover on lower track  
Shows vertical gap between transverse bulkhead and hatch cover on lower track.  
Photo taken 16 September 1999

The coaming on the clam tanks were 1 foot high.

Two 3 foot wide by 5 inches in depth sections had been cut out of the coaming located in the after portion of the number 3 port and starboard clam tanks. In those areas, the coaming that had been cut down was flush with the top of the number 3 hatch covers.



Coaming cutout in the after portion of number 3 port & starboard clam tanks  
Photo taken 16 September 1999

Additionally, there were some 1 inch wide by cut outs in the coaming on the port and starboard side that were flush with the top of the number 3 hatch covers.

To load the number 1 clam tanks, the number 1 hatches were slid aft over the number 2 clam tanks and the number 2 hatches were slid aft over the number 3 hatch covers using a block and tackle along with a winch.

Next, to load the number 2 clam tanks the number 1 hatch covers were pulled forward.

Then, to load the number 3 clam tanks the number 2 and the number 3 hatch covers were pulled forward over the number 2 clam tanks, with the number 3 hatch covers sliding underneath the number 2 hatch covers.

#### CLAM LOADING

The F/V CAPE FEAR was carrying a total of 130 cages full of ocean quahogs (clams) at the time of the casualty. Fifteen cages in each of 6 clam tanks and 40 cages on the main deck. Of the 40 cages on deck, 24 were at the waist (12 along the port rail and 12 along the starboard rail), and a total of 16 were located on top of the number 1 and number 2 clam tank hatch covers.

Clam tanks were never intentionally flooded, and were systematically pumped as the cages in the tanks were loaded with clams.

The clam cages on deck were between the bulwarks and the hatch coaming, which kept them in place. They were not tied down.

Ocean quahogs on the average weigh approximately 90 pounds per bushel.

Each empty clam cage weighs approximately 400 pounds.

Per 50 CFR 648, a standard cage measures 3' by 4' by 5', and holds 32 bushels of clams. The volume of each cage is 1.88 cubic feet (50 CFR 652.2). The cages carried aboard the CAPE FEAR were standard cages.

Each clam cage full of 32 bushels of ocean quahogs including the weight of the cage based upon the volume of the cage and the average weight of the ocean quahogs weighs approximately 3280 pounds.

The estimated total weight of a cage full of ocean quahogs including the weight of the cage referenced by Captain Novack in testimony and by John Koopman, the Naval Architect, in the Stability Manual was 3400 pounds.

Cages were "rounded up," when filled at sea to account for settling and ensure that the cage was full at least to the top when the vessel arrived at the Sea Watch, International dock.

Captain Novack testified that they always "rounded up" the clam cages, including the 7 - 8 January voyage. He said that by the time they got to the dock, "A lot of them will be even, some of them will be slack by the time they get to that point. Some of them might have just a little bit above the rim of the cage." He further stated that if the cages were not overfilled at sea, by the time they returned to the dock the clams in the cages would settle to 6 inches below full, which was not considered a full cage. The Captain estimated that normally, after all of the cages were offloaded, there were enough clams, sand and shells remaining loose in the clam tanks to fill a 55-gallon drum.

The Mate, Mr. Haley, said that while they were at sea, the clams were routinely piled on the cages 1 to 1 ½ feet over the top of the cage, until the clams started to fall off the cage. With the effects of settling, Mr. Haley estimated that the clams were normally piled at least six inches above the top of the cages by the time the CAPE FEAR moored. When the cages were offloaded at the dock, Mr. Haley said the clams would spill all over the dock and the boat, and that the crew would shovel them back on the cages.

The Captain and the Mate testified that the owner, Mr. Alexander, personally told them to round up or overfill the clam cages.

The owner had testified that he had told his captains that he did not want slack cages "because the plants are paying for 32 bushels and that's what they are entitled to." When asked if he ever told any of his masters to load the clam cages up above the clam cage top to allow for settling, the owner replied, "No, sir. All I ever request is that there is not slack cages. We get paid no more for extra."

The deckhand, Mr. Lemieux, explained that each cage was topped off by shovel, but did not elaborate.

The stability manual was computed based on the assumption that the CAPE FEAR would carry 120 cages, but did not clearly state that no more than x number of cages could be carried onboard.

With the owner's knowledge and consent, Captain Novack decided approximately a year before the casualty to carry 130 cages. After the vessel was lengthened, he gradually increased the number of cages from 115 to 130.

Captain Novack testified that he had carried 130 cages full of clams in rougher weather in the past, and "everything seemed fine, just except for the waves breaking over, breaking over the side of the boat, on the decks or whatnot, just washing off the stern."

#### TANK LOADING

The following tank loading (organized bow to stern and port to starboard) represents the approximate liquid loading of each tank just prior to the F/V CAPE FEAR sinking on 8 January 1999, and accounts for the fuel and water consumed during the trip:

Forepeak Fresh Water tank	Full less 200 gallons
Hydraulic Oil tank (forward)	$\frac{3}{4}$ Full
Port Double Bottom Fuel Oil #1	Full less 600 – 700 gallons
Starboard Double Bottom Fuel Oil #1	Full less 600 – 700 gallons
Port Double Bottom Fuel Oil #2	Full
Starboard Double Bottom Fuel Oil #2	Full
Hydraulic Oil tank (Port side frame O)	$\frac{3}{4}$ to $\frac{7}{8}$ Full
Port Double Bottom Ballast #1	Full
Starboard Double Bottom Ballast #1	Full
Port Double Bottom Ballast #2	Empty
Starboard Double Bottom Ballast #2	$\frac{1}{3}$ to $\frac{1}{2}$ Full
Aft three ballast tanks	Empty (treated as voids)

#### WATERTIGHT SUBDIVISION

Watertight Bulkheads. The CAPE FEAR has 5 watertight bulkheads. They were located as follows:

- aft of the forepeak fresh water tank
- forward and aft of the engine room
- forward and aft of the hydraulic room

#### BILGE AND BALLAST SYSTEM

The CAPE FEAR had no fixed ballast.

The bilge and ballast system consists of two 220 V Electric motors with pumps and a manifold located on the starboard side of the aft bulkhead of the engine room and associated piping going to various spaces. The manifold can be used to take a suction or fill the four double bottom ballast tanks, and to take a suction in the bilges located in the hydraulic room, the shaft alley and the forward and aft sections of the engine room. There are two stop/start boxes in the engine room that are used for the bilge and ballast motors.

A 2 inch gate sea chest valve was located in the engine room, half way between the centerline and the starboard side.

The overboard discharge for these pumps was located just outboard of the pumps, exiting the hull in the vicinity of the starboard aft section of the engine room. The discharge piping also "T's" off and runs through the shaft alley so it can be used to ballast the four double bottom ballast tanks.

A 110-volt automatic electric pump with a float pressure switch was located in the shaft alley. The discharge pipe ran forward from this pump, through the shaft alley, and across the starboard side of the aft portion of the engine room, where it exited the hull. There was a check valve in the discharge pipe.

Another 110-volt automatic electric pump was located in the forward portion of the hydraulic room.

**Refrigerated Sea Water Pumps.** Little Giant automatic electric pumps with float switches were located in each clam tank and were mainly used in the summer months to pump out water sprayed on the clams to keep them cool by the refrigerated sea water system. The pumps (total of 6) were just outboard of each clam tank near the aft bulkheads. The discharge was piped directly overboard through the wing voids. Each discharge line (1 ½ inch pipe) had a check valve in it. With a full load of clams, the discharge was below the waterline in some seas.

The Little Giant pumps were normally energized (power supplied to them), and were energized during the 7 – 8 January 1999 trip. The Little Giant pump in the number 3 starboard clam tank was inoperable due to an electrical problem during the 7 – 8 January trip.

**Bilge Level Alarms.** A low level bilge alarm in hydraulic room located at the center line in the bilge activates an audible and light signal in the pilothouse. A low level and a high level bilge alarm located approximately 2/3 aft in the shaft alley, activates one visual and one audible signal respectively in the pilothouse. There is also a low level alarm located at the aft portion of the engine room which activates an audible and visual light signal in the pilot house. All of these audible and visual alarm signals are located on the console in the pilothouse.

The Mate tested the bilge alarms 1 week before the CAPE FEAR sank, and found that the low level alarm in the engine room did not work. All of the other bilge alarms worked. He reported the problem with the low level alarm in the engine room to the shore-side engineer, but it was not fixed prior to the casualty.

There were no bilge water alarms in the clam tanks.

## CLAM PUMP SYSTEM

**Clam Pump System.** The CAPE FEAR had a Venturi or siphoning system, the manifold of which was located on the port stern section of the main deck, just aft of the number 3 port clam tank hatch. The siphoning system ran off of the dredge pump piping. The spaces that could be pumped using this system were the engine room and each of the six clam tanks. To pump a space, a crewman would open the overboard discharge valve, the suction valve, and the valve for the space they were to pump.

The clam pump, the pump engine and its 14 inch gate sea chest valve were located in the port section of the engine room. The clam pump's capacity was approximately 6000 gallons per minute.

The 10-inch clam pump piping ran aft from the engine room through the wing voids on the port side to the hydraulic room. In the hydraulic room, the 10-inch pipe turned up through the overhead to the main deck then aft to the dredge. A branch line came off of the clam pump piping in the hydraulic room which went up through the main deck to the manifold. A portion of this line was also below decks in the hydraulic room which was part of the venturi system. Some of the piping from the manifold that leads to the clam tanks and engine room was also in the hydraulic room. The overboard discharge for this system exited the hull, port side, at the forward portion of the hydraulic room.

The manifold was used to take a suction on the six clam tanks and the engine room. The engine room suction piping had a check valve to prevent the space from being flooded. This system could also be used to flood the clam tanks by opening a fill valve and a clam tank valve at the manifold, but testimony indicated that the flooding function was only used quickly to backflush and clear any debris from the rose box and clam pump piping.

The engine room valve at the deck manifold was a three-inch butterfly valve, and the rest of the valves on the manifold were four inch butterfly valves.

**Labeling.** The valves on the deck manifold were labeled with hand painted (not stenciled) abbreviations in white paint representing the space or function, i.e. "PC" represented the suction valve for the port center clam tank, and "SUC" represented the Suction valve.

The discharge piping for the clam pump system supplied water to the dredge through the 8 inch clam hose while clamming. An air ram valve located in the 10 inch clam piping on deck at the stern was used to isolate or allow water to the 8 inch clam hose for the dredge.

When a clam tank was completely pumped dry using this system, foam and air bubbles shot 20 to 30 feet out from the overboard discharge and made a hissing sound. When water was being pumped out of a clam tank, the overboard discharge shot out 3 to 5 feet and made a gargling sound. If the suction piping leading to a tank was clogged, the overboard discharge sputters out 1 to 2 feet and also made a gargling sound.

#### MACHINERY INSTALLATION

**Main Engine.** Diesel engine, model Caterpillar 3412, provided 725 horsepower to the single 4-inch stainless steel shaft and bronze propeller. The engine was rebuilt in 1993; the original year built is unknown.

**Clam Pump Engine.** A 740 horsepower Detroit 12V92TA engine, which was rebuilt in 1997, powered a 6000 gallon per minute Fairbanks Clam Pump. A hydraulic pump on the engine front powered the capstan, outriggers, conveyor belts and the shaker.

**Hydraulic Engine.** A Cummins LTA10-270 Hydraulic Pump Engine with power take off and twin hydraulic pumps. This hydraulic motor located in the hydraulic room was used to haul the dredge and the "Y" which guides the dredge into the ramp on the stern.

All engines were keel cooled.

Belt driven Air Compressor with 3 large Air Receivers (American Society Mechanical Engineers / 200 PSI Maximum Allowable Working Pressure) and 2 Air Compressors.

**Ventilation.** Power Exhaust system using one 220 VAC Pacer SW Circulating Pump and two Plate and Frame Heat Exchangers.

**Refrigerated Seawater System (RSW).** The RSW system on the CAPE FEAR consists of circulating seawater over a plate freezer to nozzles in the clam tanks. The RSW machinery is located in the hydraulic room. To cool the clam tanks, the RSW nozzles would spray refrigerated seawater over the clams stored in cages in the clam tanks. When the refrigerated seawater gets to a predetermined level in the clam tanks it is pumped overboard by the Little Giant pumps located in each clam tank or by use of the clam pump siphoning system.

**Hydraulic Steering System.**

**Rudder Post.** The rudder post entered the vessel through the hydraulic room. The CAPE FEAR experienced leaking through the rudder post when the vessel was in a loaded condition in the

past. The rudder post had recently been repacked and greased by the Mate. The Mate said he constantly had to repack the rudder post, and that the low-level bilge alarm in the hydraulic room would alert him of the problem when there was only a gallon of water in the hydraulic room bilges. Testimony indicates it did not leak after it was repacked and the crew did not experience any problems with the rudder post leaking on the 7 – 8 January 1999 trip.

#### ELECTRICAL SYSTEM:

The electrical system for F/V CAPE FEAR as described below was detailed in the Condition and Valuation Survey Report, dated 3 Jul 97, conducted by Stephen Sperlak, Marine Surveyor. The survey described the condition of the electrical system on board as being good.

##### Auxiliary Generators:

Detroit Diesel 3-71, 30 KW 110/220 VAC (Rebuilt 1992)

Detroit Diesel 3-71, 55 KW 110/220 VAC

Type of attached generators: Alternator, used just to charge batteries

Voltage: 12 volts DC

##### Battery System:

Four heavy duty batteries (Main Engine, Hydraulic Pump Engine, Clam Pump Engine, and Lighting); engine start (by the looks of it—engine is battery start?)

One 12 volt heavy duty battery (Electronics); and

Two 12 volt heavy duty battery (Generator)

Battery Charger: Lamarche Constavolts

Electrical Controls: Master switch panels located in the Pilothouse and Engine Room. Overload protection for the circuits was provided through the use of fuses and circuit breakers at the switch panels.

#### ELECTRONIC SYSTEM

The electronics system for F/V CAPE FEAR was described in the Condition and Valuation Survey Report, dated 3 Jul 97, conducted by Stephen Sperlak, Marine Surveyor. The survey provided a list of electronics equipment on board, including:

##### Navigation Equipment:

- ◆ Furuno 1941 Mark 2 Radar,
- ◆ Furuno FR8100D Radar,
- ◆ Raytheon 3604 Radar,
- ◆ Two (2) Northstar 6000 Loran C receivers,
- ◆ EPSCO C-plot 2 Loran C Plotter,
- ◆ Furuno GD180 Color Video Plotter,
- ◆ Furuno FCV 601 Color Video Sounder

##### Communications Equipment:

- ◆ Stephens Sea 222 Radio,
- ◆ Uniden PC33 CB Radio,
- ◆ Cybernet CTX 1000 Loud Hailer,
- ◆ Two (2) Motorola Triton II C VHF Radios,
- ◆ Motorola Nautilus Cellular Telephone

#### Vessel Control:

- ◆ Wood Freeman Rudder Angle Indicator,
- ◆ Wood Freeman 500 Auto Pilot

Gauges: Dytek Sea Water Temp Indicator Model 2000

#### GEAR TYPE

Winches. CAPE FEAR had several winches including: (1) Staffa Hydraulic Haul Back Winch (for the dredge); (2) 2-Bloom Hydraulic Outrigger Winches; (3) 1-Hydraulic Gypsy Head Winch for the Clam Hose and Hatch Covers.

Dredge. 120 inch Clam Dredge which was housed in a steel dredge frame.

Miscellaneous Gear. Steel Box Beam Mast. Twin outriggers. Hopper. Sorter (shaker) conveyor, chutes, 8 inch clam hose, "A" frame.

#### RIG TYPE

Western Stern Clammer.

#### MISCELLANEOUS

Cameras. One camera was located in the hydraulic room ceiling midway between the centerline and the port bulkhead, and continuously monitored the entire starboard portion of the hydraulic room and a portion of the port side. The RSW machinery, a refrigeration unit, and the bottom step of the ladder from the doghouse could be seen on a television monitor in the pilothouse.

Another camera, located just starboard of the centerline in the engine room, near the forward bulkhead, monitored the engine room and the first 3 to 4 feet of the shaft alley (the watertight door was routinely left open). This camera's image could be viewed on a separate television monitor in the pilothouse.

Both cameras presented a continuous fixed view of the spaces on the monitors. Both cameras and monitors were operational. Neither camera produced a recording or a tape.

#### DETAILS OF VESSEL SURVEYS AND REPAIRS

##### Date/Place/Results of Coast Guard boardings at sea:

On 30 January 1997, F/V CAPE FEAR was boarded by USCG STA Menemsha and Massachusetts Marine Environmental Police, 18 NM south of Noman's Land Island. No violations were noted.

On 24 January 1997, F/V CAPE FEAR was boarded by USCGC JEFFERSON ISLAND 10 NM south of Martha's Vineyard, with no violations noted.

##### Date/Place/Results of Dockside Exams and Insurance Surveys:

In 1995 and 1997, voluntary dockside commercial fishing vessel safety exams were conducted during the Condition and Valuation Surveys by Stephen Sperlak, a Marine Surveyor who was

qualified by the National Association of Marine Surveyors to conduct third party commercial fishing vessel safety exams. Commercial Fishing Vessel Safety Decals were issued during both exams. It is unclear whether the vessel's insurance company, Flagship Group, LTD, requested or required the safety decal for the CAPE FEAR.

Mr. Stephen Sperlak conducted a Condition and Valuation Survey at Fairhaven Shipyard, Fairhaven, MA, at the request of the insurance company, Flagship Group, LTD, Norfolk, VA on 28 July 1995. The survey revealed unspecified minor deficiencies, which were corrected during the course of the survey. The overall material condition of the vessel was described as good and the vessel appeared fit for route and service intended. In addition to the survey, a Commercial Fishing Vessel Safety decal was issued.

Mr. Sperlak conducted a Condition and Valuation Survey at Fairhaven Shipyard, Fairhaven, MA, at the request of Flagship Group, LTD, Norfolk, VA on 3 July 1997. The owner, Warren Alexander, and the port engineer, Tom Becica, were present. No other crew members were on board at the time. The surveyor did not recall testing the bilge alarm system. The surveyor did not test the bilge pumps. The surveyor did not enter the clam tanks. The surveyor did not recall how many survival suits were inspected but recalled that the lights worked on the ones that were looked at. The surveyor witnessed Tom Becica exercising some of the zippers on the survival suits, and did not recall if there were any problems with the zippers. But said that any problems would have been corrected on the spot with wax. The surveyor did not conduct any drills on CAPE FEAR, but checked that the proper information was posted. The survey revealed unspecified minor deficiencies, which were corrected during the course of the survey. The overall material condition of the vessel was described as good and the vessel appeared fit for route and service intended. In addition to the survey, a Commercial Fishing Vessel Safety decal was issued.

Date/Place/Results of Drydock/yard period:

Mr. Stephen Sperlak conducted a dry dock survey in 1994 at Todd's Railway, Point Pleasant, New Jersey. The surveyor did not recall what work was done to the vessel in the yard or if any problems were revealed by the examination. The surveyor did not recall entering any void spaces, ballast tanks, or the forepeak. The surveyor did not conduct any examination of the bilge, ballast, or clam pump systems.

Mr. Sperlak did not recall exactly what was done during the 1994 drydock survey, and his report was not made available to the investigator. Mr. Sperlak did say, "I usually start at the bow and go around to one side and across the stern and up the other side. I am looking into the sea chest, intakes, struts, skegs, chutes, propellers, shaft, cutlass bearings, rudders, bearings, the hull in particular, if there is any fractures or whatever, and when that's all completed, I go aboard and go down in the bilges to check the through hulls to see if they are operational, and usually while I am on the vessel, my eyes will wander around. I have been a marine inspector, I keep looking for everything else. If I see something that I think needs to be taken care of, I report that, too." Mr. Sperlak said these procedures were followed during the 1994 drydock survey.

F/V CAPE FEAR was dry docked in 1996, when the vessel was lengthed with a new midsection. The ballast tanks were cleaned and inspected, and were in good condition according to Mr. Becica. The rudderpost and rudder were removed, and new bearings and a stuffing box were fabricated and installed. The packing gland for the main shaft was repaired.

While the CAPE FEAR'S new midsection was in place and being welded on at Fairhaven Shipyard, Steven Sperlak, who was at the shipyard on other business, walked through the CAPE FEAR and talked with the owner about the lengthening. Mr. Sperlak was later asked by the CAPE FEAR'S owner to report the new value of the CAPE FEAR to the insurance company. In his letter to Flagship Group, LTD, the insurance company, he briefly described the process of installing the new midsection, that he had visited the vessel the previous month, and included

calculations regarding the vessel's new fair market and replacement values. He was not requested to conduct a complete survey by the owner or the insurance company.

Mr. Becica, port engineer, stated that the vessel was dry docked in February 1997 at D. N. Kelly & Son, Fairhaven, MA. Rough weather had damaged the keel cooler so the vessel was hauled out for repairs. The keel cooler, located on the port side forward, provides cooling for the main engine. The tubes, which fit into brass sockets at each end of the keel cooler, pulled out during rough weather. Mr. Becica stated that damage to the keel coolers did not and could not result in any flooding to the vessel. The vessel also had some engine work done. No marine surveyors conducted surveys during this dry dock period.

F/V CAPE FEAR has never had a hull gauging as far as Mr. Becica is aware.

#### Condition of Valves:

The CAPE FEAR has 3 sea chest valves. One in the engine room for the clam pump, one in the engine room for the bilge and ballast sea chest, and one in the hydraulic room for the RSW system. Mr. Becica, Port Engineer, stated that the sea valves were not pulled for routine inspection or during dry dock periods. They were only pulled when there was a problem. He believed there was a problem with the handle on the sea valve in the hydraulic engine room, but the valve was operable.

#### Post Casualty Dive Survey/13 Jan 99

On 13 January 1999, a team from Northeast Diving Services, Inc. of Newport, RI conducted a dive on F/V CAPE FEAR in position LAT: 41.23.384N and LONG: 71.01.575 W, at the request of Marine Safety Consultants, Inc. (a company hired by the owner of the CAPE FEAR). The members of the dive team were Ms. Eva Cook, President, Northeast Diving Services; Mr. John Babbitt; and Mr. W. Delmonico.

The dive was monitored on-scene by an MSO Providence Representative.

The original objectives of the dive were to plug the fuel vents along the port and starboard rail, and then to perform an initial assessment of the CAPE FEAR's hull and manifold system. These objectives were not accomplished due to the sea conditions.

No photographs or video were taken of the vessel during this dive.

The dive team found the three-inch diameter clam dredge towline from CAPE FEAR floating at the surface, and a marker buoy was secured to it.

Underwater visibility was 1 to 2 feet. Sea conditions were observed to be 5 to 8 feet. Winds were reported at 20 knots, with higher gusts.

The diver determined that the vessel was resting on its port side, with the A-frame supporting the vessel, and preventing it from rolling over.

A bottom depth of 78 feet was recorded on the diver's digital depth gauge.

Only one diver dove, and he was down for 20 minutes. The diver reported that CAPE FEAR rocked on the bottom because of surge created by wind and current. He also reported that the 8-10 inch clam hose was partially buoyant, moving with the surge in an unpredictable fashion on the starboard rail. (Note: During a later dive (conducted on 21 Jan 99), it was determined that it was the fendering system moving, not the clam hose.) These unfavorable dive conditions prevented further survey of CAPE FEAR on 13 Jan 99.

#### Post Casualty Dive Survey/20 Jan 99

On 20 January 1999, a team from the Massachusetts State Police conducted a dive on F/V CAPE FEAR in position LAT: 41.23.384N and LONG: 71.01.575 W. The purpose of the dive was to take a cursory look at the vessel with the possibility of future dives.

The dive was monitored on-scene by an MSO Providence Representative.

The team reported four feet of underwater visibility and no photographs or video were taken of the vessel during this dive.

The dive lasted 18 minutes. Divers checked the wheelhouse from the outside, observing that the windows were blown out on the starboard side. They noted an orange PFD secured to the starboard rail.

#### Post Casualty Dive Survey/21 Jan 99

On 21 January 1999, Eva Cook and John Babbitt from Northeast Diving Services, Inc. of Newport, RI, conducted a dive on F/V CAPE FEAR in position LAT: 41.23.384N and LONG: 71.01.575 W. Northeast Diving Services was again contracted by Marine Safety Consultants, Inc. to perform dives on the CAPE FEAR. The objectives of the dive were to plug the accessible fuel vents along the port and starboard rails, and to perform an initial assessment of the CAPE FEAR'S hull and clam pump manifold system.

The dive was monitored on-scene by an MSO Providence Representative.

The team plugged accessible fuel vents.

Divers surveyed the condition and attitude of the hull, but did not conduct a video survey due to bottom time limits and a failed camera battery. No photographs were taken of the vessel during this dive.

The vessel was lying on the bottom at a 90-100 degree list on its port side. The port side of the CAPE FEAR could not be viewed because it was buried approximately 5 feet in the sand.

The watertight door in the doghouse that leads to the hydraulic room on the starboard side at the aft end of the vessel was shut. The lead diver did not see if the dogs were secured, but the lead diver pulled on the door and it did not open.

The portion of the hull that could be observed appeared to be intact. All keel coolers that were viewed were intact.

There were 3-4 foot long longitudinal scrapes on the base of the keel, mostly in the mid-body area. The divers observed no structural damage to the hull.

The divers observed no wastage, fractures, or holes in the main deck of the CAPE FEAR. The divers observed no holes or fractures in the transom. No line was in the propeller and no debris on the shaft. There were no problems with the rudder blade or stock. Spacing between the propeller blades and kort nozzle appeared even. The A-frame was intact. The clam dredge was not in the chute. The shaker was off its mount and jammed in the rigging. Divers did not see any starboard side hatch covers in place, but, due to limited visibility, they could not determine if any of the hatch covers were still on the vessel. The lead diver reported that it appeared as though a couple of the starboard side hatch covers were missing. One hatch cover was observed in the sand within 10 to 15 feet of the vessel. The lead diver was not exactly sure which hatch covers were missing. The divers were unable to view any of the hatch covers on the port side. The main engine room door was tied open. All windows in the pilothouse were broken, and the wheelhouse

was buckled slightly to starboard. The port side railing on the upper superstructure around the deck and around the bow of the CAPE FEAR was bent and mangled. One of the divers did a half body penetration in to the wheelhouse and engine room, which produced no sign of the missing person, Steven Reeves. The starboard outrigger was in an upright position on the vessel; that is, lying parallel with the seabed, as the vessel was resting on its port side. The divers did not see an EPIRB. On the clam pump manifold, the lead diver stated that four valves appeared closed and one appeared open, but the lead diver could not identify the valves. There were labels painted on the manifold. However, the manifold was in a very difficult area to access because the shaker and other objects were suspended over the manifold. The divers did not see the vessel's life raft.

#### Post Casualty Dive Survey/11 Feb 99

On 11 Feb 1999, Eva Cook and John Babbitt from Northeast Diving Services, Inc. of Newport, RI, conducted a dive on F/V CAPE FEAR in position LAT: 41.23.384N and LONG: 71.01.575 W. Northeast Diving Services was again contracted by Marine Safety Consultants, Inc to perform dives on the CAPE FEAR. The objectives of the dive were to (1) locate the EPIRB; (2) gain access to the manifold system at the port stern area and document the position of the butterfly valves; and (3) videotape and photograph the vessel.

The dive was monitored on-scene by an MSO Providence Representative.

Underwater visibility was observed to be 5 to 10 feet. Divers reported that seas were 1 to 2 feet, with a west, southwest wind of 10 to 15 knots. Minimum bottom current was present.

The vessel was photographed and video was taken. The vessel was resting in the same position as on previous dives.

The watertight door to the galley was in the open position. The EPIRB was located in the galley, attached to its tether. The switch was in the "Automatic/on" position. The lens covering the strobe light on top of the EPIRB was missing. The EPIRB was retrieved and turned over to the Coast Guard. The lead diver found the EPIRB bracket and "saw the piece of twine (painter) going down towards the galley area." The lead diver did not see the detail of where the painter was attached to the bracket, and was unsure if it was tied to or tangled around the bracket. It was difficult to tell whether the galley door (which was in the opened position) was tied off or not because of the many hoses, hydraulic hoses, and debris in the area. The engine room door was still in the open position. The hydraulic room's watertight door, previously closed, was now open approximately 6 inches. The starboard side 18-inch pin that secures the clam dredge in place was intact and inside its rack, tethered to the rack. The diver could not tell if there was another pin on the port side, because that area of the vessel was buried in the seabed. The clam dredge was upside down approximately 50 feet astern of CAPE FEAR and wrapped in the clam hose. The number 3 port and starboard hatch covers were present. To starboard, a space of approximately 3 inches between the aft end of the hatch and the coaming was observed. The diver observed the port hatch in place from a distance, and did not know if it was open or closed. The following survival gear was observed: (a) An orange life ring located inside the bulwarks next to the galley door on the starboard side, (b) An orange life ring located inside the starboard side bulwarks adjacent to the stern rigging, (c) One survival suit in its bag and at least two PFD's located in the galley. Manhole access plates into the number 3 starboard void tanks, were in place in the starboard main deck, next to the clam tanks.

Video and still photographs of the clam pump manifold system were taken. The valves were labeled with hand painted letters.

After viewing the dive photographs & videotape, the Investigating Officer and the Parties in Interest stipulated that the valves on the manifold were in the following positions described below.

The following valve handles were in an open position:

- Overboard discharge valve
- Port aft (number 3) clam tank valve
- Venturi suction valve

The following valve handles were in a closed position:

- Fill valve
- Port center (number 2) clam tank valve (handle not completely in the horizontal closed position, but was only about 5 to 10 degrees below horizontal)
- Port forward (number 1) clam tank valve
- Starboard aft (number 3) clam tank valve
- Starboard center (number 2) clam tank valve
- Starboard forward (number 1) clam tank valve
- Engine room valve

#### Other Dives

Between January and December of 1999, several other dives were conducted on the CAPE FEAR. In July 1999, the M/V SEEKER, a subchapter "T" vessel specializing in scuba diving expeditions, brought recreational divers to the wreck of the CAPE FEAR. A statement from the Captain of the SEEKER and a video shot during the dive were obtained. In December 1999, the investigating officer learned that John Babbitt, a friend of Mr. Warren Alexander and a professional diver employed by Northeast Diving Services, made several dives on the F/V CAPE FEAR. In statements from each of the groups who dove on the CAPE FEAR, the people involved stated that they did not disturb anything on the CAPE FEAR. All statements regarding these dives were entered on the record as exhibits. At the time these other dives occurred they were unknown to the Coast Guard.

#### Oil Pollution

The CAPE FEAR had a total of 20,000 gallons of diesel fuel and 2,500 gallons of lube oil onboard when it sank on 8 January 1999. After the CAPE FEAR sank, a strong odor of diesel fuel oil was observed in the area of the sinking by the survivors and Coast Guard rescue personnel. On 9 and 10 January 1999, an oil sheen was observed during helicopter overflights in the sinking location. The oil sheen dissipated, and did not make landfall.

On 21 January, divers plugged the starboard fuel vents, but were unable to access the port fuel vents. Throughout the course of the salvage, 2,100 gallons of diesel oil were recovered and cleaned from the vessel (2,050 gallons removed and 50 gallons contained and cleaned), and 458 gallons of lube oil were recovered. The rest of the oil, totaling 17,900 gallons of diesel oil and 2,050 gallons of lube oil, was unaccounted for and presumed to have discharged into the navigable water.

When the CAPE FEAR was raised on its side on 2 August 1999, a minor oil sheen was observed on the navigable waters. On 15 August 1999, when the CAPE FEAR was towed to New Bedford, no further oil pollution was observed.

#### Safety Zone

A Coast Guard Marine Safety Zone was in effect in a 500 yard radius around the sunken F/V CAPE FEAR from 12 January – 31 March, and 5 July through when the CAPE FEAR was towed to Sea Watch International Dock on 15 August 1999. A CG presence was not maintained on-scene 12 January – 31 March enforcing the Safety Zone, there were however periodic CG overflights during this time period. CG On-Scene Coordinator Representatives from MSO Providence were on-scene a majority of the time throughout the salvage operation and tow in to port 5 July- 15 August 1999.

#### Vessel Salvage/July - August 1999

The F/V CAPE FEAR was raised, refloated and towed into New Bedford Harbor.

On 28 July 1999, salvors made three attempts to roll the CAPE FEAR upright on the ocean floor, where the vessel originally sank. During the first attempt, the base of the tow post snapped in half. During the second attempt to right the vessel, a wire was wrapped around the hull, over the bulwark and was attached around a ten-inch schedule 80 clam pump pipe in the port wing void. This attempt to roll the vessel by parbuckling brought the tension on the deck barge crane to 165 tons, crushed the CAPE FEAR's bulwark, and did not right the vessel. After a dive assessment, the salvor tried the same method again. This third attempt did not roll the vessel and operations were stopped after a diver confirmed the wire was cutting into the hull of the CAPE FEAR in the vicinity of the chine.

On 30 July 1999, salvors rigged slings around the hull and began pumping sand out of the F/V CAPE FEAR. A total of 250 tons of sand was pumped off of the CAPE FEAR. On 2 August 1999, salvors raised the F/V CAPE FEAR on its side. The salvors reported holes in the port and starboard side of the CAPE FEAR's hull from the slings. On 3 August 1999, the CAPE FEAR was towed while still partially submerged and on its side, to an anchorage. On 5 August 1999, The CAPE FEAR was righted in the water, and salvors reported a 6-foot by 9-foot hole in the vessel's hull, port side in the vicinity of the engine room. From 10 – 13 August 1999, 250 tons of sand was vacuumed off the CAPE FEAR.

On 15 August 1999, a doubler was welded over the hole in the vicinity of the engine room, and the CAPE FEAR was towed to New Bedford Harbor, and moored at the SeaWatch International Dock.

#### Coast Guard Survey of F/V CAPE FEAR/ post-salvage

Between August and November 1999, CWO4 Timothy Stewart, a marine inspector from MSO Providence, conducted post casualty surveys during 12 to 14 visits to the F/V CAPE FEAR at SeaWatch International Dock and then at Fairhaven Shipyard while the CAPE FEAR was drydocked. On several occasions, CWO4 Stewart was accompanied by the Investigating Officer, CAPT Matthews, and the owner's representative, Mr. Dubois. CWO Stewart's examination confirmed the condition of the CAPE FEAR as previously described in crew and diver testimony. Additionally, he made the following observations:

- ◆ The CAPE FEAR sat even keel and even trim in the water and did not take on any water.
- ◆ The pilothouse was crushed.
- ◆ The cables used to salvage the vessel were pulled through the hull (making holes in the hull), and laid over the main deck of the CAPE FEAR. The shell plating thickness was observed at the holes to be approximately 5/16 inch plating, with no corrosion or pitting.
- ◆ There was a hole covered by two 8 foot by 8 foot doubler plates on the port side hull in the vicinity of the engine room, one doubler plate was going up the vertical side shell and the other down the bottom shell. The damage was centered at the chine – the CAPE FEAR had a hard (solid round bar) chine. The damage drove the chine and associated shell plating inboard into the engine room. There was a significant inset just above the doubler plates, starting wide and narrowing up the side shell to a rub bar (a half round bar) with a narrow, deep crease in it. Below the double plates, there was a narrow, deep crease in the keel cooler. All other sections of the keel coolers were intact.

- ◆ Inside the engine room, that same hole measured approximately 7 by 8 feet, and was near the clam pump, displacing the clam pump foundation. The metal was torn and bent totally inboard 2 to 3 feet along the edges of the hole. No welds were broken.
- ◆ The Marine Safety Center calculated flooding rates for the 7 by 8 foot hole and determined the flooding rate would have been between 315,000 and 515,000 gallons per minute. They estimated the engine room and shaft alley would be flooded in 5 to 8 seconds. Additionally, their analysis indicated that penetration of shell plating and subsequent flooding of the main machinery space and shaft alley alone would not result in the loss of the vessel. The hole in the engine room would result in a moderate trim of the vessel by the bow and a marginally increased freeboard aft. Due to the geometry of the vessel, flooding of these spaces (the engine room and shaft alley) results in a negligible effect on stability.



F/V CAPE FEAR Hole in Port Side of Engine Room.  
Photo taken 15 November 1999

- ◆ There was no distortion in the hull other than the distortion caused by cable damage and in the area of the 7 by 8 foot hole of the hull. The hull was in good condition with coatings intact and no significant marine growth. All welds were in good condition with no cracks, including the 1996 midbody section. There was no significant deterioration of the shell plating.
- ◆ The rudder was intact and not loose. The shaft and shaft packing were intact. The propeller and kort nozzle were intact with no visible damage.
- ◆ The sea chest strainers were intact. There was no significant marine growth in the intakes and no evidence of failures, damage or cracks.
- ◆ All of the overboard discharges were in good condition.
- ◆ The keel was in good condition.

- ♦ On the main deck, there were approximately 17 freeing ports, all were clear and each freeing port measured 2 feet long by 6 inches high. The open stern ramp for the clam dredge measured approximately 10 feet across the stern. CWO Stewart testified that the amount of freeing port area far exceeded the amount listed in the requirements for commercial fishing vessels.
- ♦ The coaming for the doghouse door that leads down to the hydraulic room measured 17 ½ inches high. There were no holes or fractures in the doghouse.
- ♦ The two clam tank hatch covers on the lower rail, the number 3 hatch covers, were observed during the post-salvage inspection, and found to be intact and in good condition, with no holes in them. The other four clam tank hatch covers, the number 1 and 2 port and starboard hatch covers, were normally held in place only by gravity and were missing.
- ♦ The clam tank hatch covers slid on rails and were secured in place only by their weight and the tracks. There was no dogging method, and there were no gaskets or weather-stripping on the clam tank hatch covers. The clam tank hatch covers did not appear to be weathertight.
- ♦ The number 3 clam tank hatch covers were 18 feet long. Based on CWO Stewart's measurements, he determined that the front edge of the number 3 hatch covers would sit above the transverse bulkhead separating the number 2 and 3 clam tanks. Additionally, he stated "from my observation, if water were to penetrate that position, water would pour into both the number 3 and the number 2 cargo (clam) holds based on the round bar piping at the top of that position (the transverse bulkhead separating the number 2 and 3 clam tanks)." A 5 ½ inch vertical distance was observed from the top of the transverse bulkhead to the bottom of the hatch covers.
- ♦ There was a 12-inch coaming around the clam tanks. The rails for the clam tank hatch covers are attached to the coaming. There were two cutouts in the aft, transverse portions of the coaming measuring 36 inches wide and 5 inches down. One cutout was on the port side and one on the starboard, making the effective height of the coaming in those portions 7 inches, or roughly flush with the top of the number 3 hatch covers. There were also several small 1-inch wide cutouts in the port and starboard sides of the number 3 clam tank coaming, making those portions flush with the top of the number 3 hatch covers.
- ♦ The clam tanks and all associated bulkheads were in good condition, and there were no cross connections found between any of the clam tanks. There were no bilge water alarms in the clam tanks.
- ♦ The fuel and ballast tanks observed were intact and in good condition. There were no cutouts between the double bottom ballast tanks and the wing voids. While the CAPE FEAR was moored, CWO Stewart entered the fuel tanks, and was only able to enter one of the four ballast tanks, because the others were in free communication with the sea due to the salvage cable damage. While the CAPE FEAR was in drydock, CWO Stewart was able to look into some of the tanks and wing voids which were holed by the salvage cables. None of the voids or tanks which were full of water leaked into any of the adjacent spaces. The three voids at the stern were entered and found to be satisfactory with no evidence of holes or fractures.
- ♦ The number 4 port wing void was severely damaged by the salvage cable. The chine bar tore through the void where the salvage cable pulled through the hull. The damage offset the 10-inch clam pump pipe in the void by 3 to 4 inches and damaged all of the associated electrical conduit and piping transversing that wing void and penetrating the after bulkhead, which separates the number 4 port wing void and the hydraulic room. The salvage cable tore

the after bulkhead of the wing void loose from the overhead and tore the piping out of the bulkhead except for the clam pump pipe, which was set in 3 to 4 inches at the bulkhead.

- ◆ In the hydraulic room, port side, approximately 1 foot aft of the forward bulkhead (separating hydraulic room from the number 4 port wing void in that location), the 10-inch clam pump pipe was fractured at a butt weld in the pipe. The fracture was approximately 1/8 inch wide and extended from the top of the pipe down to the bottom of the pipe on the outboard side. The length of the fracture was approximately 15 to 18 inches long. The fractured section of the pipe was removed and sent to Metallurgical Consultants, Inc. for analysis to determine the cause of the fracture.
- ◆ Analysis of the fractured 10-inch clam pump pipe by Metallurgical Consultants, Inc. summarized, "There was no evidence of slow-crack growth such as fatigue, or fluid-cutting associated with small cracks or holes in pressurized systems. It appeared that the fracture occurred after the foundering of the vessel." Because they determined that the fracture did not occur at a time when water was flowing through the pipe, and there was no evidence of fluid cutting in the fractured area, they concluded, "The pipe weld appeared to have been intact before overload failure."
- ◆ Based on the analysis by Metallurgical Consultants, Inc., CWO Stewart testified "the only visible thing that I can attribute it (the fracture in the clam pump pipe) to on the vessel would be from the salvage cable damage...I see no other explanation for the damage." Additionally, he testified that the fracture in the pipe was consistent with the bending moment resulting from the cable damage.
- ◆ There was no other damage of significance observed on the CAPE FEAR.

## STABILITY INFORMATION

### Stability Book

Please note, the terms Stability Book, Stability Booklet, Stability Manual and Stability Instructions are used interchangeably throughout this report.

On behalf of the owner of the CAPE FEAR, Naval Architect John Koopman of Propulsion Data Services conducted a stability test on the CAPE FEAR, which included an inclining experiment on 17 November 1992 in Beaufort, NC. No one from the CAPE FEAR was present during the 17 November 1992 test, so the Naval Architect had to estimate the tank layout and what the various tanks were used for (ie: ballast, fuel) since he had no way to get into the tanks. In 1996, after the 21-foot mid-body section was added, John Koopman drafted a preliminary stability book for the owner of the CAPE FEAR based on calculations and vessel plans, without going onboard or conducting a deadweight survey. The preliminary stability book was conservative, assuming a very high vertical center of gravity and assuming the weight on the new mid-body, which Mr. Koopman calculated prior to seeing the CAPE FEAR.

The conservative conditions were not satisfactory to the owner, so the deadweight survey was conducted on board the CAPE FEAR. John Koopman conducted a deadweight survey on 7 April 1996 while the CAPE FEAR was in the yard in Fairhaven, MA. Again, nobody from the vessel was aboard during this test and Mr. Koopman verified the layout that he could get to.

John Koopman left Hydrostatic Curves and Tables and IMO Calculations with the preliminary stability book onboard the CAPE FEAR on 7 April 1996. A cover letter and new stability book were sent to Warren Alexander 12 April 1996. The letter said "Also enclosed are typical stability conditions used to prepare the operating table please discard the previous set which are at the back of the package I left on the boat on the 7<sup>th</sup>."

Attorney Muzyka, representing CAPE FEAR, Inc, said that the Hydrostatic Curves and Tables and IMO Calculations were discarded after receiving the new stability book and cover letter.

Stability calculations were performed based on the stability test of 1992 and the deadweight survey of 1996. The results indicated that the stability of the CAPE FEAR as it was outfitted and equipped on 7 April 1996, was satisfactory for operation on exposed waters as a commercial clam fishing vessel. It was determined that there were no unstable operating conditions provided trim was kept to plus or minus 2 feet and the freeboard at the stern was maintained at 18 inches or more. A final stability book dated 9 April 1999 was drafted by the Naval Architect and mailed to Warren Alexander, owner of the CAPE FEAR.

The Stability Book included:

- Cover Letter
- List of Tanks in order of improving effect on stability
- Diagram of tank and hold locations
- General Operating Conditions – DO's
- General Operating Conditions – DON'T's
- Winter Icing Conditions
- General Loading Information
- Several Tables of Acceptable Conditions
- Calculations

The Stability Book and the cover letter made no mention of whether the mid body extension resulted in a major conversion or substantial alteration. During the casualty analysis performed by LT Maguire, he inquired and learned from Mr. Koopman that the Stability Book was modeled using a vent 6.5 feet above the main deck as the downflooding point. Mr. Koopman also testified

that during the 1996 deadweight survey, he measured the clam tank hatch coamings and remembers them to be approximately 1 foot 4 inches to 1 foot 6 inches in height. He further discussed his familiarity with the 46 CFR 28 regulations regarding exceptions to coaming heights being less if fish holds were under constant supervision. He also checked the watertight doors, vents and fills and looked at the freeing ports briefly remembering the freeing ports to be approximately 75% what was recommended in the register. Mr. Koopman testified that the clam tank hatch covers were "fairly weathertight" but that they leak, and "over a long period of time you can add a significant amount of water." There was no mention of weathertight clam tank hatches or maintaining clam tank hatches in a weathertight condition in the Stability Book.

Tonnage modifications were made to the vessel without informing Mr. Koopman. Stability calculations were not conducted or updated after the tonnage modifications were made. Tonnage modifications were previously described in detail on Page 31 of this report.

There was a discrepancy between Mr. Koopman and Mr. Alexander's testimony regarding why the stability calculations were based on 120 cages. Mr. Koopman testified that information given by the owner was that capacity of each of the three holds was 30 clam tanks each and 30 clam cages on deck (total of 120); so he conducted calculations based on that information. The owner, Mr. Alexander, testified that did not know why the number of 120 cages was used in the stability booklet.

Mr. Koopman testified that the CAPE FEAR was "easily loaded to its capabilities with the 30 cages on deck and the 90 down below." Mr. Koopman testified that more cages should not really have been carried with the conditions of the seas the vessel had experienced.

The Stability Book was computed based on the assumption that the CAPE FEAR would carry 120 cages, but did not clearly state that no more than a certain number of cages could be carried onboard.

The estimated weight of a cage full of ocean quahogs used by John Koopman in the Stability Manual was 3400 pounds (includes the weight of the cage and of the quahogs).

The CAPE FEAR carried 10 cages more than the Naval Architect had conducted stability calculations for in the 1996 Stability Book. The owner never contacted or consulted Mr. Koopman concerning the carriage of 10 more cages. Mr. Koopman testified that 10 extra cages on the CAPE FEAR, for the total of 130 cages, would affect two things. It would affect the vertical center of gravity so the range of stability is reduced. And, it makes the boat heavier, which makes it more susceptible to water coming on deck and other problems. He also testified that in doing his stability calculations, IMO 168 and severe wind criteria were looked at which put stability limitations on the vessel. One of the limits was 2 feet of trim and 10 feet of draft which is reached with 120 cages on the vessel.

Testimony indicated that there was a Hydraulic Oil Tank at Frame O to Frame 33, forward of the number 1 port double bottom ballast tank. This tank was drawn onto Exhibits 20 and 27 by the Captain, but was not originally shown in any of the vessel diagrams nor was it included in the vessel's Stability Manual. Per the testimony of LT Maguire, the omission of the hydraulic tank from the vessel diagrams and the stability manual did not affect the vessel's stability and the stability manual was still valid.

The double bottom fuel and ballast tanks depicted on the Stability Book onboard, did not match the tanks illustrated in other exhibits and confirmed by testimony to be on the F/V CAPE FEAR. The Stability Book lists four port and starboard double bottom ballast tanks (total of 8) under the clam tanks. However, there were only two port and starboard double bottom ballast tanks (total of 4) under the clam tanks, and there were two port and starboard double bottom fuel tanks (total of 4) under the forward clam tanks.

Mr. Koopman testified that differences in the double bottom tank configuration would effect the loading of the CAPE FEAR, because some of the tank loading conditions demonstrated in the Stability Book are not attainable. He said that if the fuel had been loaded similar to the way the Stability Book said to load ballast, there would have been very little effect. However, because fuel rather than ballast was in the first two double bottom tanks, the crew lost the ability to alter the trim of the vessel using ballast. Additionally, he said the differences in the tank configuration would have had very little impact on the April 1996 deadweight survey because the tanks were empty on the vessel.

The 1996 Stability Book contained the following STABILITY DO'S – GENERAL OPERATING CONDITIONS

Text in ALL CAPS is taken from Exhibit 16, Page 6 – Stability Manual dated 12 Apr 96  
Text in Sentence Case represents facts revealed in testimony and exhibits.

DO - RESTRAIN ALL DUNNAGE, STORES AND SPARE GEAR IN SUCH A MANNER TO PREVENT SHIFTING IN A SEAWAY.

DO - KEEP CROSS CONNECTIONS BETWEEN PORT AND STARBOARD TANK PAIRS CLOSED AT ALL TIMES.

DO - USE FUEL AND OTHER CONSUMABLES IN A SEQUENCE SUCH AS TO MINIMIZE TRIM AND LIST.

DO - KEEP WATERTIGHT DOORS, ICE SCUTTLES, AND ACCESS HATCHES CLOSED AT ALL TIMES EXCEPT WHEN IN ACTUAL USE.

DO - KEEP BILGES AND VOIDS PUMPED TO MINIMUM CONTENT CONSISTENT WITH POLLUTION PREVENTION REQUIREMENTS.

DO - KEEP DECK FREEING PORTS OPERABLE AND UNOBSTRUCTED AT ALL TIMES.

DO - MAKE EVERY EFFORT TO DETERMINE THE CAUSE OF ANY LIST IN THE VESSEL BEFORE TAKING CORRECTIVE ACTION.

DO - MAINTAIN A MINIMUM OF 18-INCH FREEBOARD AT THE STERN.

DO - MAINTAIN FRESH WATER AND HYDRAULIC OIL TANKS FORWARD AS FULL AS POSSIBLE TO MINIMIZE TRIM.

DO - USE BALLAST TANK #2 STARBOARD TO MINIMIZE HEEL.

DO - LOAD CAGES INTO HOLDS STARTING WITH HOLD 1 WORKING BACK.

DO - USE BALLAST TANK #1 P/S TO MINIMIZE TRIM AS AFT TRIM INCREASES.

The 1996 Stability Book contained the following STABILITY DON'T'S – GENERAL OPERATING CONDITIONS

Text in ALL CAPS is taken from Exhibit 16, Page 7 – Stability Manual dated 12 Apr 96

Text in Sentence Case represents facts revealed in testimony and exhibits.

DON'T - RESTRAIN DUNNAGE OR DECK CARGO BY ATTACHING TO TANK VENTS OR FILLS.

DON'T - RESTRAIN DUNNAGE OR DECK CARGO BY ATTACHING TO HATCH OR DOOR HANDLES.

DON'T - USE THE WATERTIGHT DOOR AT FRAME 17 DURING SEVERE WEATHER WHEN THERE IS A HIGH PROBABILITY OF WATER ON DECK.

DON'T - USE THE WATERTIGHT DOOR AT FRAME 52 DURING SEVERE WEATHER WHEN THERE IS A HIGH PROBABILITY OF WATER ON DECK.

DON'T - OPERATE IN BAD WEATHER UNNECESSARILY WITH FLOODED HOLDS. HEAVY FOLLOWING SEAS ARE PARTICULARLY BAD WITH FLOODED HOLDS.

DON'T - MOVE HEAVY GEAR ON DECK DURING BAD WEATHER.

DON'T - USE THE AFT PEAK BALLAST TANK FOR BALLAST WATER.

DON'T - USE BALLAST TANKS #3 AND #4 P/S.

DON'T - FLOOD HOLDS, ESPECIALLY WITH EMPTY OR NO CAGES.

## Technical Studies

### Mr. Koopman's Post Casualty Stability Analysis:

Prior to Mr. Koopman's testimony at the CAPE FEAR investigation, the investigating officer provided him with exhibits which detailed the tankage and loading of the CAPE FEAR at the time of the casualty. Mr. Koopman used these exhibits to conduct further stability calculations and an updated listing of tank capacities. According to the testimony of LT Maguire, Mr. Koopman performed post casualty analysis using a downflooding point of a stack 6.5 feet above the main deck. Mr. Koopman's testimony indicated he felt the hatchcovers were fairly weathertight and discussed the coaming heights and freeing ports. Mr. Koopman was not paid by the Coast Guard or either Party in Interest for his calculations.

Mr. Koopman did stability calculations based on 6 sets of conditions and compared his results to IMO, Severe Wind, Intact OSB, and Damage Survival criteria. The 6 sets of conditions and the results of their comparisons to the criteria are as follows:

#### Conditions

1. Minimum Ballast, No Extra Deck Load
2. Nominal Tankage, No Extra Deck Load
3. Nominal Tankage, 10 Extra Cages
4. Nominal Tankage, 10 Extra Cages, Flood #3 Clam Holds
5. Nominal Tankage, 10 Extra Cages, Flood #2 & 3 Clam Holds
6. Nominal Tankage, 10 Extra Cages, Flood #1, 2 & 3 Clam Holds

Results	IMO	Severe Wind	Intact OSB	Damage Survival
1. Min Ballast, 120 cages	OK	OK	OK	OK
2. Nom Tankage, 120 cages	OK	OK	OK	OK
3. Nom Tankage, 130 cages	OK	OK	No	OK
4. Nom Tank, 130 cages, flood #3	No	No	No	OK
5. Nom Tank, 130 cage, flood #2 & 3	No	No	No	No
6. Nom Tank, 130 cage, flood 1, 2 & 3	No	No	No	No

For the **Minimum Ballast**, Mr. Koopman calculated based on:

- the actual loading of the number 1 and 2 port and starboard double bottom fuel tanks, hydraulic oil and freshwater tanks;
- the number 1 port and the number 2 port and starboard double bottom ballast tanks being empty, and
- the number 1 starboard double bottom ballast tank being 37% full to minimize heel

For the **No Extra Deck Load**, Mr. Koopman calculated based on 120 full cages on board.

For the **Nominal Tankage**, Mr. Koopman used the tank loading conditions described in Exhibit 27, Steven Novack's sketch of tank loading immediately before sinking.

For the **10 Extra Cages**, Mr. Koopman used the clam cage loading shown on Exhibit 19, Steven Novack's sketch on General Layout of Main Deck and 01 Deck showing clam cage locations which reflects the clam cage loading at the time of the casualty.

Calculations were done based on both 120 full cages and 130 full cage to show the effect of adding 10 extra cages on stability.

**Condition 3 above, Nominal Tankage, 10 extra cages, reflects the condition of the CAPE FEAR as it transited inbound on 8 January 1999 just prior to sinking.**

Intact Stability. Based on the actual condition of the CAPE FEAR as represented in Condition 3, the vessel met the Intact Stability criteria in Mr. Koopman's calculations, with 10 feet 8 inches of draft, 1.84 feet of trim aft, and 3.54 feet of freeboard at the aft corner of the number 3 clam tank. Mr. Koopman also ran intact offshore supply boat (OSB) criteria, because the CAPE FEAR resembled an OSB, and the vessel failed the criteria.

The freeboard at the aft corner of the number 3 clam tanks was calculated because Mr. Koopman said that was the most likely position for abnormal downflooding.

Damaged Stability. Based on the actual condition of the CAPE FEAR as represented in Condition 3, the vessel met the Damaged Stability criteria in Mr. Koopman's calculations.

Damaged Stability - Special Cases.

The conditions for the following Damage Stability calculations were determined for nominal tankage and 130 cages.

Stability after downflooding.

Condition 4 above- with the number 3 port and starboard clam holds flooded, Mr. Koopman calculated that the vessel failed intact stability (46 CFR 28.570 / IMO A.168), severe wind (46 CFR 28.575), and intact Offshore Supply Boat (OSB) (46 CFR 174.185) criteria; and passed damage survival criteria (46 CFR 28.580). Mr. Koopman testified that with the number 3 clam tanks flooded, "either as a pair or singularly, that you will go from a badly trimmed operating condition but one still within the stability limits of the vessel to a survival mode of operation in which you must take - - that you are in serious risk and you must take corrective action." "If you fill the aft two holds, if they flood, then stability is greatly impaired. With a following sea breaking over the stern and a clam tank hatch open 6 inches, Mr. Koopman testified that "if you don't continuously pump, then it's only a matter of time before the hold will fill and the free surface and the weight becomes too much and you get progressive - - the freeboard starts to deteriorate very rapidly." Mr. Koopman further testified that if you were to flood one of those holds, that the list would be severe, and would expect eventually that you would get flooding into one of the other holds, and unless you were able to pump it quickly, you could lose the boat.

Condition 5 above- with the number 2 and 3 port and starboard clam holds flooded, Mr. Koopman calculated that the vessel failed all of the criteria examined: intact stability (46 CFR 28.570 / IMO A.168), severe wind (46 CFR 28.575), intact Offshore Supply Boat (OSB) (46 CFR 174.185) and damage survival criteria (46 CFR 28.580). "If you flood hold 3 and 2, essentially your stability is totally gone and your chances of survival are nil. So the corrective action really needs to be taken of the flooding of hold number 3," according to Mr. Koopman.

Condition 6 above- with the number 1, 2 and 3 port and starboard clam holds flooded, Mr. Koopman calculated that the vessel failed all of the criteria examined: intact stability (46 CFR 28.570 / IMO A.168), severe wind (46 CFR 28.575), intact Offshore Supply Boat (OSB) (46 CFR 174.185) and damage survival criteria (46 CFR 28.580).

Mr. Koopman's Opinions

According to Mr. Koopman, operating in following seas with the number 3 clam holds flooded would create a particularly severe problem. Per Mr. Koopman, with a flooding hold - the Stability Book indicates not to operate in a following sea. In this situation, he said the boat should be turned into the seas so it is no longer taking water on deck, and then attempts should be made to correct the flooding problem. He testified "the flooding of the holds symmetrically is really the worst condition because it's something that can creep up on you without knowing it's happening and because the boat is settling down evenly." "You really need to watch your tankage back there and pump it as often as possible in the following sea to make sure this doesn't happen."

With regard to free surface effect with flooded clam holds, Mr. Koopman testified "You could be lulled into a false security on a vessel of this type because the water going through the clams has a damping effect and it will actually make the boat feel more comfortable than if the water was not there."

#### Technical Studies:

##### LT Patrick Maguire, USCG Marine Safety Center Post Casualty Stability Analysis

At the request of the Investigating Officer, CAPT Matthews, LT Maguire of the Coast Guard Marine Safety Center conducted a casualty stability analysis for the F/V CAPE FEAR investigation. The Investigating Officer provided LT Maguire with testimony transcript (Volumes I through V) and several exhibits, including Exhibits 6 – 10, 12, 16, 19, 23, 24, 27, 46, 60, 61, 63, 65, and 70 – 73.

The results of LT Maguire's stability analysis of the F/V CAPE FEAR were reviewed by his Commanding Officer, CAPT Lance, and three other degreed naval architects at the Marine Safety Center. All confirmed that LT Maguire's calculations and conclusions were accurate.

Summary of Marine Safety Center (MSC) Findings. The analysis indicates the CAPE FEAR, if operated in accordance with its 1996 stability booklet, met the stability criteria of 46 CFR Subchapter C part 28 - Requirements For Commercial Fishing Industry Vessels. However, the intact stability was compromised by the failure to maintain weathertight integrity in way of the hatches. The fact that the clam hold hatches were not weathertight lowered the downflooding from the stack 6.5 feet above the deck to the aft clam hold hatch covers. With the lowered downflooding point the vessel fails all stability criteria. Even without the open hatch the vessel failed to meet all the stability criteria when loaded in accordance with the testimony. In the testified loading condition, downflooding through the open hatch would be accelerated by the combination of excessive water ballast, added weight from ten extra clam cages, an open hatch, and six to seven foot following seas would have likely led to the flooding of at least the after holds. In this condition the loss of the vessel is likely. Evidence of the likelihood is provided by the large margin failures of a majority of the relevant stability criteria.

As the vessel heels, the downflooding point is the first opening without a weathertight enclosure where water may enter the vessel.

The computer model General Hydrostatics (GHS) version 6.7, developed by Creative Systems, was used to complete the majority of the calculations.

Input to the computer model was derived from many sources. The basic hull form was provided electronically by Propulsion Data Services (PDS) upon request on 8 February 1999. The compartments were generated using dimensions from St. Michael's Ship Design drawings, which had been forwarded by the investigating officer. The tank loadings, weights and weight centers were derived from the testimony, the 1996 stability booklet, the January 1999 PDS calculations, and from information (exhibits and testimony transcript per above) provided by the investigating officer.

Numerous loading conditions were evaluated in an effort to determine the most contributory factors. An initial set of calculations was completed with nearly identical values to the January 1999 PDS calculations in order to verify the results and gain familiarity with the vessel. The verification proved PDS' calculations and summary to be generally correct. Many conditions were evaluated twice, once with the actual downflooding point of the aft portion of the clam hold hatch covers and once with the intended downflooding point of the stack 6.5 feet above the deck. Both sets of calculations proved to be demonstrative but both pointed to the lack of weathertight integrity at the hatch as the critical factor.

Three basic loading conditions formed the foundation of the analysis. These are referred to as "By the Book," "Actual," and "Flood Hold 3." The first simply represents the actual casualty condition modified by removal of all water ballast from ballast tanks number 3 and number 4 (also referred to as number 1 and number 2 port and starboard ballast tanks) in accordance with the 1996 Stability Book, Exhibit 16. The second represents the best estimate of the tank and weight loading at the time of the casualty. The last represents the actual condition with 95% flooding of hold 3 (port & starboard). Three cage loadings are varied through each basic loading condition. These are referred to as "120 Cages," "130 Cages," and "130 Cages w/ Extra." The first is the basis of the analysis found in the vessel's stability booklet. The second is the commonly practiced cage loading with ten more cages than the booklet specifies. The third represents an addition to the second commonly called "rounding up." The rounding up estimate was provided by the investigating officer and is 5 bushels at 90 lb/bushel.

The indication of pass/fail shows satisfaction of all criteria for each set of criteria evaluated. The number of criteria failed is provided to show, in one respect, the margin of failure. For damage stability the number of damage cases failed is shown not the number of damage criteria failed. There were seven basic damage scenarios applied to the vessel. The status of the freeboard at the stern, before damage, is provided with each condition.

The following five sets of tabulated results are the Marine Safety Center conclusions garnered from the analysis of each set. Because of the illustrative results yielded when comparing to the intact and damage stability criteria, the downflooding point was maintained at the top of the stack for most of the calculations. Calculations using the actual downflooding point, the aft portion of the clam tank hatch covers, did not show the effect of altering vessel loading conditions because the vessel consistently failed the stability criteria measured for most loading conditions.

The vessel failed the stability criteria with the downflooding at either the port or starboard aft hatch, the actual downflooding point, in almost all loading conditions. LT Maguire determined that continuing the evaluation using the actual downflooding point would not demonstrate anything, because the vessel would continue to fail all of the stability criteria. So, LT Maguire raised the downflooding point to the intended position, at the top of a vent six feet above the deck, and evaluated various loading conditions. Raising the downflooding point took downflooding out of the analysis and enabled the Marine Safety Center to determine the effects of vessel loading.

The Forth Set of results most accurately reflects the actual stability of the CAPE FEAR because the downflooding point is at its actual location, the aft hatches.

The vessel modeled by the Marine Safety Center had a slight list to starboard due to the liquid loading.

In an effort to be as accurate as possible to the true conditions of the vessel, no conservative assumptions were made in this analysis.

FIRST SET OF INPUT DATA:

Liquid loading conditions based on testimony (January 1999).

Downflooding point at stack top, 6.5 feet above main deck (hatches assumed to be weathertight).

Three runs varying the cage loading from 120, to 130, to 130 with extra bushels.

	Intact Stability	Intact Stability	Damage Stability
	Torremolinos	Severe Wind & Roll	Fishing VsIs

Loading Condition: ACTUAL, 120 CAGES: (ref. #1)

Pass/Fail	P	P	P
Criteria failed	0	0	0

Centerline freeboard at stern: 2.2 ft.

Loading Condition: ACTUAL, 130 CAGES: (ref. #2)

Pass/Fail	P	P	F
Criteria failed	0	0	1 case

Centerline freeboard at stern: 2.18 ft.

Loading Condition: ACTUAL, 130 CAGES W/ EXTRA: (ref. #3)

Pass/Fail	F*	P	F
Criteria failed	1 of 7	0	2 cases

Centerline freeboard at stern: 1.82 ft.

\*Passes criteria of 46 CFR 170.173(c)

**Marine Safety Center (MSC) Findings.** This summary demonstrates that even if weathertight integrity is maintained the vessel, as loaded, was at risk in the event of collision or one compartment damage.

## SECOND SET OF INPUT DATA:

Liquid loading conditions based on testimony (January 1999) except no ballast, in accordance with the stability booklet, exhibit 62.

Downflooding point at stack top, 6.5 feet above main deck (hatches assumed to be weathertight).

Three runs varying the cage loading from 120, to 130, to 130 with extra bushels.

	Intact Stability	Intact Stability	Damage Stability
	Torremolinos	Severe Wind & Roll	Fishing VsIs

Loading Condition: BY THE BOOK, 120 CAGES: (ref. #4)

Pass/Fail	P	P	P
Criteria failed	0	0	0

Centerline freeboard at stern: 3.1 ft.

Loading Condition: BY THE BOOK, 130 CAGES: (ref. #5)

Pass/Fail	P	P	F
Criteria failed	0	0	1 case

Centerline freeboard at stern: 3.09 ft.

Loading Condition: BY THE BOOK, 130 CAGES W/ EXTRA: (ref. #6)

Pass/Fail	P	P	F
Criteria failed	0	0	2 cases

Centerline freeboard at stern: 2.73 ft.

**MSC Findings.** This summary demonstrates the effectiveness of the stability guidance even with the changes to the vessel since the booklet was issued. It also demonstrates that the booklet provided a slightly conservative approach in accordance with the regulations.

The changes to the CAPE FEAR since the Stability Book was issued include tonnage modifications and tank positions / dimensions that did not match the actual vessel. Even with those major changes to the vessel which were unknown to the naval architect or not included in his calculations, the 1996 Stability Book was still valid.

Even when the basic assumptions and guidelines of the stability booklet are exceeded, as long as the single restriction for no ballast in tanks 3 & 4 (port & starboard) is followed, the vessel passes all intact stability criteria and fails only a few damage cases.

### THIRD SET OF INPUT DATA:

Liquid loading conditions based on testimony (January 1999), with maximum cages and extra bushels.

Downflooding point at stack top, 6.5 feet above main deck (hatches assumed to be weathertight).

Three runs varying the loading from no ballast, to actual tank loading on day of casualty, to actual loading with hold 3 flooded.

	Intact Stability	Intact Stability	Damage Stability
	Torremolinos	Severe Wind & Roll	Fishing VsIs

Loading Condition: BY THE BOOK, 130 CAGES W/ EXTRA: (ref. #6)

Pass/Fail	P	P	F
Criteria failed	0	0	2 cases

Centerline freeboard at stern: 2.73 ft.

Loading Condition: ACTUAL, 130 CAGES W/ EXTRA: (ref. #3)

Pass/Fail	F*	P	F
Criteria failed	1	0	2 cases

Centerline freeboard at stern: 1.82 ft. \*Passes criteria of 46 CFR 170.173(c)

Loading Condition: FLOOD HOLD 3, 130 CAGES W/ EXTRA: (ref. #7)

Pass/Fail	F	F	F
Criteria failed	6 of 7	1 of 2	6 cases

Centerline freeboard at stern: 0.36 ft.

**MSC Findings.** This summary highlights the critical point where too many restrictions have been exceeded. The extra cages, the extra bushels in each cage and the failure to prevent downflooding by maintaining weathertight integrity eroded the intact and damage stability to a large extent. For example: righting arm @ 30 is one third of required (.24 v. .66 feet); righting energy from 0 to 40 is roughly half the requirement (9.2 v. 16.9 ft-deg).

FOURTH SET OF INPUT DATA:

Liquid loading conditions based on testimony (January 1999).

Downflooding point at aft hatch, 14.5 feet above baseline (hatches assumed not to be weathertight).

Three runs varying the cage loading from 120, to 130, to 130 with extra bushels.

	Intact Stability	Intact Stability	Damage Stability
	Torremolinos	Severe Wind & Roll	Fishing VsIs

Loading Condition: ACTUAL, 120 CAGES: (ref. #8)

Pass/Fail	F	F	F
Criteria failed	2 of 7	1 of 2	3 cases

Centerline freeboard at stern: 2.2 ft.

**THE FOLLOWING CONDITION BEST REPRESENTS THE ACTUAL LIQUID LOAD, CLAM CAGE LOAD AND DOWNFLOODING POINT ON THE CAPE FEAR AT THE TIME OF THE CASUALTY:**

Loading Condition: ACTUAL, 130 CAGES: (ref. #9)

Pass/Fail	F	F	F
Criteria failed	2 of 7	1 of 2	6 cases

Centerline freeboard at stern: 2.18 ft.

Loading Condition: ACTUAL, 130 CAGES W/ EXTRA: (ref. #10)

Pass/Fail	F	F	F
Criteria failed	3 of 7	1 of 2	All 7 cases

Centerline freeboard at stern: 1.82 ft.

**MSC Findings.** This summary reveals that the failure to maintain the weathertight integrity causes a complete failure of the criteria in all evaluated conditions.

Downflooding through the hatch is highly likely as evidenced by the failure of almost every criterion related to the downflooding point.

This illustrates the emphasis placed on the weathertight integrity by the regulations.

FIFTH SET OF INPUT DATA:

Liquid loading conditions based on testimony (January 1999) with hold 3 flooded.

Downflooding point at stack top, 6.5 feet above main deck (hatches assumed to be weathertight).

Three runs varying the cage loading from 120, to 130, to 130 with extra bushels.

	Intact Stability	Intact Stability	Damage Stability
	Torremolinos	Severe Wind & Roll	Fishing VsIs

Loading Condition: FLOOD HOLD 3, 120 CAGES: (ref. #11)

Pass/Fail	P	P	F
Criteria failed	0	0	1 case

Centerline freeboard at stern: 0.77 ft.

Loading Condition: FLOOD HOLD 3, 130 CAGES: (ref. #12)

Pass/Fail	F	P	F
Criteria failed	3 of 7	0	3 cases

Centerline freeboard at stern: 0.75 ft.

Loading Condition: FLOOD HOLD 3, 130 CAGES W/ EXTRA: (ref. #7)

Pass/Fail	F	F	F
Criteria failed	6 of 7	1 of 2	6 cases

Centerline freeboard at stern: 0.36 ft.

**MSC Findings.** Following from the Third Set conclusion that downflooding was extremely probable in the actual loading condition, this summary highlights the effect of flooding in hold 3. The combination of flooding with loading that exceeded the stability guidance resulted in severely degraded intact and damage stability.

The reduction in aft freeboard with flooding of the hold and carriage of ballast is also made obvious in this summary.

The commonly practiced loading left no margin for flooding in the holds.

Further Marine Safety Center findings:

1. Lack of weathertight closure at clam hold hatches is crucial.
2. Vessel's loading beyond the stability guidance put the vessel in marginal stability condition.
3. Vessel's intact stability is minimal in the actual loading such that wind and waves may likely cause foundering, especially with flooded holds.
4. The shifting/jettisoning of the cages on deck from the starboard side during roll to port would dampen any possibility of righting.

The Marine Safety Center had more accurate information about the loading and construction of the CAPE FEAR. The following is a list of Differences from 1996 stability booklet and January 1999 analysis by Propulsion Data Services:

1. Slight difference in geometry file at the aft end of the hatches. Hatch ends at 91.0 feet from forward perpendicular vice 93.0 feet.
2. Compartment names differ but are intended to follow exhibit 61.
3. Sail area for house, bulwark, A-frame, cages and mast added to model.
4. The vertical centers for the clam cages and clams in each cage were lowered from apparent conservative assumption to true location.
5. The longitudinal centers for the cages and clams on the hatches were matched to the testimony and exhibit 19.
6. Damage stability was evaluated in accordance with 46 CFR 28.580 including the limitations on bulkhead spacing (46 CFR 28.580(d)(1)). The forward two compartments and the after two compartments must be treated as one compartment each for damage stability.
7. Tonnage framing (1.45 tons) was added at an average of centers for 16 frames (port & starboard) in accordance with exhibits 71 and 72.
8. Five extra bushels per cage (90 lb/bushel) were added to some loading conditions at an average of centers for the 114 cages, the first 6 cages on the hatches, and the extra 10 cages on the hatches.
9. The addition of weights for the cages was broken up into the 6 cages on the hatches and the extra 10 cages on the hatches for clarity.
10. The per cage clam weight was lowered to correspond to the 90 lb/bushel and 32 bushels per cage values, as provided by the investigating officers.
11. Engine room recess into shaft alley added to the model per the plans (exhibit 7).
12. A lube oil tank was added to starboard void #1 as per exhibit 62.
13. Tank capacities differ slightly from exhibit 63 due to the minor differences in compartment locations within the same geometry file.
14. The forward hydraulic oil tank is modeled in accordance with exhibit 7. The forward boundary of the tank is not moved one foot aft.

In addition to the above, LT Maguire testified concerning the applicability of certain 46 CFR 28 subpart E Stability requirements regarding the CAPE FEAR. Specifically, that the intact stability criteria 28.570 and 28.575 and damage stability 28.580 requirements were not applicable since the keel of the CAPE FEAR was laid before 1991 and they had some substantial alteration when the mid body was put in. A stability booklet, in accordance with 28.570 (c) through (e), was all that was required. LT Maguire also stated that he had contacted Mr. Koopman and learned that

the 1996 stability booklet for the CAPE FEAR was modeled using a downflooding point of 6.5 feet at the stack.

#### LIFESAVING GEAR:

According to the master and the owner, all required gear was onboard and stored as follows:

- Immersion Suits. For the purposes of this report - immersion, exposure and survival suit nomenclature was used interchangeably. There were a total of 8 immersion suits on board. 2 immersion suits were stored under a desk in the pilothouse. There were 4 immersion suits stored in the main deck vestibule, just inside the watertight door, on a shelf above the washer and dryer. The remaining 2 immersion suits were stored in the berthing area as follows: Mate's own personal suit was stored on top of a locker on the starboard side of the five-man bunkroom; a deckhand's suit was stored on top of a shelf in the one person stateroom.
- Ring Buoys. There were four ring buoys on board - one on either side of the pilothouse, one on the doghouse leading to the Hydraulic Room, and one on the port side of the boat hanging from a ladder. The one on the port side hanging from a ladder did not have a strobe light on it, the other three had strobe lights.
- Life raft. The life raft was attached to the top of the pilothouse and equipped with a hydrostatic release, as required.
- Distress signals. No mention was made as to the location of the flares.
- EPIRB. The EPIRB was located aft of the pilothouse by divers. It was equipped with a hydrostatic release, as required. However, the Captain tied it to the EPIRB bracket using its tether line.

During the evacuation of the vessel, the only survival gear used by the crew was the immersion suits. Each member was able to locate a suit and begin donning them prior to abandoning the ship. The crew did not manually deploy the life raft or EPIRB, nor did they throw any of the life rings or grab any of the flares.

The following gear was recovered and identified as belonging to the CAPE FEAR:

- Six immersion suits (3 recovered from survivors, 1 recovered from victim's body, 1 washed ashore 9 Jan 1999 and 1 washed ashore in its bag 4 March 1999) (2 suits were never recovered or found)
- One PFD
- One ring buoy with strobe light
- One life raft and life raft equipment pack
- One SOLAS A pack
- One EPIRB
- One Mustang Suit (recovered from the CAPE FEAR during salvage operations 8 August 1999)

All recovered lifesaving gear was inspected by CWO Charles Kipouras, a Coast Guard Marine Inspector from MSO Providence. The following deficiencies or points were noted during the inspection of the survival suits:

- The strobe light worked on only 1 of the 6 immersion suits. CWO Kipouras changed the batteries on the 5 that did not work, and they still did not work. The light bulbs were not changed and the switches appeared to have an oil/water film on them. There was water found in each strobe light that did not work. Water was not found in the strobe light that did work.

- CWO Kipouras could not move the zippers on 2 of the 6 survival suits. On the 2 immersion suits where he couldn't move the zippers, the marine inspector attempted to pull the zipper up using both hands and a great deal of force, and was unable to move the zipper more than 2 inches. There was no evidence of corrosion or disrepair on either of the zippers that CWO Kipouras could not move. Additionally, there was no cloth or debris caught in those zippers, and all of the zipper teeth were present. The suits where the inspector was unable to move the zippers more than 2 inches were the ones that were found on the victim, Paul Martin, and the one that was washed ashore on 9 January 1999 without a survival suit storage bag. At a later date, Mr. David DuBois, a marine consultant hired by the owner of the CAPE FEAR, was able to move the zippers on the two survival suits that CWO Kipouras had previously been unable to move the zippers on.
- One survival suit did not have the proper amount (only had 9 square inches, regulations require 31) of retro reflective material attached. This suit was the one recovered from the victim, Paul Martin.
- Two of the survivors used Parkway/Imperial #1409 immersion suits. One survivor used a Stearns #ISS-5901. The immersion suits used by the deceased were both Parkway/Imperial #1409.

Captain Novack testified that he kept a log in the wheelhouse of expiration dates that pertained to the lifesaving equipment he had onboard.

The port engineer, Tom Becica also kept a log of expiration dates that pertained to the lifesaving equipment on the CAPE FEAR.

Captain Novack testified that he inspected the lifesaving equipment approximately every couple of months, and not on any set schedule.

The last time Captain Novack recalled taking the immersion suits out of their storage bags and looking at them was approximately two months before the casualty. At that time, they changed all of the strobe light batteries. They did not wax the immersion suit zippers at that time. The last time Captain Novack recalled waxing the zippers was approximately five months before the casualty. The U.S. Marine Safety Association recommends that the zippers should be lubricated every three months. That recommendation is listed in their Care and Inspection Booklet, which is included with Stearns and Parkway suits at the time of purchase.

The CAPE FEAR's Viking 6-man inflatable liferaft and an open SOLAS A liferaft equipment pack were recovered by the Coast Guard on 19 January 1999 and inspected by CWO Kipouras. The raft was in good condition with no holes or tears. The equipment bag was open and its contents were still in their original packages.

## REGULATORY RECOMMENDED PRACTICES

Commercial Fishing Vessel Safety Examination program. The CAPE FEAR participated in this voluntary examination program and was last issued a Commercial Fishing Vessel Safety Decal on 3 July 1997.

There is no requirement for fishing vessel captains to be licensed on vessels under 200 Gross Tons.

There is no requirement for fishing vessel crews to hold Merchant Mariners Documents on vessels under 200 Gross Tons.

Although Stability Letters or Books are required on some fishing vessels, there is no requirement for the vessel to keep a copy of the stability instructions on board, for anyone to read the instructions or for the instructions to be followed.

In their Care and Inspection Booklet, the U.S. Marine Safety Association recommends inspecting survival suits before every voyage or at least every quarter. Their instructions for inspecting survival suits include lubricating the zippers. Their Care and Inspection Booklet is included with Stearns and Parkway suits at the time of purchase. Additionally, Stearns, a survival suit manufacturer, recommends lubricating zippers every 6 months. The regulations, 46 CFR 28.140(b)(3), require lifesaving equipment to be maintained per the manufacturer's guidelines. Additionally, 46 CFR 28.140 requires the master or person in charge to ensure that each item of lifesaving equipment be in good working order, ready for immediate use and readily accessible before the vessel leaves port and at all time when the vessel is operated.

The regulations do not require crews to log drills or training conducted or log preventative maintenance of lifesaving equipment.

Although the regulations (46 CFR 28.250) appear to require high water alarms in clam holds (i.e.: a space with a non-watertight closure, such as a space with a non-watertight hatch on the main deck), the Federal Register Notice that promulgated the regulation specifies that the intent of the regulation is not to require high water alarms in fish holds.

The regulations (46 CFR 28.50, 28.500, 28.501 or the rest of Subpart E--Stability) do not specify who determines if alterations made to a vessel constitute a Major Conversion, a Substantial Alteration or a Substantial Alteration in a manner which adversely affects its stability.

The applicability of 46 CFR 28 subpart E is based on the determination of Major Conversion or Substantial Alteration, per 46 CFR 28.500 and 28.501. In essence, a vessel that has been substantially altered does not have to comply with the requirements of subpart E provided that it has stability instructions by a qualified individual that comply with 28.530 (c) through (e).

There is no requirement in the regulations for fishing vessel crews to have the Stability Book on board, read the Stability Book, or follow the guidance in the Stability Book. The intent of the regulations (46 CFR 28.530(a)) which is only applicable if the vessel had its keel laid or underwent a major conversion after September 15, 1991, is that the stability instructions provide masters and persons in charge of fishing vessels with easily understood information to keep their vessels in satisfactory stability condition. The regulations offer detailed requirements for how stability instructions should be developed and what should be contained.

There are no regulations requiring pre-employment, random or periodic drug testing of fishing vessel captains or crewmembers. The only time the regulations require fishermen to be drug tested is following a serious marine incident that they were directly involved in (46 CFR 4.06). The Coast Guard has no authority to detain crewmembers until drug testing is completed. Additionally, the regulations require DOT approved drug testing.

#### VESSEL MANAGEMENT:

OWNER, CAPE FEAR, INC.

##### Experience in Industry

Warren Alexander, the managing owner, worked on fishing vessels for 20 to 21 years. Ninety-five percent of that time was spent on clam boats, and the rest was on lobster boats. He spent 4 years as a deckhand, a few years as a mate and was a captain the rest of the time.

Mr. Alexander has been involved in the commercial fishing business for 28 years. He currently owns several clam boats including the JERSEY DEVIL, MISS MERNA, JOHN N, and CAPE FEAR, and has owned clam boats since 1985.

Mr. Alexander never served as a crewmember, mate or captain of the F/V CAPE FEAR.

Mr. Alexander has never had any formal training pertaining to commercial fishing. Specifically, he has never had any lifesaving, firefighting, or stability training.

Mr. Alexander testified that he was familiar with some of the Coast Guard regulations pertaining to fishing vessels, 46 CFR 28.

Mr. Alexander testified that he was familiar with the stability book and specifically with the "DO's and DON'Ts."

Mr. Alexander made the arrangements to have Naval Architect, Mr. Koopman, do the stability book. However, he never called Mr. Koopman back after the tonnage modifications were made to the CAPE FEAR. It is unknown whether the owner was aware of the misnamed tanks and the associated operational limitations. The owner never brought the deficiencies in the stability book to the attention of Mr. Koopman. The owner never consulted a naval architect when he increased the number of clam cages carried from 120 to 130. It is unknown whether or not the owner or Naval Architect made any type of determination as to whether the mid-body addition in 1996 was a major conversion or a substantial alteration.

Mr. Alexander had never held any Coast Guard license or merchant mariner's document.

#### Financial Limitations

Mr. Alexander did not use a budget to plan for vessel operating or maintenance costs. The only time a budget was used was for a scheduled event, such as hauling the vessels out of the water.

The port engineer approved procurement requests for the owner's clam boats. The owner did not routinely review the invoices or approve procurements for his boats.

#### Degree of Involvement in Vessel Operations

The captains of Mr. Alexander's boats evaluate the weather conditions and make the determination whether or not to get underway. The captains set their own schedules and decide where to fish. Neither the owner nor the clam processing company interferes with the captains' decisions to get underway or remain at the dock.

Mr. Alexander signed an agreement with Sea Watch, International, the clam processing company, which says "Atlantic Shellfish agrees to schedule its trips for the harvesting of ocean quahogs in accordance with a fishing schedule established by Sea Watch, provided that Atlantic Shellfish is provided with reasonable advance notice of the dates on which fishing trips will be necessary."

Testimony by Captain Novack, Warren Alexander and John Miller of Sea Watch indicates that Sea Watch did not set a fishing schedule for Mr. Alexander's clam boats, and that the captains of the boats set their own schedules.

The captains on Mr. Alexander's clam boats do not need to call Mr. Alexander for permission to return to the dock early.

The owner does not have any policy restricting the vessels from getting underway in certain weather conditions.

Mr. Alexander periodically calls his boats while they are underway to check on their status. Mr. Alexander normally tries to estimate when the boats will be returning to the dock so he can let the

clam processing company know when to expect the boats. The day of the sinking, he called the CAPE FEAR and spoke with the Mate at approximately 2:00 P.M. Later, approximately 7:50 P.M., the owner called and spoke with Captain Novack. There were no indications of any problems during either phone conversation.

The clam processing company does not pressure the owner or captains to get the clam boats underway. They do on occasion ask the owner to have some of his boats return to port early so they can process the clams.

Mr. Alexander did not oversee any maintenance on the CAPE FEAR including lifesaving and firefighting equipment maintenance.

There were no written instructions to the master or the port engineer instructing them to notify the owner of any conditions or discrepancies aboard the clam boats.

The port engineer would normally notify Mr. Alexander of major work that needed to be done on the boats, such as an engine overhaul.

There were no written operating procedures regarding fishing on the clam boats.

Mr. Alexander did not ensure drills were conducted onboard his clam boats. In 1995, he paid for one person (captain or mate) from each boat to attend a 2-day Drill Conductor Workshop, and testified that it was the captains' job to oversee drills onboard their boats.

There was no training program for the crew of Mr. Alexander's vessels. There were no formal schools that Mr. Alexander required his crews to attend.

After the CAPE FEAR sank, the owner and the port engineer had wooden handles installed on the survival suit zipper tabs for the other clam boats owned by Mr. Alexander.

After the CAPE FEAR sank, the owner and the port engineer instructed the captain of the MISTY DAWN to reduce the number of cages they carried to the number specified in their stability booklet. Additionally, the owner instructed his other fishing vessel crews to read their stability instructions. The owner contacted a naval architect and asked questions so he could explain the stability instructions to his crews and answer their questions.

#### Hiring Practices

Mr. Alexander hired the captain, Steven Novack, and the port engineer, Tom Becica. When hiring captains, Mr. Alexander primarily looks at their experience on clamming vessels. Mr. Alexander interviews the candidates for captain prior to hiring them.

No pre-employment drug testing is conducted for new employees.

The crew of CAPE FEAR signed a Crewmember Contract when they were initially hired. The contract is a standard form with blanks for the crewmember's name, the name of the vessel and the amount they will be paid per bushel. It explains general company policies and has signature lines for the crewmember, the captain and the managing owner. The contract specified that use or possession of drugs or narcotics on board was unauthorized conduct, and that crewmembers will submit to a pre-employment physical and substance abuse test at the operators / insurance companies expense and discretion.

A record of Captain Novack's Crewmember Contract was subpoenaed, but the owner was unable to locate it.

The Captain and crew of the CAPE FEAR were paid by the bushel of clams caught, based on 32 bushels of clams per loaded clam cage. Captain allotted himself \$.30 per bushel, and determined the amount per bushel that the Mate and rest of the crewmembers made. Mate made \$.20 per bushel of quahogs and \$.24 per bushel of surf clams. Trip Logs for 1998 landings indicate the CAPE FEAR caught 370,496 bushels of clams. Based on the 1998 Trip Logs, if they made every trip, the Captain would have earned approximately \$111,150 that year, and the Mate would have earned approximately \$80,000. It is unknown how many trips the Captain and Mate actually worked in 1998.

#### Company Repair Practices and Policies

There were no written company repair or maintenance policies.

Mr. Alexander did not instruct the port engineer to keep a Preventative Maintenance System (PMS) aboard the clam boats. The port engineer did not have a PMS aboard the clam boats, except for routine main engine oil and filter changes. No dockside maintenance records were kept.

#### Interaction with Other People

There were no written job descriptions of duties for the captain, the port engineer or any crewmembers.

According to Mr. Alexander, the port engineer's job was to oversee all maintenance done by employees and contractors, including scheduling dry docks. In Mr. Alexander's absence, the port engineer scheduled the clam boats and stayed in contact with them.

According to Mr. Alexander, Captain Novack's duties were to manage the crew and control the vessel underway. Captain Novack and his crew maintained the CAPE FEAR and coordinated with the port engineer when they needed assistance or repairs.

Mr. Alexander interacted informally with the crews of his clam boats. He did not hold meetings with the captains. Every few days he would visit the boats and have coffee with anyone that was onboard.

Last time he visited the vessel was 7 January 1999. During that visit he met with Captain Novack. Neither Captain Novack nor the owner were aware of any problems aboard the CAPE FEAR with the exception of a valve handle missing on the RSW sea chest valve which was reported to the port engineer.

Mr. Alexander testified that he had no idea why the CAPE FEAR sunk.

#### Standing Policies / Directives

There were no formal or written policies or directives issued to the crewmembers aboard Mr. Alexander's vessels other than the Crewmember Contract. There were no formal or written standing operation procedures.

#### CAPTAIN NOVACK

##### Experience in Industry and Qualifications

Captain Novack served as the Captain of the F/V CAPE FEAR since the owner, Warren Alexander, bought the boat.

The last time the Captain missed a trip for vacation was three months prior to the casualty.

Captain Novack completed a 16-hour Drill Conductor Workshop at Cape May Seafood Association, Inc., on January 6 & 7, 1995. That was the only formal training Captain Novack has received regarding his profession.

Captain Novack has never held any Coast Guard license or merchant mariner's document.

#### Financial Limitations

Captain Novack testified that he did not have any financial problems before the CAPE FEAR sank.

#### Degree of Control Over Vessel Operations

When asked what his responsibilities as the master of a fishing vessel were, Captain Novack responded by saying "You could sum it up saying just upkeep and maintenance and just making sure everything is running properly."

Captain Novack listened to weather forecasts and determined whether or not the CAPE FEAR would get underway.

#### Hiring Practices

Captain Novack hired his crew, as was customary on all of the boats Warren Alexander owned.

#### Captain's Repair Practices and Policies

Captain Novack reported any problems on the CAPE FEAR to Warren Alexander, Tom Becica or Andy Becica (the alternate Port Engineer). There was one outstanding problem when the CAPE FEAR sank. The sea chest valve handle in the Hydraulic Room was broken and would just spin on the stem. The port engineer was unable to tell if the valve was open or closed.

#### Interaction with Other People

Captain Novack had served with Mr. Reeves, Mr. Martin and Mr. Lemieux approximately 1 year. He had served with the Mate for a total of approximately 9 years.

Watch Schedules. There was no watch schedule used. The Captain and Mate alternated standing watch, switching when they got tired, but not on any set schedule. The one on watch would just ask the other to relieve him when they got tired. The deckhands made their own watch schedule for loading the clam cages.

On the 7 – 8 January 1999 voyage, Captain Novack got the CAPE FEAR underway at 3:15 P.M. on 7 Jan, and had the watch until he was relieved by the mate at approximately 5:00 A.M. 8 Jan. Sometime between 3 and 5:00 P.M., the Captain relieved the Mate. The Captain had the watch until the CAPE FEAR sank.

There was no formal watch relief process, nor were rounds of the vessel conducted prior to assuming the watch. The Captain and the Mate would normally just have a conversation. Neither the Captain nor the Mate could recall what they discussed at the changes of watch during the 7 – 8 January voyage. The Captain testified that although he could not recall the conversation, he would have asked the Mate about the weather during the 3 – 5:00 P.M. watch relief on 8 January 1999.

## Standing Policies / Directives

Captain Novack did not know what part of the regulations, 46 CFR, pertain to fishing vessels and testified he was only somewhat familiar with these regulations.

Captain Novack talked with his crew about emergency situations. This was not done on a regular schedule, nor was it logged. No drills were conducted as if there was an actual emergency. The last time the crew pulled out the survival suits was in November 1998, and they changed to batteries on the strobe lights, but did not don the suits or wax the zippers. Captain Novack considered the survival suit maintenance and safety conversations he had with his crew to be drills.

Captain Novack was not at all familiar with the Stability Book, and had only glanced at the front of it when it was first placed aboard the vessel. He was not aware of the recommendations listed in the Stability DO's and DON'T's.

With the owner's knowledge and consent, Captain Novack decided approximately a year before the casualty to carry 130 cages. After the vessel was lengthened, he gradually increased the number of cages from 115 to 130.

Captain Novack loaded the clam cages and the fuel and ballast tanks on the CAPE FEAR by experience, and did not reference the Stability Book. He testified that after years of working on the water and knowing how the boat handled in rough weather, he knew how to do it by "common sense."

Captain Novack did not have any written policies or directives for his crew.

The Mate testified that the Captain's rules were no drugs, no alcohol, and follow orders.

## Physical Limitations

The morning after the F/V CAPE FEAR sank, Captain Novack tested [REDACTED].

Captain Novack did not appear to have any other unusual physical limitations.

## Disposition

Captain Novack maintained a good disposition throughout the hearings. He was helpful and appeared very concerned about his shipmates and the casualty.

When asked if he knew why the CAPE FEAR sank, Captain Novack said he did not know. But, he speculated that water must have entered the number 3 port and starboard clam tanks, possibly from seepage through the hatch covers or from a problem with the clam pump system. He added that if this flooding of the aft clam tanks had occurred, he thought he should have noticed the stern staying more awash vice shedding the waves that washed on deck. Based on the way he saw the vessel sink, he said that both the port and starboard clam tanks must have flooded, because the CAPE FEAR sank evenly prior to capsizing.

## CREW INFORMATION:

### JAMES HALEY, MATE

#### Qualifications and Experience

Mr. Haley served as the Mate and Engineer on the CAPE FEAR for the last 5 ½ years, and has been a commercial fisherman for 16 years.

Mr. Haley has served as the Captain of a fishing vessel in the past.

Mr. Haley was not aware of the requirements pertaining to fishing vessels in 46 CFR 28, and said he had not read them before.

The Mate has never had any formal training associated with his job, and has never had stability training.

The Mate attended a safety drill on the CAPE FEAR led by Tom Dameron. It is unknown when that training occurred.

The Mate normally worked 5 to 6 weeks on and one week off of the CAPE FEAR.

Mr. Haley has never held any Coast Guard license or merchant mariner's document.

#### Role

There is no written job description of duties for the Mate on the CAPE FEAR. The Mate understood that his job was to oversee the maintenance of the CAPE FEAR and ensure it was ready for sea. Specifically, he oversaw the maintenance of the engines and the deck equipment.

Mr. Haley was not a mechanic, and understood his role to be supervisory in nature.

The mate loaded the ballast tanks, fuel tanks, day tanks and hydraulic tanks on board as part of his regular duties.

Mr. Haley was not at all familiar with the Stability Book.

Mr. Haley loaded the clam cages and ballast, fuel, day and hydraulic tanks on the CAPE FEAR by experience, and did not reference the Stability Manual. He said he loaded the vessel the way he was told to by the Captain, and the way they had always done it.

The Mate tested the bilge alarms as part of his regular duties.

Mr. Haley was not specifically in charge of the maintenance of lifesaving equipment. He was unsure who was in charge of maintaining the equipment, but said that the crew serviced the equipment as a group.

#### Physical Limitations

Mr. Haley wore glasses.

The morning after the F/V CAPE FEAR sank, Mr. Haley tested [REDACTED]  
[REDACTED]

Mr. Haley did not appear to have any other unusual physical limitations.

#### Interaction with Other People

The Mate had served with Mr. Reeves, Mr. Martin and Mr. Lemieux approximately 1 year. He had served with the Captain for a total of approximately 9 years.

There was no particular crewmember that the Mate worked closest with to fix or maintain equipment onboard.

The Mate notified Tom Becica, the shore-side port engineer, when he needed assistance fixing broken equipment.

Drills. The Mate could not recall the last time an emergency drill was conducted on the CAPE FEAR or the last time the crew donned their survival suits.

When asked if he knew what caused the CAPE FEAR to sink, the Mate testified that he had no idea.

#### JOSEPH LEMIEUX, DECKHAND

##### Qualifications and Experience

Mr. Lemieux has never held any Coast Guard license or merchant mariner's document.

Mr. Lemieux has been a fisherman for 1 year and 3 months. He was serving as a relief crewmember for the F/V CAPE FEAR since October of 1997. He got underway with the CAPE FEAR when a permanent crewmember was on vacation. Mr. Lemieux made a few trips on other fishing vessels during the 1 year and 3 months.

Mr. Lemieux has never had any formal training related to his job as a fisherman. Specifically, he has never attended any safety, stability or firefighting schools.

##### Role

As a deckhand, Mr. Lemieux assisted with the maintenance of equipment on deck and loading the clams in the cages. He knew how to and operated the clam pump system.

##### Physical Limitations

The morning after the CAPE FEAR sank, Mr. Lemieux took a drug test and tested [REDACTED]

Mr. Lemieux did not appear to have any unusual physical limitations.

Mr. Lemieux does not know how to swim. Both Captain Novack and Mate Haley knew this prior to the casualty.

When asked if he knew what caused the CAPE FEAR to sink, Mr. Lemieux testified that he did not know.

#### PAUL MARTIN, DECKHAND

##### Qualifications and Experience

Mr. Martin had made several trips with the F/V CAPE FEAR over the last 3 months.

Mr. Martin was hired in October of 1995 to work on the F/V MISS MERNA, a clam boat owned by Warren Alexander.

##### Role

As a deckhand, Mr. Martin assisted with the maintenance of equipment on deck and loading the clams in the cages.

## Physical Limitations

Toxicology results from blood drawn during the autopsy of Mr. Martin indicate that he had cocaine in his system.

Based on the testimony of other witnesses and results of the autopsy, Mr. Martin did not have any unusual physical limitations.

## STEVEN REEVES, DECKHAND

### Qualifications and Experience

Mr. Reeves had made several trips with the F/V CAPE FEAR over the last year.

Mr. Reeves signed a crewmember contract on 8 February 1996 to work on the F/V JOHN N, a clam boat owned by Warren Alexander.

### Role

As a deckhand, Mr. Reeves assisted with the maintenance of equipment on deck and loading the clams in the cages.

### Physical Limitations

There was no testimony that indicated Mr. Reeves had any unusual physical limitations.

## ENVIRONMENT INFORMATION

### Weather Conditions:

6 January 1999:

F/V CAPE FEAR departed New Bedford and returned on 06 January 1999 due to the weather conditions. Captain Steven Novak, F/V CAPE FEAR, testified regarding the forecast for 06 January 1999, stating, "I believe it was somewhere out of the south. That day we went to go out on the 6<sup>th</sup>, it was somewhere out of the south. I wanted to go look at it and they were calling for so-so, and like I say, it seemed like it wasn't going to be fit so we didn't want to bother with it."

The National Weather Service forecast issued at 1600 for WED, 06 Jan 99 for Buzzards Bay and Rhode Island Sound read: "Gale warning tonight. TONIGHT: SW wind increasing 25 to 35 knots. Seas building 3 to 6 ft. Scattered evening flurries. THU, 07 Jan 99: W wind 20 to 30 knots becoming NW around midday. Seas 3 to 6 ft. Vsby may lower to less than 3 miles in morning snow. THU NIGHT: NW wind 20 to 25 kts early then diminishing 10 to 15 kts and becoming NE toward daybreak. Seas subsiding 2 to 4 ft. FRI, 08 Jan 99: NE wind 10 to 15 kts becoming SE. Seas 2 to 4 ft."

The Mate testified that the weather conditions on 6 January were essentially the same as the weather conditions on the afternoon of 8 January.

7 January 1999

F/V CAPE FEAR departed the Sea Watch, Int. dock in New Bedford at 1515. Captain Steven Novack, F/V CAPE FEAR, testified regarding the weather for 07 Jan 99 stating, "I knew they called for on the 7<sup>th</sup>, on the 7<sup>th</sup> of January, that night they were calling for light and variable through the 8<sup>th</sup>, light and variable until about lunchtime, approximately about lunchtime. After

lunchtime they were calling for 20 to 25, south southeast or east southeast, 20, 25, increasing, I thought, maybe 25 to 45 or 30 to 40 or a pretty stiff -- they were calling for a gale sometime around midnight."

Captain Novack testified that he used the VHF and single side band radios to check the weather forecasts.

The National Weather Service forecast issued at 1040 on 07 Jan 99 for Buzzards Bay and Rhode Island Sound read: "SMALL CRAFT ADVISORY. (BUZZARDS BAY) THIS AFTERNOON: NW 25 to 30 kts diminishing to 20 to 25 kts late. Seas 4 to 8 ft. Light freezing spray developing. (RI SOUND) THIS AFTERNOON: NW wind 20 to 25 kts diminishing to 15 to 20 kts late. Seas 3 to 6 ft. (BUZZARDS BAY & RI SOUND) TONIGHT: NW wind 15 to 20 kts early then diminishing to 10 to 15 kts. Seas subsiding 2 to 4 ft. FRI: Variable wind less than 10 kts becoming SE 15 to 20 kts in the afternoon. Seas 2 to 4 ft."

The National Weather Service forecast issued at 1530 on 07 Jan 99 for Buzzards Bay and Rhode Island Sound read: "TONIGHT: NW wind 15 to 20 kts early then diminishing to 10 to 15 kts. Seas subsiding to 2 to 4 ft. FRI: Variable wind less than 10 kts becoming SE 15 to 20 kts this afternoon. Seas 2 to 4 ft. Vsby lowering during the afternoon to under 1 mile in snow. FRI NIGHT: SE winds 15 to 20 kts. Seas 3 to 5 ft. Vsby improving to 1 to 3 miles as snow changes to rain. SAT: SW wind 15 to 20 kts. Seas 3 to 5 ft. Vsby 1 to 3 miles in rain."

The National Weather Service forecast issued at 2205 on 07 Jan 99 for Rhode Island Sound read: "OVERNIGHT: Wind diminishing to W 10 kts. Seas 2 to 4 ft. FRI: Variable wind less than 10 kts becoming SE 15 to 20 kts in the afternoon. Seas 2 to 4 ft. Vsby lowering during the afternoon to under 1 mile in snow. FRI NIGHT: SE winds 15 to 20 kts. Seas 3 to 6 ft. VSBY improving to 1 to 3 miles as snow changes to rain. SAT: SW wind 15 to 20 kts. Seas 3 to 6 ft. Vsby 1 to 3 miles in rain and fog."

8 January 1999

Captain Steven Novack, F/V CAPE FEAR, testified regarding the weather forecast for 08 January 1999 stating, "It was a gale, the exact, 25 to 35. They could have called for more than that but I know they were at least calling for gale. I believe it was south, south to southeast they were calling for gale coming through sometime around midnight on the 8<sup>th</sup> to the morning of the 9<sup>th</sup>."

The National Weather Service forecasts issued at 0335 and 1045 on 08 Jan 99 for Buzzards bay and Rhode Island Sound read: "TODAY: NW wind 10 kts or less this morning...GALE WARNING.....This afternoon....wind becoming SE 15 to 20 kts. Seas 2 to 4 ft. Vsby lowering to under 1 mile in snow. TONIGHT: SE winds 20 to 25 kts becoming SW and increasing to 25 to 35 kts. Seas building to 4 to 8 ft. Snow changing to rain early with vsby below 3 miles and locally below 1 mile. SAT: SW wind 30 to 40 kts diminishing to 25 to 35 kts late in the day. Seas 5 to 10 ft...highest near Nantucket. Vsby 1 to 3 miles in rain and fog."

The National Weather Service forecast issued at 1515 on 08 Jan 99 for Buzzards bay and Rhode Island Sound read: "GALE WARNING..... TONIGHT: SE wind increasing to 25 to 35 kts. Seas building to 4 to 8 ft. Snow changing to rain early with vsby below 3 miles and locally below 1 mile. SAT: SW wind 30 to 40 kts diminishing to 25 to 35 kts late in the day. Seas 5 to 10 ft...highest near Nantucket. Vsby 1 to 3 miles in rain and fog. SAT NIGHT: Wind becoming NW 20 to 30 kts. Seas 4 to 8 ft. Vsby 1 to 3 miles in rain. SUN: NW wind 15 to 25 kts. Seas 4 to 8 ft. Vsby locally below 1 mile in snow squalls."

Captain Steven Novack, F/V CAPE FEAR, testified regarding the weather on the fishing grounds on the evening 08 January 1999 stating, "The weather, when we left, we pulled out at roughly 6:30, 6:45 PM on the 8th. The weather was just starting to come on a few hours before that previous to the time we left the grounds. I would say the weather was blowing somewhere around

20 to 30 out of the southeast. The seas were starting to build. The sea was probably roughly running 6 foot or a little better, 8 foot in sets; probably running about 6 to 8 foot you could say out of the southeast."

At 2000, the F/V MISTY DAWN, underway in the vicinity of Buzzards Bay Tower reported: Wind direction southeast, speed 25 kts or "a little bit more", seas 6-7 ft, visibility  $\frac{3}{4}$  of a mile.

At 2148, USCG Helicopter, 6021, on-scene the search area reported: Wind direction 150-210 degrees (T), speed 30 kts, heavy rain/snow mix with 200-400 ft ceiling, vsby 1-6 miles, seas 6-10 ft.

9 January 1999

On 09 Jan 99 at 0000, USCGC PT FRANCIS, underway in the search area on Buzzards Bay recorded: Wind direction 235 degrees (T), speed 22 kts, barometric pressure 30.13 inches, overcast skies, visibility 3 miles, air temp 45 degrees, sea waves 210 degrees (T), height 6 ft.

## **CONCLUSIONS:**

The cause of the **capsizing** and **sinking** of the FV CAPE FEAR was downflooding from following seas into the clam tanks through hatch covers that were not weathertight. Evidence indicates the downflooding most likely began in the number 3 port and starboard clam tanks and spread to the number 2 port and starboard clam tanks.

- ♦ The number 3 port clam tank hatch cover was open approximately 6 inches, which allowed for greater downflooding than the other clam tanks. Although the clam pump was lined up properly to take a suction on the number 3 port clam tank it most likely did not keep up with downflooding caused by seas washing up on the number 3 port clam tank hatch cover.
- ♦ The seas washed up on the CAPE FEAR's starboard quarter and stern causing downflooding in the number 3 starboard clam tank because the hatch cover was not weathertight. The water in the number 3 starboard clam tank was able to accumulate because there were no pumps that were energized in the space.
- ♦ The flooding was most likely difficult to detect because the vessel was rolling in rough sea conditions; it did not develop a pronounced list, and it gradually increased its trim by the stern. Flooding into the number 3 clam tanks with following seas and no evasive action was in itself enough to cause the foundering and subsequent sinking.
- ♦ Flooding into the number 2 port and starboard clam tanks most likely occurred from downflooding through non-weathertight hatch covers and a vertical gap between the overlap of the number 2 and number 3 hatch covers. This was due to the amount of water that flooded number 3 clam tanks and the added weight of the water on the vessel's stern which caused the seas to wash further forward onto the vessel. Flooding also occurred from water washing over the top of the transverse bulkheads from the number 3 port and starboard clam tanks into the number 2 port and starboard clam tanks since there was a 5 ½ inch gap between the top of the transverse bulkhead and the bottom of the hatch covers.

The cause of the **death** of Paul Martin was determined by the medical examiner to be hypothermia and drowning. Mr. Martin did not fully don his immersion suit. The zipper on the immersion suit on Mr. Martin's body was found stuck open by the Massachusetts Environmental Police and Westport Police. A Coast Guard Marine Inspector from MSO Providence was unable to move the zipper on Mr. Martin's suit, a marine consultant hired by the owner of the CAPE FEAR was able to move the zipper. It cannot be determined if an inoperative zipper prevented Mr. Martin from fully donning the suit prior to entering the water or if he had other difficulties zipping up the suit once in the water.

Based on testimony of the survivors, the cause of Steven Reeves's **death** was hypothermia and drowning. Mr. Reeves did not fully don his immersion suit prior to entering the water. A survival suit stenciled with "CAPE FEAR" on it that was found without a storage bag washed ashore 9 January 1999. That suit is most likely the suit that Mr. Reeves was attempting to don. A Coast Guard Marine Inspector from MSO Providence was unable to move the zipper on Mr. Reeves' suit, a marine consultant hired by the owner of the CAPE FEAR was able to move the zipper. It cannot be determined if an inoperative zipper prevented Mr. Reeves from donning the suit prior to entering the water or if he had difficulties zipping up the suit once in the water.

The CAPE FEAR capsized to port and rolled completely upside down (keel up) in a matter of 5 minutes after the stern was awash in vicinity of the number 3 clam tanks. The vessel then sank to the bottom because watertight doors into the engine room, shaft alley and galley were left open, allowing the engine room, shaft alley and galley to flood once the vessel capsized. Additionally, the number 1 and number 2 port and starboard clam tank hatch covers, which are held in place by gravity, most likely fell off when the CAPE FEAR capsized enabling further flooding of the clam tanks.

The F/V MISTY DAWN received the distress call on VHF channel 8, and immediately turned around on a course for the CAPE FEAR's last known position and called the Coast Guard. After spotting a strobe light on the water, the crew of the MISTY DAWN rescued the three survivors of the CAPE FEAR from the water. The actions of the crew of the F/V MISTY DAWN were instrumental in the rescue of the survivors.

Following the sinking of the CAPE FEAR, a harmful quantity of oil (approximately 17,900 gallons of diesel fuel oil and 2,050 gallons of lube oil) were discharged into Rhode Island Sound and Buzzard's Bay, a U.S. navigable waterway, in violation of 33 USC 1321(b)(3).

### **Causes of the Accident**

- ◆ Active Failures leading to the Accident
  - ◆ Active Human Performance Failures
    - ◆ The failure to load the vessel in accordance with the guidance in the Stability Book resulted in the vessel being overloaded and improperly loaded, and created a hazardous stability condition.
    - ◆ The crew of the CAPE FEAR did not need any specific stability training to follow the simple stability Do's & Don'ts. However, proper stability training would have made them aware of the importance and consequences if the simple Do's and Don'ts were not followed.
    - ◆ The failure to maintain an 18-inch freeboard at the stern in accordance with the guidance provided in the Stability Book created a hazardous situation. The 6 to 8-foot following seas made this condition particularly hazardous, because the seas were able to wash over the stern. This is a stability book DO.
    - ◆ The failure to properly secure the number 3 port clam tank hatch cover allowed water washing on the deck to enter into the number 3 port clam tank.
    - ◆ The failure to determine why the clam pump running at half speed (approximately 3000 gallons per minute), while lined up to take a suction in the number 3 port clam tank for the 3 hours prior to the CAPE FEAR sinking, did not pump the space dry, and the failure to determine how much water was in the number 3 port clam tank, allowed the flooding to progress unchecked. Based on testimony and post-casualty dive surveys, the clam pump was lined up properly to take a suction in the number 3 port clam tank.
    - ◆ The failure to immediately recognize the dangers of seas washing up on the stern and the failure to detect or recognize downflooding into the number 3 clam tanks cost valuable time needed to save the ship and the crew. There was a failure to recognize dangers from when they first left the fishing grounds where they could have taken evasive actions including changing course, closing the number 3 port hatch cover, lining up the clam pump for both the number 3s even the 2s, and paying attention to the overboard discharge and gauges to ensure it was pumping (i.e: definitely different when clogged, pumping or space dry).
    - ◆ The failure to take immediate and proper evasive action when the vessel was in imminent danger of sinking contributed to how fast the capsizing and sinking occurred. The Captain slowed the vessel by putting its engine to idle when he realized the vessel was in imminent danger as the stern was sinking. This maneuver causes the stern to rise in normal conditions but may have been the wrong action to take with the stern already under water with following seas. He also did not change course. It is possible that keeping way on and turning in to the seas could have stopped the seas from washing over the stern and may have stemmed further downflooding into the clam tanks. A possibility exists however, that turning into the seas may have caused the CAPE FEAR to capsize as they passed beam to the seas. Running the CAPE FEAR aground was not an option because the closest point of shallow water to the vessel was approximately 1 mile to the direction east south east. Captain Novack also throttled back the clam pump that was lined up to take a suction

on the number 3 port clam tank. This may have increased the rate of flooding in the number 3 port clam tank and in combination with the wind and sea direction caused the CAPE FEAR to roll to port. Because Captain Novack was not aware that the stern was gradually sinking until the sinking was imminent, it is unlikely that any emergent evasive actions could have saved the vessel, since it was already within 5 minutes of capsizing. I am unable to conclusively determine if any particular strategy for emergent evasive actions could have prevented the vessel sinking or bought enough time to allow the crew to abandon ship properly.

- ◆ Because of the failures that allowed the initial problems to escalate to an emergent situation and the failure to take immediate evasive action to control the situation once it was emergent, the crew did not have time to determine the source of the flooding or make any attempt to control it. They also did not have time to properly abandon ship. They were not able to deploy the life raft or call MAYDAY to the Coast Guard, and three of the five crewmembers did not completely don their immersion suits before the CAPE FEAR capsized. They were, however, able to call the F/V MISTY DAWN, and ask for assistance. The fact that they were able to call the MISTY DAWN in all probability is the only reason that three lives were saved.
- ◆ Active Equipment Failures
  - ◆ Based on dive surveys and post-salvage Coast Guard survey of the CAPE FEAR, there were no catastrophic equipment failures. The hull and piping systems were fully intact prior to the salvage of the vessel. There was no evidence of any grounding damage that may have caused this casualty.
    - ◆ The hole in the port hull in the vicinity of the engine room was made after the capsizing and was most likely caused by the F/V MISTY DAWN accidentally striking the partially submerged CAPE FEAR during the search and rescue.
    - ◆ The 10-inch schedule 80 clam pump pipe was in good condition except for the fracture in the hydraulic room which was caused by salvage operations.
    - ◆ There was no evidence of any failures resulting from the mid body conversion.
    - ◆ The stern tube, rudder post, sea chests, and keel coolers were intact with no evidence of any damage.
    - ◆ The watertight bulkheads, doghouse aft, and the transverse and centerline bulkheads in the clam tanks were all in good condition.
    - ◆ The tears in the hull located aft were caused by cable damage that occurred during salvage operations.
    - ◆ All voids, ballast tanks and fuel tanks were found to be in good condition.
  - ◆ Problems with the immersion suits may have contributed to the deaths of two crewmembers.
    - ◆ Although it cannot be determined for certain, it is possible that the zippers on two of the immersion suits used got stuck in the open position rendering them most difficult for the crewmen using the suits to zip them up without assistance. Neither of the crewmen who died zipped their survival suits up. A Coast Guard Marine Inspector was able to move the zippers on the immersion suits worn by the three survivors. That same inspector applied considerable force using two hands, and was unable to move the zipper on the suit that was taken off of Mr. Martin's body and the zipper on a suit that is believed to be the one Mr. Reeves wore. Later, a marine consultant hired by the owner of the CAPE FEAR was able to move the zippers on Mr. Martin and Mr. Reeves' survival suits.
    - ◆ The sparse amount of retro-reflective tape on Mr. Martin's suit and strobe lights that did not light on his and Mr. Reeves' suit hampered their search and rescue. Of all of the suits used by the crew of the CAPE FEAR, only the Mate's strobe light worked, and the other two crewmen who were rescued, Captain Novack and Deckhand Lemieux were both alongside the Mate in the water. The crew of the MISTY DAWN testified that they were able to rescue the three crewmen because they spotted a strobe light.

- ◆ Hazardous Preconditions leading to Active Failures
  - ◆ Preconditions of the People leading to Active Human Performance Failures
    - ◆ Specific Precondition
      - ◆ Current regulations do not require masters of fishing vessels under 200 gross tons to be licensed or have any formal training. The only formal training the Captain of the CAPE FEAR had was a two-day safety drill conductor workshop in 1995
  - ◆ Connection to Specific Active Failure
    - ◆ There are certain professional standards for licensed personnel. Licensed personnel must be aware of the laws, regulations and guidance that pertain to their profession in order to pass licensing exams and are drug tested. If licensed personnel violate the law or regulations, fail a drug test, commit misconduct, or are incompetent or negligent, they can lose their licenses. Therefore, all of the Active Failures listed could have been eliminated or minimized if a properly trained, licensed mariner had been the captain of the CAPE FEAR.
    - ◆ Based on the testimony of the Captain and Crew of the CAPE FEAR, they had no real knowledge of stability. For captains and crews of loaded clam vessels, knowledge of stability is essential. Stability was detrimentally effected by stern trim, 130 vs 120 full clam cages and the way the vessel was ballasted. The vessel had approximately one foot to one and a half foot of freeboard at the stern, and following seas frequently washed and splashed on deck in vicinity of the number 3 clam tank hatch covers. Although aware that the clam tanks did get water in them from the seas when fully closed, the Captain and the Mate were not fully cognizant on the significance of hatches being non-weathertight or being left open 3 to 6 inches. This made it crucial that the clam tank hatch covers be closed and weathertight (if required) or closely monitored and that the clam tanks be kept dry. Any breach of these closures by downflooding combined with the added weight of breaking water on the stern left little room for error from a stability standpoint.
- ◆ Specific Precondition
  - ◆ Complacency;
- ◆ Connection to Specific Active Failure
  - ◆ Complacency, or inattentiveness of conditions aboard vessel, led to several of the Active Failures including the failure to follow the guidance in the Stability Book.
    - The failure to properly secure the number 3 port clam tank hatch cover;
    - The failure to determine why the clam pump did not pump the number 3 port clam tank dry and how much water was in the tank;
    - The failure to take the weather they were experiencing seriously;
    - The failure to immediately recognize the dangers of following seas washing up on the stern and the seriousness of the downflooding into hatches that were not weathertight;
    - The failure of the Captain to conduct a thorough watch relief and round of the vessel prior to assuming his watch; and
    - The failure of the Captain to conduct a thorough round of the vessel approximately 15 minutes prior to the sinking at the time they took two big rolls.
    - The failure to determine if water was entering clam tanks.
    - The failure to use the clam pump piping system to pump out all tanks periodically as a precaution.
    - Lack of concern carrying 10 additional clam cages.
    - Lack of concern and failure to read and understand the Stability Book

- ◆ Specific Precondition
  - ◆ The Captain, crew and owner of the CAPE FEAR were completely unfamiliar with the contents of the vessel's Stability Book to the degree they were even unfamiliar with the simple Do's and Don'ts contained within the book.
- ◆ Connection to Specific Active Failure
  - ◆ Lack of knowledge and familiarity with the Stability Book regarding safe loading and operation of the vessel caused several Active Failures, including:
    - The failure to liquid load the vessel in accordance with the guidance in the Stability Book.
    - The failure to maintain an 18-inch freeboard at the stern.
    - The failure to recognize and be alert to the dangers of following seas washing up on the stern and the seriousness of the downflooding.
    - The failure to maintain the watertight integrity of the vessel by leaving 3 of the 4 watertight doors open for the entire voyage.
    - The failure to load the vessel with the acceptable 120 versus 130 clam cages.
    - The failure to recognize that the stability book did not reflect the vessel configuration regarding double bottom ballast tanks being used as double bottom fuel tanks.
    - The failure of the owner to notify the Qualified Individual of the discrepancy with the double bottom ballast tanks and fuel tanks which accordingly limited the options involving trimming the vessel.
    - The failure of the owner to notify the Qualified Individual of tonnage modifications and increase to 130 clam cages.
  - ◆ Below is a listing of each Stability DO and DON'T listed in the Stability Book, followed by a description of how each was followed or not followed.

The 1996 Stability Book contained the following STABILITY DO'S – GENERAL OPERATING CONDITIONS

Text in ALL CAPS is taken from Exhibit 16, Page 6 – Stability Manual dated 12 Apr 96  
Text in Sentence Case represents facts revealed in testimony and exhibits.

DO - RESTRAIN ALL DUNNAGE, STORES AND SPARE GEAR IN SUCH A MANNER TO PREVENT SHIFTING IN A SEAWAY.

Testimony regarding the placement of clam cages on deck indicated that they were positioned in a manner to prevent them from shifting on deck. No other dunnage, stores or spare gear were discussed in the hearings.

DO - KEEP CROSS CONNECTIONS BETWEEN PORT AND STARBOARD TANK PAIRS CLOSED AT ALL TIMES.

There were no cross connections between the port and starboard clam holds or double bottom tanks.

DO - USE FUEL AND OTHER CONSUMABLES IN A SEQUENCE SUCH AS TO MINIMIZE TRIM AND LIST.

The crew did use fuel to minimize list, but did not use fuel to minimize trim. During their voyage, they used the fuel in the number 1, port and starboard double bottom tanks, vice the fuel in the number 2 tanks, which would not have helped their aft trim

DO - KEEP WATERTIGHT DOORS, ICE SCUTTLES, AND ACCESS HATCHES CLOSED AT ALL TIMES EXCEPT WHEN IN ACTUAL USE.

Three of the four watertight doors on board were left open.

1. The watertight door leading to the engine room was tied open.
2. The watertight door in the engine room leading to the shaft alley was left open so the entrance to the shaft alley could be viewed in the pilothouse through a camera in the overhead of the engine room.
3. The watertight door leading to the Galley was open. These three doors remained open for the entire trip.
4. Two of six dogs on the watertight door in the doghouse leading to the Hydraulic Room were shut to keep the door closed. The normal practice aboard the CAPE FEAR was to close the middle and lower dogs on the side opposite the door's hinges.

The number 3 port clam tank hatch was left open 3 – 6 inches.

DO - KEEP BILGES AND VOIDS PUMPED TO MINIMUM CONTENT CONSISTENT WITH POLLUTION PREVENTION REQUIREMENTS.

Testimony indicated this was done. Monitors and bilge alarms indicated no water in bilges. When alarm sounded- bilge pumping ensued.

DO - KEEP DECK FREEING PORTS OPERABLE AND UNOBSTRUCTED AT ALL TIMES.

Freeing ports were large and open, additionally, the open stern ramp allowed for plenty of drainage.

DO - MAKE EVERY EFFORT TO DETERMINE THE CAUSE OF ANY LIST IN THE VESSEL BEFORE TAKING CORRECTIVE ACTION.

Testimony indicated there was a slight port list (1 to 2 degrees), and that the port double bottom fuel tank was being drawn from because the Captain preferred the slight port list in the sea conditions.

DO - MAINTAIN A MINIMUM OF 18-INCH FREEBOARD AT THE STERN.

Mr. Koopman testified that if the freeboard was less than 18 inches it would present a hazard, particularly if the vessel sustained damage aft. Stability would be greatly reduced and could lead to swamping or capsizing.

There were no freeboard or draft marks on the hull of the CAPE FEAR. The Captain approximated that the freeboard at the stern when the CAPE FEAR left port was 3 feet, and that the freeboard was 12 to 18 inches aft when the CAPE FEAR left the fishing grounds (while the deckhands were loading the last 2 – 3 cages). Joe Lemieux, a deckhand who was on the stern loading the cages, estimated that the freeboard aft was 10 inches when the CAPE FEAR left the fishing grounds, and said that the scuppers were awash with the waves.

DO - MAINTAIN FRESH WATER AND HYDRAULIC OIL TANKS FORWARD AS FULL AS POSSIBLE TO MINIMIZE TRIM.

Testimony indicated the fresh water and hydraulic oil tanks were nearly full at the time of the incident.

DO - USE BALLAST TANK #2 STARBOARD TO MINIMIZE HEEL.

This tank was actually the number 2 starboard double bottom fuel tank. This tank was not used to minimize heel.

DO - LOAD CAGES INTO HOLDS STARTING WITH HOLD 1 WORKING BACK.

Testimony indicated this was done.

DO - USE BALLAST TANK #1 P/S TO MINIMIZE TRIM AS AFT TRIM INCREASES.

These were actually the number 1 port and starboard double bottom fuel tanks and needed as fuel tanks for the operation of the vessel.

Therefore, the crew could not have used the number 1 port and starboard double bottom fuel tanks as ballast tanks to minimize trim.

The 1996 Stability Book contained the following STABILITY DON'T'S – GENERAL OPERATING CONDITIONS

Text in ALL CAPS is taken from Exhibit 16, Page 7 – Stability Manual dated 12 Apr 96  
Text in Sentence Case represents facts revealed in testimony and exhibits.

DON'T - RESTRAIN DUNNAGE OR DECK CARGO BY ATTACHING TO TANK VENTS OR FILLS.

It appears the crew complied with this.

DON'T - RESTRAIN DUNNAGE OR DECK CARGO BY ATTACHING TO HATCH OR DOOR HANDLES.

It appears the crew complied with this.

DON'T - USE THE WATERTIGHT DOOR AT FRAME 17 DURING SEVERE WEATHER WHEN THERE IS A HIGH PROBABILITY OF WATER ON DECK.

There were two watertight doors at frame 17, the galley door and the engine room door. Both were open for the entire voyage.

DON'T - USE THE WATERTIGHT DOOR AT FRAME 52 DURING SEVERE WEATHER WHEN THERE IS A HIGH PROBABILITY OF WATER ON DECK.

Two of six dogs on the watertight door at frame 52 in the doghouse leading to the Hydraulic Room were shut to keep the door closed.

DON'T - OPERATE IN BAD WEATHER UNNECESSARILY WITH FLOODED HOLDS. HEAVY FOLLOWING SEAS ARE PARTICULARLY BAD WITH FLOODED HOLDS.

The clam holds (tanks) were not intentionally flooded, and were pumped out prior to departing the fishing grounds.

The vessel was returning to port in following seas.

DON'T - MOVE HEAVY GEAR ON DECK DURING BAD WEATHER.

It appears the crew complied with this.

DON'T - USE THE AFT PEAK BALLAST TANK FOR BALLAST WATER.

The three aft ballast tanks were treated as voids.

DON'T - USE BALLAST TANKS #3 AND #4 P/S.

Ballast Tanks #3 and #4 are actually Ballast Tanks #1 and #2, and are the port and starboard ballast tanks aft of the fuel tanks.

The following is the loading condition of those ballast tanks:

Port Double Bottom Ballast #1	Full
Starboard Double Bottom Ballast #1	Full
Port Double Bottom Ballast #2	Empty
Starboard Double Bottom Ballast #2	1/3 to 1/2 Full

DON'T - FLOOD HOLDS, ESPECIALLY WITH EMPTY OR NO CAGES.

The clam holds were not intentionally flooded.

- ◆ Specific Precondition
  - ◆ The Captain and crew of the CAPE FEAR did not conduct safety drills in accordance with 46 CFR 28.270.
- ◆ Connection to Specific Active Failure
  - ◆ Because drills, including abandon ship drills, were not conducted monthly for each individual on board and as actual emergencies, in accordance with the regulations, the crew may not have been familiar with the procedures to quickly deploy all available lifesaving equipment (life rafts, flares, EPIRBS, life rings, etc.).
  - ◆ The regulations (46 CFR 28.270 (b)) specify that drills must include donning immersion suits. Had drills been conducted as specified in the regulations, potential problems with the survival suit zippers, lights and retro-reflective tape may have been discovered and corrected prior to the casualty. Also, some of the crew may have been more familiar in donning immersion suits more quickly.
- ◆ Specific Precondition
  - ◆ Three of four crewmembers tested were found to be drug users. The Captain tested [REDACTED], the Mate tested [REDACTED], and deckhand Paul Martin tested [REDACTED] during a post-mortem toxicology screen. The investigation was unable to determine if and how drug use may have contributed to the casualty and the degree to which the drugs may have influenced the crewmembers.
- ◆ Specific Precondition
  - ◆ Fatigue is not believed to be a factor, because the Captain had been off watch for ten to twelve hours on the day of the sinking, and had only been on watch three to five hours when the CAPE FEAR sank.

- ◆ Precondition of the Equipment leading to Active Equipment Failures
  - ◆ Specific Precondition
    - ◆ The clam tank hatch covers were concluded to not be weathertight or maintained in a weathertight condition. In accordance with 46 CFR 28.500(a), the regulations requiring the hatch covers to be weathertight, 46 CFR 28.560(a), would only apply to the CAPE FEAR if the mid-body addition was considered a “major conversion”.
  - ◆ Connection to Specific Active Failure
 

Since the hatch covers were concluded to not be weathertight and the number 3 port clam tank hatch cover was open 3 to 6 inches, the number 3 port and starboard clam tanks became the downflooding point. Post casualty analysis using these hatches as the downflooding point resulted in the vessel failing all stability calculations (Torremolinos – 46 CFR 28.570, Severe Wind & Roll – 46 CFR 28.575, and Damage Stability for Fishing Vessels – 46 CFR 28.580) given the vessel's loaded condition at the time of the casualty. According to the testimony of LT Maguire, the downflooding point Mr. Koopman used in all of his stability calculations was a vent 6.5 feet above the main deck, and Mr. Koopman assumed the clam tank hatch covers were closed and weathertight.
  - ◆ Specific Precondition
    - ◆ Immersion suit lights, zippers and retro-reflective tape were not maintained on a set schedule and the immersion suit maintenance was not logged.
    - ◆ In their Care and Inspection Booklet, the U.S. Marine Safety Association recommends inspecting survival suits before every voyage or at least every quarter. Their instructions for inspecting survival suits include lubricating the zippers. Their Care and Inspection Booklet is included with Stearns and Parkway suits at the time of purchase. Additionally, Stearns, a survival suit manufacturer, recommends lubricating zippers every 6 months. The regulations, 46 CFR 28.140(b)(3), require lifesaving equipment to be maintained per the manufacturer's guidelines.
    - ◆ Additionally, 46 CFR 28.140 requires the master or person in charge to ensure that each item of lifesaving equipment be in good working order, ready for immediate use and readily accessible before the vessel leaves port and at all time when the vessel is operated.
    - ◆ There are no regulations requiring fishing vessel crews to log the maintenance of immersion suits.
  - ◆ Connection to Specific Active Failure
    - ◆ Problems with the survival suits may have been eliminated through regularly scheduled preventative maintenance – specifically waxing and exercising the zippers, ensuring the strobe lights work and checking the retro-reflective tape.
    - ◆ It cannot be determined if the immersion suit strobe lights worked properly before being submerged in the oil and seawater environment.
- ◆ Precondition of the Weather leading to Active Equipment Failures
  - ◆ Specific Precondition
    - ◆ Hazardous weather, namely 6 – 8 foot following seas, gale, snow and ice conditions during search and rescue; cold water, and low visibility (night plus snow/rain/sleet), led to several active failures.
  - ◆ Connection to Specific Active Failure
    - ◆ For the CAPE FEAR, the 6-8 ft seas following seas caused seawater to wash on deck
    - ◆ Night-time, combined with low visibility due to snow/rain/sleet conditions, hindered efforts to locate people in the water.

- ◆ The sea state hampered the SAR operations.
  - ◆ Weather conditions delayed the launch of the helicopter and eventually became so bad that the helicopter was grounded.
  - ◆ Cold water cut down the survival time of people in the water.
  - ◆ Weather conditions led to less time to reach fatigue limits for the Coast Guard 44 foot boat crews
- 
- ◆ Latent Unsafe Conditions Creating the Hazardous Preconditions
    - ◆ Captain Novack
      - ◆ Specific Latent Condition created
        - ◆ Captain Novack was unfamiliar with the applicable fishing vessel safety regulations; and
        - ◆ The two-day Drill Conductor Workshop that Captain Novack attended in 1995 was the only formal safety training he had.
      - ◆ Connection to Specific Hazardous Precondition
        - ◆ The Latent Condition listed above resulted in the Captain and crew of the CAPE FEAR not conducting safety drills monthly and as actual emergencies in accordance with the regulations. The last "drill" was conducted approximately 3 months before the casualty, and primarily consisted of a discussion period regarding actions to be taken during an emergency.
        - ◆ The Captain would have known the operational readiness, maintenance and inspection requirements for the lifesaving equipment if he had been familiar with the requirements in 46 CFR 28.
  - ◆ Decisions and Actions of High Level Decision-makers
    - ◆ Owners
      - ◆ Specific Latent Condition created
        - ◆ CAPE FEAR's owner does not have any formal written guidance or operational procedures for his fleet. He had no standard procedures or instructions with regard to weather, stability and trim or training and drills. In the absence of any standard policy, all decisions were left to the vessel's captains.
        - ◆ CAPE FEAR's owner did not provide / acquire training for the Captain regarding evaluating the impacts of weather, stability and trim on seagoing vessels.
        - ◆ The Captain and Owner had a verbal understanding that the Captain was to make decisions regarding whether or not to get underway due to weather or other conditions.
        - ◆ The Captain increased the number of cages by the feel of the vessel, and the Owner was aware of it. Both thought the stability book was conservative. Neither the Captain or the Owner brought the increase of 120 to 130 clam cages to the attention of a Naval Architect.
      - ◆ Connection to Specific Hazardous Precondition
        - ◆ The Captain was not given the tools necessary to make prudent operating decisions. He was required to load his vessel without training in stability.
        - ◆ There was no company policy regarding:
          - Hiring of personnel
          - Job descriptions or individuals' responsibilities
          - Safe work practices
          - Watch relief procedures
          - Training of personnel
          - Conducting required drills
          - Knowing and following applicable regulations

- Drug testing,
- Conducting preventative maintenance of equipment
- Applying guidance from the Stability Book
- Maintaining watertight integrity
- ◆ The Owner did have a written contract that employees sign which includes a no drug use policy.
- ◆ There were general understandings of who did what. The Mate did some maintenance of machinery. The Port Engineer handled maintenance the Mate needed assistance with. The Master, Mate and crew did maintenance of lifesaving equipment and the Port Engineer tracked some lifesaving equipment servicing dates (ie; fire extinguishers and liferaft servicing).
- ◆ Specific Latent Condition created
  - ◆ The owner did not manage or oversee the training / drills of his fishing vessel crews.
- ◆ Connection to Specific Hazardous Precondition
  - ◆ The lack of oversight regarding training / drills of the crew lead to insufficient training of crewmembers.
- ◆ Underwriters
  - ◆ Specific Latent Condition Created
    - ◆ Third Party Marine Surveyor hired by underwriter did not conduct drills prior to issuing a Commercial Vessel Safety Decal in 1995 and 1997. Conducting drills with the crew is not required prior to issuing a decal.
    - ◆ It is unclear how often the insurance company required the CAPE FEAR to have Commercial Fishing Vessel Safety Examinations.
  - ◆ Connection to Line Manager Decisions/Actions
    - ◆ Because the Third Party Marine Surveyor did not conduct drills with the Captain and crew of the CAPE FEAR, a much-needed opportunity for training was missed. Had the Marine Surveyor conducted a drill with Captain Novack and his crew, he may have been able to show the crew that they were not conducting drills properly and frequently enough, and show them the requirements for conducting drills in the regulations.
- ◆ Regulators
  - ◆ Specific Latent Condition Created
    - ◆ The Requirements for Commercial Fishing Industry Vessel (46 CFR 28) do not adequately address many relevant safety issues.
  - ◆ Connection to Specific Hazardous Precondition
    - ◆ Because the regulations do not require crews to log drills or training conducted or log preventative maintenance of lifesaving equipment, there is no way to determine, and/or guarantee or hold accountable the fact that fishing vessel crews are meeting the drill and training requirements specified in the regulations or maintaining their lifesaving equipment on the required frequency.
    - ◆ Although the regulations (46 CFR 28.250) appear to require high water alarms in clam holds (i.e.: a space with a non-watertight closure, such as a space with a non-watertight hatch on the main deck), the Federal Register Notice that promulgated the regulation specifies that the intent of the regulation is not to require high water alarms in fish holds. If the CAPE FEAR had high water alarms in the clam tanks the crew would have been alerted of the flooding prior to the sinking being imminent. High water alarms were necessary in the clam tanks because:

- ◆ The number 1 and number 2 clam tank hatch covers can not be opened at sea once the loaded clam cages are on top of these hatch covers. Each clam cage full of clams weighs approximately 3400 lbs, and there was no crane onboard the CAPE FEAR.
- ◆ The CAPE FEAR had some excellent early flooding detection features including TV monitors for the engine room and hydraulic room, both large unmanned spaces, and several bilge alarms. However, high water alarms in the clam tanks, although not required in the regulations, were essential given the difficulty to gauge the closed clam tanks and that CAPE FEAR's stability is so adversely affected by flooding the large clam tanks.
- ◆ The regulations (46 CFR 28.50, 28.500 or the rest of Subpart E--Stability) do not specify who determines if alterations made to a vessel constitute a Major Conversion, a Substantial Alteration or a Substantial Alteration in a manner which adversely affects its stability. Accordingly, although not required, an interpretation of the regulations could lead one to assume the owner should make this determination. From an economic standpoint, incentive exists to determine a vessel underwent a Substantial Alteration vice a Major Conversion, because less regulations with associated cost apply to Substantial Alterations. From a safety standpoint, incentive exists to determine a vessel underwent a Major Conversion. Although the CAPE FEAR had a mid-body extension after September 1991, this investigation was unable to determine if the owner or Qualified Individual determined this conversion to be a major alteration, substantial alteration or substantial alteration in a manner that adversely affects its stability. The regulations are confusing regarding the definitions and determinations of what constitutes a major conversion versus a substantial alteration. Therefore, this mid body lengthening conceivably could be either a major conversion or substantial alteration depending on interpretation.
- ◆ No one, including the owner or Naval Architect, Mr. Koopman, determined whether the CAPE FEAR's mid-body addition was a major conversion or a substantial alteration. Mr. Koopman's stability instructions ran stability calculations for the stability book for 46 CFR 28.570, 575 and 580 using a downflooding point at stack height 6.5 feet above the main deck. He also performed post casualty analysis using this same downflooding point. His testimony indicated he felt the hatchcovers were fairly weathertight and discussed the coaming heights and freeing ports.
- ◆ Conceivably had a determination been made that the mid-body extension was a major conversion it is possible this casualty may have been prevented. The regulations in 46 CFR 28 Subpart E that are applicable for Major Conversions, **but not applicable for Substantial Alterations**, and that could have been possibly prevented this casualty include:
  - The requirement for clam tank hatches to be weathertight or watertight (46 CFR 28.560(a)). The lack of weathertight hatches on the CAPE FEAR allowed downflooding through closed hatch covers. The lowering of the downflooding point from the stack 6.5 feet above the main deck to the aft hatch covers caused the CAPE FEAR to fail all intact and damage stability calculations evaluated given the loading condition at the time of the casualty.
  - Coaming height requirements (46 CFR 28.560 (b) (1)). CAPE FEAR did not meet the requirements for a watertight coaming of 24 inches in height. 46 CFR 28.560 (c) allowing 6 inch coaming was not applicable since the clam tanks have closures in place and are not under constant attention.

- Freeing port size requirements (46 CFR 28.555). CAPE FEAR appeared to meet these requirements.
- ◆ If the mid-body addition was considered a substantial alteration, the CAPE FEAR met the requirements. All the CAPE FEAR would need was a stability book in accordance with 46 CFR 28.530 (c) through (e), which it had.
- ◆ There is no requirement in the regulations for fishing vessel crews to have the Stability Book on board, read the Stability Book, or follow the guidance in the Stability Book. The intent of the regulations (46 CFR 28.530(a)) which is only applicable if the vessel had its keel laid or underwent a major conversion after September 15, 1991, is that the stability instructions provide masters and persons in charge of fishing vessels with easily understood information to keep their vessels in satisfactory stability condition. The regulations offer detailed requirements for how stability instructions should be developed and what should be contained. However, the stability instructions are of no value if they are not read, understood and followed by fishing vessel owners, captains and crews.
- ◆ Specific Latent Condition Created
  - ◆ Coast Guard authority to enforce post casualty drug testing regulations is lacking.
- ◆ Connection to Line Manager Decisions/Actions
  - ◆ The Coast Guard has no authority to detain crewmembers until drug testing is completed.
  - ◆ The regulations are inadequate and difficult for post-casualty drug testing.
    - ◆ Because the regulations require DOT approved drug testing, the testing could not be conducted at the hospital that the crew of the CAPE FEAR was brought to after they were rescued. Additionally, because the CAPE FEAR crewmembers were not members of drug testing consortiums, the testing could not reasonably be completed until the following morning.
    - ◆ The captain and crew of the CAPE FEAR asserted their Fifth Amendment rights during the hearing – even when asked about other crewmembers' drug use.
      - ◆ This investigation was unable to determine if the Captain and the crew were under the influence of illegal drugs or alcohol so as to contribute to this casualty.
      - ◆ Crewmembers of the MISTY DAWN testified that there was no smell of alcohol on any of the three rescued CAPE FEAR crewmembers and that they were in shock.
      - ◆ The regulations place burden to obtain post casualty drug testing on the owner. This appears to create a conflict of interest for the owner, who may lack incentive to ensure the drug testing is completed properly due to potential liability issues.
  - ◆ There are no regulations requiring pre-employment, random or periodic drug testing of fishing vessel captains or crewmembers.
  - ◆ Captain Novack, Mate Haley and Deckhand Martin were drug users.
  - ◆ The Owner failed to ensure that chemical tests were conducted on the crew of the CAPE FEAR as soon as practical following the sinking of the vessel.

- ◆ Larger-scale Market Forces
  - ◆ Specific Latent Condition Created
    - ◆ The crew compensation system of a fixed amount of money per bushel of clams landed is an incentive to take risks and in itself is a strong economic motivator to make money.
  - ◆ Connection to Line Manager Decisions/Actions
    - ◆ The CAPE FEAR's captain gradually increased the number of cages loaded aboard the vessel from 120 (noted in the Stability Book) to 130 cages in the year before the casualty.
    - ◆ On the day of the casualty the weather was forecasted to deteriorate to gale conditions that night with following seas yet the vessel continued loading all 130 clam cages. Once the cages were loaded with clams, there was no way to remove or jettison them to lighten the vessel's load. By the time the Captain departed the fishing grounds, he testified that the wind was 20 to 30 kts out of the southeast and the seas were 6 to 8 feet out of the southeast. Weather, especially the 6 – 8 foot following seas, became a factor in the casualty because the CAPE FEAR remained on the fishing grounds while the forecasted, deteriorating weather approached.
    - ◆ The clam house did not pressure the Captain or crew of the CAPE FEAR to get underway. Contrary to the wording in a contract between Sea Watch International and the owner, the clam house did not determine schedules or influence the Captain to continue fishing until a full load of clams were caught.
    - ◆ The Owner did not pressure the Captain to get underway or continue clamming.
  - ◆ Specific Latent Condition Created
    - ◆ Ocean quahogs are plentiful.
  - ◆ Connection to Line Manager Decisions/Actions
    - ◆ Therefore, the National Marine Fisheries Service (NMFS) does not closely enforce regulations pertaining to ocean quahogs other than the issuance of ITQ's which can be bought or sold from other clam processing companies or clam vessel owners. Specifically, NMFS does not count cages at the dock or ensure that the cages are not overfilled ("rounded up").
    - ◆ The amount of ITQ's the Owner had did not appear to be a limiting factor for underway times or number of trips. The CAPE FEAR could go out, fish, unload and go right back out again throughout the year. The CAPE FEAR made 106 trips in 1998, for a total of 3,888 hours at sea. The average trip lasted 36.6 hours.
- ◆ Stability Book
  - ◆ Specific Latent Condition Created
    - ◆ Errors in tank size, location and function limited the options the crew had to ballast and therefore trim or heel the vessel. However the DO's and DON'Ts and the number of cages listed in the Stability Book were still appropriate and should have been followed by the CAPE FEAR's crew.
    - ◆ The Stability Book met the requirements of 46 CFR 28.530 (c) through (e).
  - ◆ Connection to Line Manager Decisions/Actions
    - ◆ Had the Owner, Captain or Crew of the CAPE FEAR read the Stability Book, they would have learned that there were errors in the tank layout that limited the options to ballast the vessel. The naval architect who provided the stability book was never contacted regarding the inaccuracies. Inaccurate tank layout did not affect stability calculations, it did however limit options of where to ballast. Additional ballasting in the wrong tanks (not in accordance with the stability book) did contribute to the casualty.

- ◆ Specific Latent Condition Created
  - ◆ The Naval Architect, Mr. Koopman, testified that the hatch covers were “fairly weathertight” and told LT Maguire that he used the assumption that they were weathertight when he conducted calculations for the Stability Book. According to LT Maguire, Mr. Koopman used a downflooding point of a stack 6.5 ft above the main deck when modeling his Stability Book, and, he used this same stack height as the downflooding point for his post casualty analysis.
- ◆ Connection to Line Manager Decisions/Actions
  - ◆ The failure to have or maintain the weathertight integrity of the clam tank hatch covers (only required if the mid-body addition was considered a major conversion) caused the vessel to fail intact and damage stability calculations with the vessel as loaded at the time of the casualty when using a downflooding point at the after section of the number 3 hatches per LT Maguire’s analysis.
  - ◆ No one, including the Naval Architect, Mr. Koopman, determined whether the CAPE FEAR’s mid-body addition was a major conversion or a substantial alteration.
- ◆ Vessel Design
  - ◆ Specific Latent Condition Created
    - ◆ The configuration of the CAPE FEAR increased the risk of downflooding, specifically the:
      - Open stern ramp for the dredge
      - Vertical gap between transverse bulkheads separating the clam tanks and the hatchcovers,
      - Low freeboard aft when fully loaded
      - Clam tank hatch coamings with cutouts
      - Number 3 port and starboard hatch covers that are at a lower level than number 1’s and 2’s
      - Vertical gap between the number 2 and number 3 hatch covers
      - Number 3 hatch covers extending forward over the transverse bulkhead over the number 2 clam tanks
      - Non-weathertight hatch covers
  - ◆ Connection to Specific Hazardous Precondition
    - ◆ The aft trim and keeping the right freeboard aft is critical. The fact that this was not done, with the following seas that were encountered resulted in seas coming over the stern and reaching the number 3 hatch covers.
    - ◆ The non-watertight transverse bulkheads separating the clam tanks allowed flooding of the number 3 clam tanks to progress into the number 2 clam tanks once the number 3 clam tanks were full of water. Similarly, flooding in the number 2 clam tanks could progress into the number 1 clam tanks once the number 2’s were full.
    - ◆ Because the clam tanks were full of loaded clam cages, it would have taken less water to fill the clam tanks then if they had been empty, and a dampening effect would occur from the cages with any free surface effects.
    - ◆ The narrow beam of the vessel put the CAPE FEAR at risk of capsizing. This was considered in stability calculations.
  - ◆ Specific Latent Condition Created
    - ◆ The clam tank hatch cover design put the CAPE FEAR at risk of downflooding through the hatch covers.
  - ◆ Connection to Line Manager Decisions/Actions
    - ◆ A collection or gutter effect was created by the number 3 hatch covers being at a lower level than the number 2 hatch covers when combined with the raised

- coaming. Water that splashed or washed up on the number 3 hatch covers could collect and enter into the number 3 clam tanks due to non-weathertight seal. Additionally, this water could enter into the number 2 clam tanks through the  $\frac{3}{4}$  to 1½-inch vertical gap located between the number 2 and number 3 hatchcovers.
  - ◆ The hatches were non-weathertight by design. The hatches are designed to slide over the clam tanks on tracks using a teflon material, and do not seal. Additionally, there is no gasket material or weatherstripping to prevent water from entering into the clam tanks.
- ◆ Specific Latent Condition Created
  - ◆ Although the clam tank hatch coaming was one foot in height, cutouts in the coaming decreased the effectiveness of the coaming.
- ◆ Connection to Specific Hazardous Precondition
  - ◆ The hatch coaming was cut down five inches in two 3-foot wide sections aft of the number 3 hatch covers to allow water that washed on top of the hatch covers and / or rain to wash off. Additionally, there were numerous 1-inch wide by 5 inch down slits intermittently cutout into the hatch coamings that were flush with the top of the hatch covers on the port and starboard side of the hatches. These cutouts in the coaming decreased the effective height of the hatch covers to seven inches.
- ◆ Failed Defenses
  - ◆ Failures in existing Defenses that allowed Active Failures to develop into an Accident
    - ◆ Human System Failures
      - ◆ Aboard Ship
        - ◆ Failure to follow the guidance provided in the Stability Book led to the CAPE FEAR being operated in an unstable condition.
        - ◆ Failure to adequately monitor the condition of the CAPE FEAR while underway allowed the vessel to take on water until it was too late for remedial actions to be effective.
      - ◆ Management Ashore
        - ◆ Failure to ensure the Captain of the CAPE FEAR followed the guidance provided in the Stability Book led to the CAPE FEAR being operated in an unstable condition.
      - ◆ Coast Guard
        - ◆ The Coast Guard conducted a good Search and Rescue response.
        - ◆ There is no evidence that any personnel from the Coast Guard or any other government agency caused or contributed to the cause or impact of this casualty.
        - ◆ The darkness, high winds, sea state and snowy / icy conditions negatively hampered the Search and Rescue (SAR) operation.
    - ◆ Equipment Failures
      - ◆ Aboard Ship
        - ◆ The following equipment problems led to failed defenses aboard the CAPE FEAR:
          - Hatch covers not maintained in a weathertight condition.
          - Open number 3 port clam tank hatchcover.
          - Survival suit problems – zippers difficult; mittens impractical and awkward; and lights not watertight.

- While it is unknown when the liferaft deployed, the crew would have had extreme difficulty seeing the liferaft while they were in the water. Only a small dome light was on the top of the liferaft canopy and another dome light was inside the liferaft interior (as required in the regulations).
- ◆ Failures in existing Defenses that failed to Minimize the Consequences of the Accident
  - ◆ Human System Failures
    - ◆ Aboard Ship
      - ◆ Failure to follow the guidance in the CAPE FEAR's Stability Book.
      - ◆ Drills not conducted monthly or as actual emergencies in accordance with the regulations.
      - ◆ Improper stowage of lifesaving equipment (EPIRB tied to mounting bracket) – lashing EPIRB to vessel prevented its reaching the surface.
      - ◆ Failure to ensure the immersion suits were properly maintained.
    - ◆ Management Ashore
      - ◆ Failure to ensure the guidance in the CAPE FEAR's Stability Book was accurate and followed.
      - ◆ Failure to ensure drills were conducted monthly and as actual emergencies in accordance with the regulations.
      - ◆ Failure to ensure the immersion suits were properly maintained.
    - ◆ Coast Guard
      - ◆ The SAR Mission Coordinator (SMC) did not deploy the Coast Guard Cutter JUNIPER, which was the closest Coast Guard ship to the incident and which could have been the quickest vessel on-scene. The cutter would have arrived on-scene at approximately 10:00 P.M. Although not initially known at the time of the Search and Rescue, both of the crewmen who died were either not wearing immersion suits properly or in the case of Steven Reeves his suit at a certain point came completely off. According to Figure 1-3 of the Search and Rescue Manual Volume II, and testimony from LT Perrone, both men were considered fast coolers based on their low body fat. LT Perrone further testified that the Search and Rescue Manual specifies that a person with a survival suit partially on or improperly donned would have the same survival time as a person without a survival suit due to the fact that water would still wash into the suit and the person's body would still be exposed to the cold water. Death from hypothermia in the 36 degree Fahrenheit water was highly probable after 45 minutes to just over 1-hour for fast coolers. It is highly probable that both Mr. Martin and Mr. Reeve had died from hypothermia or drowning before the JUNIPER could have been able to arrive in the search area. The first Coast Guard asset that arrived on scene was the helicopter, which arrived at 9:48 P.M. The JUNIPER was a suitable and capable asset for this Search and Rescue in view of the weather and sea conditions.
      - ◆ The Coast Guard helicopter was directed to launch at 8:44 P.M. by the District Command Center. The helicopter launched at 9:24 P.M. due to weather conditions and the installation of the night sun, a special searchlight. According to the testimony of LT Perrone, the installation of the night sun takes approximately five minutes, so the primary delay of the helicopter launch was due to weather. This was a valid delay of the B-0 requirement of 30 minutes for underway/launch time.

- ◆ Equipment Failures
  - ◆ Aboard Ship
    - ◆ Survival Suit Lights. The strobe light on only one of the five survival suits used operated (lit) in the seawater / oil environment. Although the lights are required to be Coast Guard Approved, the regulations do not require them to be watertight. The strobe lights on the suits which were used were found full of seawater and the switches appeared to have an oil/water film on them. After the Coast Guard Inspector emptied the water and replaced the batteries, the lights still did not work. The inspector did not replace the light bulbs or any other parts.

Misconduct, Incompetence, Negligence, Use of a Dangerous Drug, and Willful Violation of Law

- ◆ No Individuals holding Coast Guard issued Merchant Mariners' Credentials were involved in this incident.
- ◆ There is no evidence of Misconduct, Incompetence, Negligence, Use of a Dangerous Drug or Willful Violation of Law by an Officer, Employee, or Member of the Coast Guard.
- ◆ By any Other Person
  - ◆ CAPTAIN OF VESSEL
    - ◆ Negligent Operations, 46 USC 2302, on the part of the Captain in that he operated the CAPE FEAR in a negligent manner that endangered the life, limb and property of a person. Captain Novack operated the CAPE FEAR in an unsafe condition by failing to follow the guidance provided in the vessel's Stability Book; failing to pay attention to conditions aboard the vessel including the clam tank pumping, seas washing on deck, an open the clam tank hatch cover; and failing to take appropriate action (i.e. periodically pump out clam tanks) when seas were washing and splashing over the non-weathertight hatch covers.
    - ◆ Violation of law by the Captain in that he failed to conduct drills monthly or as actual emergencies as specified in the regulations (46 CFR 28.270(a)).
    - ◆ Violation of law by the Captain in that he failed to ensure that each item of lifesaving equipment was in good working order, ready for immediate use and readily accessible before the vessel left port and at all time while the vessel was operated as specified in the regulations (46 CFR 28.140).
    - ◆ Use of a Dangerous Drug (46 USC 2302 (c)) on the part of the Captain in that he tested positive for cocaine the morning after the CAPE FEAR sank.
  - ◆ MATE OF VESSEL
    - ◆ Use of a Dangerous Drug (46 USC 2302 (c)) on the part of the Mate in that he tested positive for cocaine and marijuana the morning after the CAPE FEAR sank.
  - ◆ OWNER OF VESSEL
    - ◆ Negligent Operations, 46 USC 2302, on the part of the Owner in that he operated the CAPE FEAR in a negligent manner that endangered the life, limb and property of a person. The Owner operated the CAPE FEAR in an unsafe condition by failing to ensure the guidance provided in the vessel's Stability Book was followed; failing to notify the naval architect of changes made to the CAPE FEAR; failing to ensure drills were conducted; and failing to ensure lifesaving equipment was maintained and operable.
    - ◆ Violation of the Federal Water Pollution Control Act on the part of the owner for discharging a harmful quantity of oil into the navigable waters of the US.
    - ◆ Failure to follow drug testing regulations, 46 CFR 4.06, on the part of the Owner. There is evidence to support that the Owner failed to conduct post casualty drug testing as soon as practical after the casualty.

**EVIDENCE OF CRIMINAL ACTS**

There is no evidence of any criminal acts on the part of anyone involved.

## RECOMMENDATIONS:

1. That the Coast Guard considers undertaking a regulatory project that requires licensing of masters and mates for certain types/class/size of Commercial Fishing Vessels that operate beyond the boundary line including oceangoing Clam Vessels. This would ensure that they would have a good understanding of stability regarding their vessels. It would also ensure, that the vessel, its equipment and lifesaving gear are maintained and operated properly in accordance with applicable regulations. Licensed masters and mates would additionally have an understanding of human factors and would be held accountable with drug and alcohol testing regulations.
2. That the Coast Guard considers undertaking a regulatory project that requires crews aboard certain types/class/size of Commercial Fishing Vessels that operate beyond the boundary line including oceangoing Clam Vessels to hold merchant mariner documents. This would provide them a foundation with safety at sea and would hold them accountable with drug and alcohol testing regulations.
3. That the Coast Guard considers undertaking a regulatory project to perform a major revision and/or amendment with 46 CFR Part 28 –REQUIREMENTS FOR COMMERCIAL FISHING INDUSTRY VESSELS to include the following:
  - a. That certain types/class/size of Commercial Fishing Vessels that operate beyond the boundary line including oceangoing Clam Vessels be required to have mandatory annual or biennial inspections conducted by the Coast Guard or third party certified by the Coast Guard.
  - b. That certain types/class/size of Commercial Fishing Vessels that operate beyond the boundary line including oceangoing Clam Vessels be required to have Stability Instructions and Stability Letters regardless of keel laying dates or any conversions or alterations. Stability Letters should be required to be posted in the wheelhouse. Coast Guard Headquarters should review and approve the Stability Instructions that are provided by the 'Qualified Individual' and issue the Stability Letter. Stability Instructions should be required to be on the vessel and to be followed by the master and the mate. Stability Instructions and the Stability Letter should be required to contain easily understood liquid, cargo, fish catch, on deck loading restrictions with simple Do's and Don'ts. Should there be any changes to the vessel affecting its stability calculations, the 'Qualified Individual' should be required to be contacted. The vessel owner should be required to ensure all of the above is adhered to.
  - c. That 46 CFR sections 28.555, 560, and 565 regarding freeing ports, watertight and weathertight integrity and water on deck be applicable to certain types/class/size of Commercial Fishing Vessels that operate beyond the boundary line including oceangoing Clam Vessels regardless of its build, construction, keel laying or any type of conversion/alteration dates.
  - d. That 46 CFR 28.250 specifically require high level alarms in fish holds.
  - e. That Coast Guard Headquarters make any major conversion or substantial alteration determinations, that the definitions and determinations be more distinctive or remove those specific applicability provisions.
  - f. That requirements or industry standards be developed and added to the regulations regarding the material condition of the vessel, watertight integrity, seaworthiness, construction and frequency of dry-dock examinations.

- g. That 46 CFR 28.270, the regulations requiring monthly drills be conducted as actual emergencies, be amended to include those drills be logged, and that the log be maintained on board the vessel. That these same regulations be amended to include that the Coast Guard witness these drills during the annual or biennial inspection.
  - h. That 46 CFR 28.270 (e) and (f), the regulations requiring new crewmembers to receive a detailed safety orientation prior to getting underway, be amended to require the completion of this orientation to be logged and that the log be maintained aboard the vessel.
  - i. That 46 CFR 28.140 include specific requirements to wax zippers on immersion suits every 4 months and that an entry for the required servicing of all lifesaving equipment be made in the vessel's log and that that log be maintained aboard the vessel.
- 4. That the Coast Guard considers undertaking a regulatory project to amend lifesaving regulations to include the following:
  - a. That a strobe light be installed on every liferaft that is automatically activated once a liferaft is deployed and is readily seen from the surface of the water by survivors and is sufficiently illuminated for search and rescue purposes.
  - b. That a certain size (size to be determined) toggle handle be added to the zipper tabs on all immersion suits based upon research conducted by the Coast Guard Research and Development Center in partnership with immersion suit manufacturers.
  - c. That strobe lights on all immersion suits and personal flotation devices be watertight and capable of operation in an oil/water environment. That water activated homing devices be required on all immersion suits.
- 5. That the Coast Guard considers undertaking research projects and tasking the Coast Guard Research and Development center with the following:
  - a. Research various manufactured immersion suits in partnership with the manufacturers to determine what if any problems exist with the operation of the zippers in and out of the water under emergency conditions that can be expected requiring their use. If problems are found to exist, research suitable alternatives including but not limited to a recommendation regarding the size and material of a toggle handle for the zipper tab that eases the zipper operation.
  - b. Research the feasibility of a thermal protection suit for crewmembers that can be worn as a work suit so their duties can be performed without restrictions from the suit yet provides a minimum of two-hour survival protection in frigid waters.
  - c. Research the feasibility of water activated homing devices that can be installed on immersion suits.
- 6. That the Coast Guard considers launching a major public outreach campaign conducted by Coast Guard Marine Safety Offices with the commercial fishing community to publicize the lessons learned from this casualty. Outreach should include such items as the maintenance of lifesaving equipment, actual drills, waxing immersion suit zippers, stability, watertight integrity, launching of liferafts, mayday procedures, and damage control.
- 7. That the Coast Guard initiate a program with the National Marine Fisheries Service to conduct joint dockside boardings with the local Marine Safety Office and determine if clam vessels are overloaded, and if the number of Individual Transferable Quotas (ITQ's) per trip correspond with stability instructions.

8. That the Coast Guard emphasizes to Coast Guard Search and Rescue units the importance of deploying the nearest capable Coast Guard vessel resource that can arrive quickest on-scene after a distress call has been received.
9. That the Coast Guard distributes the lessons learned from this casualty to all Coast Guard units involved with Commercial Fishing Vessel Safety including; those units that perform boardings, exams, law enforcement, voluntary dockside exams and/or search and rescue. Further, pending the implementation of new regulations discussed in above recommendations of this report, that the Coast Guard considers implementing a rigorous voluntary dockside program aimed at correcting lessons learned from this casualty, and a rigorous at sea boarding with a dockside follow-up program to reduce the likelihood of commercial fishing vessel casualties from unsafe conditions that were found as lessons learned in this casualty.
10. That the Coast Guard considers establishing policy or undertake a regulation project such that any hospital or clinic are approved to conduct post-casualty drug testing of fishermen.
11. That the Commanding Officer, Marine Safety Office Providence ensures that the owner, CAPE FEAR, INC, is contacted at the earliest opportunity, and advised of the findings and lessons learned from this investigation so the owner can take proper remedial actions. Specifically those pertaining to his similar class of vessels involving vessel design problems with the clam tank hatches and the importance of adhering to stability instructions. Additionally, that the owner be encouraged to develop job descriptions and formal written policies for his employees.
12. That the Commanding Officer, Marine Safety Office Providence, considers initiating a civil penalty investigation into evidence of violation of regulations or law per the following:
  - a. Negligent Operations, 46 USC 2302, on the part of the Captain in that he operated the CAPE FEAR in a negligent manner that endangered the life, limb and property of a person. Captain Novack operated the CAPE FEAR in an unsafe condition by failing to follow the guidance provided in the vessel's Stability Book; failing to pay attention to conditions aboard the vessel including the clam tank pumping, seas washing on deck, an open the clam tank hatch cover; and failing to take appropriate action (i.e. periodically pump out clam tanks) when seas were washing and splashing over the non-weathertight hatch covers.
  - b. On the part of Captain Novack in that he failed to conduct drills monthly or as actual emergencies as required by 46 CFR 28.270(a).
  - c. Violation of law by the Captain in that he failed to ensure that each item of lifesaving equipment was in good working order, ready for immediate use and readily accessible before the vessel left port and at all time while the vessel was operated as specified in the regulations (46 CFR 28.140).
  - d. Use of a Dangerous Drug (46 USC 2302 (c)) on the part of the Captain in that he tested positive for cocaine the morning after the CAPE FEAR sank.
  - e. Use of a Dangerous Drug (46 USC 2302 (c)) on the part of the Mate in that he tested positive for cocaine and marijuana the morning after the CAPE FEAR sank.
  - f. Negligent Operations, 46 USC 2302, on the part of the Owner in that he operated the CAPE FEAR in a negligent manner that endangered the life, limb and property of a person. The Owner operated the CAPE FEAR in an unsafe condition by failing to ensure the guidance provided in the vessel's Stability Book was followed; failing to notify the

naval architect of changes made to the CAPE FEAR; failing to ensure drills were conducted; and failing to ensure lifesaving equipment was maintained and operable.

g. Failure to follow drug testing regulations, 46 CFR 4.06, on the part of the Owner. There is evidence to support that the Owner failed to conduct post casualty drug testing as soon as practical after the casualty.

h. On the part of the owner, CAPE FEAR INC, for violation of the Federal Water Pollution Control Act by discharging a harmful quantity of oil into the navigable waters of the US.

13. That this casualty investigation be closed.

Date

G. R. Matthews  
Captain US Coast Guard  
Investigating Officer

Some information in this report is being withheld  
under 5 U.S.C. Section 552(b)(6).