Case Study

Water Transport v. Boston Towing

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UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

WATER TRANSPORT COMPANY Plaintiff - against - BOSTON TOWING & TRANSPORTATION COMPANY, INC., REINAUER TRANSPORTATION COMPANIES, INC., MARINE OFFICE OF AMERICA CORP., COMITE D'ETUDES ET DE SERVICES DES ASSUREURS MARITIMES ET TRANSPORTS DE FRANCE, HULL & CARGO SURVEYORS, INC., JARDINE INSURANCE BROKERS OF NEW YORK, INC., NASHVILLE BRIDGE COMPANY, ROYAL INSURANCE COMPANY OF AMERICA, ALBANY INSURANCE COMPANY, FIREMAN'S FUND INSURANCE COMPANY, AMERICAN HOME ASSURANCE COMPANY, in personam, and TUG DACE REINAVER, her engine, tackle, appurtenances, etc., in rem, Defendants	92 Civ. 5290 (SS)
Water Transport Company, Plaintiff - against - TUG DACE REINAUER, her engines, boilers, tackle, furniture, apparel, etc.	94 Civ. 3718 (SS)

FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER

SONIA SOTOMAYOR, U.S.D.J.

In order to have sludge transported between various treatment facilities in Boston Harbor, plaintiff Water Transport Company ("Water

Transport") contracted for a shipyard, NABRICO, in Nashville, Tennessee to design and build two barges, named NUMBER ONE and NUMBER TWO (collectively, the "Barges"). Following their construction, the Barges were delivered to defendant Boston Towing & Transportation Company, Inc. ("Boston Towing") under a bareboat charter for transport from New Orleans, Louisiana to Quincy, Massachusetts. Boston Towing used a tugboat, the DACE REINAUER, and crew supplied by its sister company, defendant Reinauer Towing Transportation Companies, Inc. ("Reinauer"), for the tow.

The Barges left New Orleans on October 3, 1991. In the early morning hours of October 8, 1991 off the coast of Fort Pierce, Florida, they suffered a casualty resulting in the eventual break-off of their bows and the cracking of their structures. After Water Transport's settlement of its claims against the other defendants, I held a bench trial of Water Transport's liability claims against defendants Boston Towing, Reinauer and Tug Dace Reinauer.[1] For the reasons discussed below, I find Boston Towing, Reinauer and the Tug liable for the negligent tow of the Barges and for breach of the bareboat charter.[2] I will consider damages at the next phase of the trial.

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[1] The original action, Index No. 92 Civ. 5290 was filed on July 15, 1992. The DACE REINAUER was not served with process within 120 days of the filing of that Complaint. Water Transport commenced the second action, Index No. 94 Civ. 3718 (SS), to obtain an in rem warrant of arrest of the Tug and thereby serve the Tug and obtain security. For a fuller description of these events, see my Opinion and Order dated September 13, 1995, on the motion to vacate the security posted by Reinauer as a substitute res for the arrested Tug DACE REINAUER.

[2] In the event I found them liable, defendants asked that I assess a percentage of fault against defendants Hull & Cargo Surveyors, Inc. ("Hull & Cargo") and NABRICO based on the tort apportionment principles set out in McDermott, Inc. v. Amclyde, 114 5. Ct. 1461 (1994). Plaintiff instead maintains that McDermott is not applicable to its claims because they are contract claims. Nevertheless, plaintiff's complaint does allege tort claims which would appear to implicate the McDermott apportionment principles. I have not found the parties' submissions adequate in addressing which remedies are available under each of the various tort and contract claims alleged in the complaint or in addressing the relative contributions of the other defendants to the damages at issue. I will permit the parties to brief these questions more fully at the damages trial and if necessary, I will supplement

STIPULATED FACTS

I adopt as findings the following Undisputed Facts agreed to by the parties in their Joint Pre-Trial Order dated July 20, 1993:

1. Up to and including February 1993, Water Transport[3] was a general partnership whose three general partners were Enviro-Gro Technologies Company ("Enviro-Gro"), O'Connell Engineering & Financial, Inc. ("O'Connell") and Christine Dunn d/b/a Dunn Associates.

2. As of February 1993 up to and including the present, the general partnership of Water Transport has been composed of O'Connell and Dunn Associates.

3. O'Connell is an industrial and commercial development company, with its only office and principal place of business in Holyoke, Massachusetts.

4. O'Connell has been conducting business in Massachusetts since 1879.

5. Dunn Associates is a sole proprietorship of Christine Dunn, with its only office and place of business in Boston, Massachusetts.

6. At all material times, Michael T. Downey was and still is the Vice—President of O'Connell.

7. At all material times, James N. Sullivan was and still is Treasurer of O'Connell and also responsible for ensuring that all O'Connell business risk is covered by insurance.

8. At all material times, Boston Towing[4] had its principal office and place of business in East Boston, Massachusetts.

9. At all material times, Boston Towing was and still is in the marine transportation business within New England and predominantly in and

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my liability findings at that time to apportion fault.

[3] I substituted "Water Transport" for "WTC" in the parties' Undisputed Facts.

[4] I substituted "Boston Towing" for "BTT" in the parties' Undisputed Facts.

around Boston Harbor.

10. At all material times, Jonathan C. Wales was a Vice President and Director of both Reinauer and Boston Towing.

11. At all material times, Jonathan C. Wales was the President of Reinauer, Inc., the parent company of both Reinauer and Boston Towing.

12. Jonathan C. Wales' office is located in Boston Towing's East Boston facility.

13. At all material times, Vincent D. Tibbetts, Jr. was the President of Boston Towing.

14. At all material times, the owner of the Tug DACE REINAUER has been and continues to be BancBoston Leasing, Inc.

15. Beginning in or about September 1987 and up to the present, the Tug DACE REINAUER has been operated by Reinauer under a bareboat charter arrangement with BancBoston Leasing, Inc.

16. The Tug DACE REINAUER is an ocean-going tugboat built in 1968 and purchased by Reinauer in 1982 for $1.2 million.

17. The DACE REINAUER has an Insured Value of $1.6 million.

18. On or about March 15, 1988, New England Fertilizer Company ("NEFCO") entered into an Agreement for Interim Sludge Processing and Disposal Services with the Massachusetts Water Resources Authority ("MWRA"), pursuant to which NEFCO agreed to perform certain sludge transportation services in connection with the government mandated cleanup of Boston Harbor commencing in the fourth quarter of 1991 and continuing for four or five years at the option of the MWRA ("Sludge Contract").

19. On or about December 1, 1990, NEFCO subcontracted to Water Transport the marine transportation services required under the MWRA/NEFCO Sludge Contract.

20. In connection with its obligations under the NEFCO/Water Transport Subcontract, Water Transport decided to purchase two newly

constructed double skin barges.

21. At the conclusion of the MWRA/NEFCO Sludge Contract and the NEFCO/ Water Transport Subcontract, Water Transport intended to resell the Barges in the petroleum or other liquid cargo markets.

22. On or about December 3, 1990, Enviro-Gro, on behalf of Water Transport, contracted with Nashville Bridge Company ("NABRICO") for Barge Contract 7145 ("the Barge Contract"), the purpose of which was the construction by NABRICO for Water Transport of the Barges necessary for the performance of the NEFCO/MWRA contract and the NEFCO/Water Transport Subcontract.

23. The Barge Contract purchase price for the Barges was paid by Water Transport to NABRICO.

24. At all material times, Water Transport was and continues to be the owner of both Barges.

25. On or about March 3, 1991, Water Transport obtained short-term financing from JWP Credit Corp. for construction of the Barges, in exchange for which Water Transport executed a Promissory Note payable on demand.

26. The ABS (the American Bureau of Shipping) inspected and approved the as-built design of the Barges as being in compliance with the ABS River Rules.

27. Each Barge was and continues to be classed ABS Maltese cross Al Tank Barge for River Service.

28. Water Transport arranged for and was afforded Hull and Machinery insurance covering the Barges in accordance with Joint Policy #SJ9108 assembled by Sedgwick James Brokerage, dated September 9, 1991 ("the Royal Policy").

29. Barge NUMBER ONE was launched on August 23, 1991, and Barge NUMBER TWO was launched on September 13, 1991.

30. On or prior to September 11, 1991, the U.S. Coast Guard inspected

the Barges in connection with the issuance of certificates required by law for the Barges' one-time ocean voyage delivery trip from New Orleans to Boston.

31. On September 11, 1991, the U.S. Coast Guard issued Temporary Certificates of Inspection and Coastwise Load Line Certificates permitting one coastwise voyage from Ashland, TN to Boston, MA, in "fair weather only."

32. Prior to September 27, 1991, Water Transport and Boston Towing entered into negotiations for the towage of the Barges on the Barges' delivery trip from New Orleans, LA, to Boston, MA.

33. During the negotiations prior to September 27, 1991, Boston Towing proposed to Water Transport that the Barges could be towed successfully in a single hawser tandem tow arrangement employing the Tug DACE REINAUER.

34. On July 11, 1991, at the request of Jonathan Wales, Reinauer's Vice President of Operations William Anderson prepared a towing analysis based upon a seven knot average speed for the delivery trip from New Orleans to Boston.

35. During negotiations prior to September 27, 1991, Boston Towing represented to Water Transport that Boston Towing previously had successfully towed two newly constructed barges on a delivery trip from New Orleans to Boston, in a tandem tow arrangement employing the Tug DACE REINAUER.

36. William Anderson based his July 7, 1991 towing analysis upon the analysis of towing gear and arrangements and speeds formulated by Garth Stickel, the DACE REINAUER Tug Master on the prior New Orleans to Boston tandem tow delivery trip.

37. If the DACE REINAUER could navigate in the Gulf Stream off the eastern coast of Florida on its northern passage towing the Barges, the Tug and tow would be able to cover the distance from New Orleans to Boston in a shorter period of time.

38. On July 16, 1991, Jonathan Wales transmitted a letter to NEFCO's Steven Lush, setting forth Boston Towing's proposal and estimated price quotation for the ocean voyage delivery trip of the Barges.

39. The July 16, 1991 Boston Towing proposal for the delivery tow of the Barges, provided that the Barges would be towed in tandem by the Reinauer Tug DACE REINAUER.

40. Boston Towing and Reinauer represented to Water Transport that Boston Towing and Reinauer could successfully tow the Barges from New Orleans to Boston by utilizing the identical towing gear and tandem towing arrangement previously utilized for the 1990 delivery voyage of two barges also newly constructed by NABRICO.

41. The July 16, 1991 Boston Towing proposal to Water Transport was based upon a tandem towing arrangement and towing gear designed by Reinauer Tug Captain Garth Stickel.

42. The July 16, 1991 Boston Towing tow proposal's $115,000 quote for the ocean tow provided that Water Transport would pay for additional running time at the rate of $250.00 per hour in the event the DACE REINAUER could not maintain an average 7 knot speed, due to either requirements of underwriters, or in the sole judgment of the Master of the DACE REINAUER, to prevent excessive pounding of the Barges.

43. Under the contract tow arrangement originally envisioned by Boston Towing and Water Transport in their negotiations prior to September 27, 1991, the barge owner Water Transport would maintain Hull and Machinery insurance on the barges, and the towers Boston Towing and Reinauer would maintain tower's liability coverage for their own account.

44. At all material times, Jardine Insurance Brokers of New York, Inc. ("Jardine"), and specifically Watson N. Driggs, acted as insurance brokers for both Boston Towing and Reinauer in procuring coverage under a consolidated Reinauer Fleet Policy.

45. The Royal Policy underwriters required an additional premium of $12,000 for issuance of a Release of Tower's Liability Endorsement to the Royal Policy releasing Boston Towing from liability for damage to the Barges during the ocean tow.

46. Jonathan Wales took the position that the additional premium for the Release of Tower's Liability Endorsement on the Royal Policy should be for W4ter Transport's account.

47. Boston Towing's and Reinauer's fleet of tugs and barges were afforded marine hull and machinery insurance and protection and indemnity insurance under Cover Notes JIB-91/010 and JIB-9l/019, respectively, procured by Jardine and underwritten by MOAC and a syndicate of French underwriters ("the Reinauer Fleet Policy")

48. Prior to September 27, 1991, Jonathan Wales and Watson Driggs represented to James Sullivan that if Water Transport bareboat chartered the Barges to Boston Towing, the Barges and Water Transport would be insured under the Reinauer Fleet Policy.

49. Boston Towing represented to Water Transport that the Reinauer Fleet Policy was broader than the Royal Policy.

50. Boston Towing represented to Water Transport that the Reinauer Fleet Policy was less expensive than the Royal Policy.

51. On or about September 27, 1991, Water Transport and Boston Towing entered into a Bare Vessel Charter Agreement ("Bareboat charter"), pursuant to which Water Transport bareboat chartered the Barges to Boston Towing.

52. Under ¶ 12 of the Bareboat Charter, Boston Towing agreed to insure the Barges for "full marine risk" in the amount of $1,800,000, with protection and indemnity insurance in the amount of $1,000,000, "during the entire term of this Charter and any extensions thereof."

53. Under ¶ 10 of the Bareboat Charter, Boston Towing and Reinauer were obligated to navigate the Barges so that they would not ground, even

where it is customary for similar sized barges to safely lie aground.

54. The Bareboat Charter constituted a demise of Barges NUMBER ONE and NUMBER TWO between Water Transport as Owner and Boston Towing as Charterer.

55. Water Transport has complied with ¶ 17 of the Bareboat charter wherein Water Transport warranted "that it is and will be the sole and absolute owner of the Vessels and equipment thereof. . . ."

56. Under ¶ 14 of the Bareboat Charter, the term of the Charter began at New Orleans on or about September 30, 1991 and continued until delivery of the Barges to Boston, Massachusetts.

57. Under ¶ 5 of the Bareboat Charter, Boston Towing was responsible for the delivery of the Barges to Boston, Massachusetts.

58. Pursuant to ¶ 6 of the Bareboat charter, "(p)rior to the delivery of the Vessels to (Boston Towing], (Boston Towing] examined the Vessels and (was) satisfied with them."

59. On September 27, 1991, Water Transport and Boston Towing entered into a Vessel Delivery Agreement, pursuant to which Boston Towing agreed to tow the Barges from New Orleans to Boston.

60. Prior to the commencement of the New Orleans to Boston delivery trip of the Barges in tandem tow of the DACE REINAUER, Boston Towing represented to Water Transport that the Barges were fully insured for full marine risk and protection and indemnity by the Reinauer Fleet Policy against loss or damage during the voyage.

61. By Policy Endorsement effective October 3, 1991, attached to and forming part of the Reinauer Fleet Policy, the Barges were afforded Hull and Machinery coverage and Protection and Indemnity coverage for the voyage from New Orleans to Boston.

62. By Policy Endorsement effective October 3, 1991, attached to and forming part of the Reinauer Fleet Policy, Water Transport was added as an

Additional Assured on Hull and Machinery coverage and Protection and Indemnity coverage for the Barges.

63. By Policy Endorsement effective October 3, 1991, attached to and forming part of the Reinauer Fleet Policy, the Barges and Water Transport were afforded Hull and Machinery coverage for an Insured Value of $1,800,000 for each Barge.

64. Prior to delivery of the Barges to Boston Towing and Reinauer in New Orleans, Louisiana, Boston Towing and Reinauer knew that the Barges were inland service barges.

65. Prior to delivery of the Barges to Boston Towing and Reinauer in New Orleans, Louisiana, Boston Towing and Reinauer knew that the Barges were river service barges.

66. While the Barges were still under construction, Boston Towing's President Vincent Tibbetts, Jr., after reviewing blueprint drawings of the Barges, recommended a stern notch design compatible with Boston Towing tugs operating in Boston Harbor.

67. Prior to delivery of the Barges to Boston Towing in New Orleans while the Barges were still under construction, Boston Towing was provided with a blueprint drawing depicting the hull design and bow rake configuration of the Barges.

68. While the Barges were still under construction, Boston Towing's Marine Superintendent, Melvin Gouthro, was provided with blueprint drawings of the Barges depicting the Barges' hull design and bow rake configuration.

69. On or about September 4 and 5, 1991, Boston Towing's Marine Superintendent, Melvin Gouthro, attended the NABRICO shipyards in Nashville and Ashland, Tennessee, where the Barges were still under construction.

70. On or about September 4 and 5, 1991, Boston Towing's Marine Superintendent, Melvin Gouthro, attended the NABRICO shipyards in Nashville

and Ashland, Tennessee, where he observed installation of towing hardware on both Barges for the purpose of facilitating the tandem tow by the Pug DACE REINAUER.

71. On or about September 4 and 5, 1991, further to the installation of towing hardware on both Barges for the purpose of facilitating the tandem tow by the Tug DACE REINAUER, Boston Towing's Marine Superintendent Melvin Gouthro observed the welding of the towing hardware.

72. Prior to delivery of the Barges to Boston Towing and Reinauer in New Orleans, Louisiana, Boston Towing and Reinauer knew that the Barges were brand new barges on a one time ocean tow delivery trip from the shipyard where they were constructed.

73. Hull and Cargo's Trip-in-Tow Survey concluded that the Barges, the DACE REINAUER and the tandem towing arrangements were fit for the Barges' one time ocean tow, subject to compliance by the DACE REINAUER with Hull and Cargo's handwritten Recommendations containing restrictions for the tow.

74. The Hull and Cargo Trip-in-Tow Survey Recommendations required Capt. Edwards to strictly regulate the speed of the DACE REINAUER and to reduce speed to prevent pounding of the Barges.

75. Reinauer's Vice President of Operations, William Anderson, had instructed Capt. Stickel to order all additional towing gear and to prepare the Barges for the ocean tandem tow.

76. In late September 1991, the DACE REINAUER, under the command of Capt. Stickel, sailed to New Orleans for purposes of meeting the Barges for the delivery trip to Boston.

77. When it became apparent that the tow of the Barges would not commence until after the conclusion of Capt. Stickel's two-week shift, William Anderson informed Capt. Harold Edwards that Edwards was going to be in command of the DACE REINAUER for the tandem tow of the Barges.

78. The Hull and Cargo surveyor, Kenneth Lambertson, informed Capt.

Edwards that the Barges were inland river service barges on a one—time ocean tow and that extra caution was required during the tow.

79. The Hull and Cargo surveyor for the Trip-in-Tow Survey, Kenneth Lambertson, informed Capt. Edwards of the provisions of the Coast Guard Certificates prior to commencement of the tandem tow.

80. Prior to commencement of the tandem tow of the Barges by the Tug DACE REINAUER on their delivery trip from New Orleans to Boston, the Tug's Master, Harold Edwards, did not review the U.S. Coast Guard Temporary Certificates of Inspection and Coastwise Load Line Certificates.

81. Reinauer has issued a written Operations Manual which contains procedures governing Tug Captains, Mates and Engineers in their duties on board Reinauer vessels.

82. The Reinauer Operations Manual provides that in construing and complying with its provisions, due regard shall be had to any special circumstances including the limitations of the vessels involved.

83. The Reinauer Operations Manual provides that Reinauer captains have overall command of and responsibility for the Reinauer Tug, barges in tow and embarked crews.

84. The Reinauer Operations Manual charges the Reinauer captain with the obligation to protect the property under his command, by whatever lawful means are appropriate.

85. The Reinauer Operations Manual provides that Reinauer Captains have authority to make final decisions concerning vessel operations, and are expected to use their best judgment in exercising discretion to prosecute any voyage, taking into account weather, environmental factors and vessel conditions.

86. The Reinauer Operations Manual provides that the captain of each Reinauer vessel is clearly and finally responsible for the safe operation of his vessel, and that only the captain can make the decision of whether an

operation may safely be undertaken.

87. The Reinauer Operations Manual provides that the Chief Engineer shall keep the Engine Room Log Book, that he might sign each day's entries and that he shall enter the particulars of any mishap, breakdown or stoppage of engines.

88. The Reinauer Operations Manual provides that any time a visitor from any company or organization, including the Coast Guard, boards a Reinauer vessel, the visitor's name, title and "on" and "off" times shall be entered in the Log Book.

89. The Reinauer Operations Manual contains provisions governing the reporting and logging of casualties, damages and possible damages while a Reinauer vessel is at sea.

90. The Reinauer Operations Manual provides that the Daily Tug Log Book must be kept daily and accurately, and that if an entry is not made on the same day as the occurrence to which it relates, the date of the occurrence and the date of the entry must be logged.

91. The Reinauer Operations Manual provides that the Daily Tug Log Book must contain entries for all delays due to weather.

92. The Reinauer Operations Manual provides that each nautical chart aboard a Reinauer vessel must be marked to indicate that it is the property of the vessel.

93. Pursuant to III-13 of the Reinauer Operations Manual, Reinauer Tug Captains and Mates must board all non-self-propelled tows prior to commencement of a voyage to conduct a reasonable inspection of the tows for the purpose of determining that the tows are ready for sea.

94. Pursuant to Page III-13 of the Reinauer Operations Manual, if after boarding and inspecting the tow, the Reinauer Captain or Mate determines that the tow is not ready for sea, he should inform the crew of the tow, the representative of the tow's owner and the Reinauer dispatcher.

95. Prior to commencement of the voyage of the Barges in tandem tow of the Tug DACE REINAUER, Capt. Stickel, Capt. Edwards. and Mate Boyles each conducted an inspection of the Barges pursuant to the requirements of 111-13 of the Reinauer Operations Manual.

96. The Mate on the DACE REINAUER for the tow of the Barges was Denzil Boyles.

97. Capt. Edwards did not inform Reinauer that the Hull and Cargo Trip-in-Tow Survey Recommendations required the DACE REINAUER to seek safety if sea conditions in excess of six feet were forecast between ports of refuge.

98. The DACE REINAUER was equipped with an autopilot and fathometer, but had no course, RPM or speed recorder.

99. The DACE REINAUER was pilothouse-controlled, with tachometers in the pilothouse to provide readings on engine RPMs.

100. At full speed, the DACE REINAUER's engines generated 1,200 RPM, and the Tug's throttle could be adjusted downward for incremental decreases in engine RPMs.

101. The nautical references and publications aboard the DACE REINAUER included nautical charts, tide tables, current charts, the Light List, and the Coast Pilot Volumes I-V.

102. The DACE REINAUER's communications equipment consisted of two VHF radio transceivers, a single-sideband (SSB) transceiver and a cellular telephone.

103. The DACE REINAUER was not equipped with a weather facsimile unit.

104. The DACE REINAUER was equipped with a hand-held anemometer, and Capt. Edwards would determine wind direction by taking bearings.

105 All communications by SSB were by Capt. Edwards.

106. During the tow of the Barges, Capt. Edwards communicated by SSB with Reinauer's office at 0700 and 1900 daily.

107. Capt. Edwards and Mate Boyles alternated on watch, with Capt. Edwards standing the 0600-1200 and 1800-2400 hours watches and Mate Boyles standing the 0001-0600 and 1200-1800 watches.

108. Capt. Edwards navigated by Loran-C, Radar, and Dead Reckoning; he did not know celestial navigation.

109. Capt. Edwards' usual practice to determine speed was either to pick a ground speed off the Loran or to take two Loran fixes one hour apart and measure the distance run between them.

110. During Capt. Edwards' career as a Tug Master even before his employment with Reinauer, his practice while navigating in the open sea was to log positions, speeds, wind direction and velocity, and sea states, every three hours.

111. Capt. Edwards planned the route of the DACE REINAUER and the Barges prior to commencing the tow in New Orleans, by establishing waypoints and inputting the waypoints into the Loran unit.

112. Capt. Edwards' practice was routinely to monitor the anal Weather Service) weather channel on VHF at the end of his watch.

113. Prior to commencement of the tow, Captain Edwards and the Hull and Cargo Surveyor, Kenneth Lambertson, discussed available ports of refuge along the eastern coast of Florida.

114. The Coast Pilot, Volume IV, which was aboard the DACE REINAUER during the voyage of the Barges, contained information regarding ports along the eastern coast of Florida.

115. Capt. Edwards required his mates to follow his procedures concerning making log book entries every three hours and monitoring weather forecasts.

116. Capt. Edwards did not log courses because he knew the direction in which he was traveling.

117. Capt. Edwards and Mate Boyles determined the wind velocities and

sea heights recorded in the DACE REINAUER's log book, by visual observation and estimation.

118. Capt. Edwards' general practice on long distance tows as Tug master was to make logbook entries every three hours recording speed, wind speed and direction, and sea states.

119. Capt. Edwards would not have towed the Barges any differently whether they were inland, river or ocean-going barges.

120. On October 3, 1991, the DACE REINAUER commenced the tandem tow of the Barges at New Orleans, Louisiana destined for Boston, Massachusetts, via the southern tip of Florida.

121. After departing the Mississippi River Gulf Outlet (MARGO) Canal on October 4, 1991, the DACE REINAUER and the Barges crossed the Gulf of Mexico on a straight line course for a waypoint south of Dry Tortugas.

122. During the Gulf of Mexico transit, the DACE REINAUER and the Barges were at times more than 20 miles away from the nearest coast.

123. The Tug and the Barges passed the Dry Tortugas on October 6, 1991, at approximately 1230 hours.

124. During the Gulf of Mexico transit, the DACE REINAUER and the Barges encountered several hours of north northeasterly winds during the afternoon of October 5, 1991.

125. On October 6, 1991, during dusk, when the running lights went out on Barge NUMBER ONE, the DACE REINAUER came about, went alongside Barge NUMBER ONE and the deckhand, Lonnie Generous, went aboard the Barge to install portable running lights.

126. Capt. Edwards and Mate Boyles made log entries every three hours during the Gulf of Mexico transit, recording positions, wind speed and direction, sea heights and speed over land.

127. The speed of the DACE REINAUER and the Barges over ground during the Gulf of Mexico transit was in the range of 8.4 to 10.1 knots.

128. On October 6, 1991, at 2030 hours EDT, when the DACE REINAUER was off Sand Key, several miles west of the main ship channel to Key West, the National Weather Service coastal marine forecast for October 7, 1991 for the Atlantic Ocean off the coast of the area between Jupiter Inlet and Key Largo, Florida, predicted winds out of the Northeast increasing to 20 knots and seas building to 4-6 feet, but higher in the Gulf Stream; for the seas off the coast of Florida between Cape Canaveral and Jupiter Inlet, the forecast predicted winds out of the North to Northeast at 20 knots and waves of 5-7 feet with a Small Craft Advisory.

129. The October 6, 1991 National Weather Service forecast issued at 2030 hours EDT predicted that during the night of October 7, 1991, the area between Jupiter Inlet to Key Largo would have winds out of the northeast at 20 knots and seas of 5-7 feet but higher in the Gulf Stream; for the area between Cape Canaveral to Jupiter Inlet, the 2030 hours EDT forecast predicted winds out of the northeast at 20 knots and seas of 5-7 feet.

130. On or about October 7, 1991, at approximately 0300 hours, the Tug DACE REINAUER was towing the Barges in the Atlantic Ocean east of Alligator Reef, Florida.

131. On October 7, 1991, at 0430 hours EDT, the DACE REINAUER was off Lower Matacumbe Key between Tennessee Reef and Alligator Reef.

132. The National Weather Service forecast issued on October 7, 1991, at 0430 hours EDT, for the area between Cape Canaveral to Jupiter Inlet, called for winds out of the North at 15 knots to North/Northeast at 20 knots, and seas building to 5-7 feet with a Small Craft Advisory.

133. The October 7, 1991, 0430 hours EDT, National Weather Service coastal marine forecast for Jupiter Inlet to Key Largo for the evening of October 7, 1991, called for winds out of the Northeast at 15—20 knots but seas of 4-6 feet and higher in the Gulf Stream with Small Craft Caution; for Cape Canaveral to Jupiter Inlet, the forecast predicted winds out of the

Northeast at 20 knots and seas building to 5-7 feet with a Small Craft Advisory in effect.

134. On October 7, 1991, at 1030 hours EDT, the DACE REINAUER and the Barges were in the Atlantic Ocean east of Miami, Florida.

135. On October 7, 1991, at 1030 hours EDT, the National Weather Service forecast for the afternoon of October 7, 1991, Jupiter Inlet to Key Largo, called for winds out of the North to Northeast increasing to 15—20 knots and seas building to 4-6 feet but higher in the Gulf Stream; for Cape Canaveral to Jupiter Inlet, the forecast called for winds out of the North at 15 knots to North/Northeast at 20 knots with seas of 5-7 feet arid a Small Craft Advisory.

136. The October 7, 1991, 1030 hours EDT, National Weather Service forecast for the evening of October 7 and morning of October 8, 1991, Jupiter Inlet to Key Largo, predicted winds out of the Northeast at 15-20 knots and seas of 4-6 feet but higher in the Gulf Stream; for Cape Canaveral to Jupiter Inlet, the forecast predicted winds out of the Northeast at 20 knots and seas of 5-7 feet with a Small Craft Advisory.

137. On October 7, 1991, at 1630 hours EDT, the DACE REINAUER and the Barges were east of West Palm Beach and Lake Worth Inlet.

138. On October 7, 1991, at 1630 hours EDT, the National Weather Service coastal marine forecast for Cape Canaveral to Jupiter Inlet, called for winds out of the North at 15-20 knots to North/Northeast at 20 knots, seas building to 5-7 feet with a Small Craft Advisory in effect.

139. The October 7, 1991, 1630 hours EDT, National Weather Service coastal marine forecast, for October 8, 1991, Cape Canaveral to Jupiter Inlet, predicted winds out of the Northeast at 20 knots with occasional higher gusts and seas of 5-7 feet with a Small Craft Advisory in effect.

140. On October 7, 1991, at 2000 hours EDT, the DACE REINAUER and the Barges were approximately 11 miles east of St. Lucie Inlet and about 15 miles

north of Jupiter Inlet.

141. On October 7, 1991, at 2000 hours EDT, the National Weather Service coastal marine forecast for the evening of October 7, 1991, Cape Canaveral to Jupiter Inlet, predicted winds out of the North at 15-20 knots becoming North/Northeast at 20 knots and seas building to 5-7 feet with a Small Craft Advisory in effect.

142. The October 7, 1991, 2000 hours EDT, National Weather Service coastal marine forecast for the evening of October 7 and morning of October 8, 1991, Cape Canaveral to Jupiter Inlet, predicted winds out of the Northeast of 20 knots with occasional higher gusts and seas of 5-7 feet with a Small Craft Advisory in effect.

143. On October 7, 1991, at 2230 hours, the DACE REINAUER and the Barges were approximately 14 miles southeast of Fort Pierce Inlet.

144. On October 7, 1991, at 2230 hours EDT, the National Weather Service coastal marine forecast for the evening of October 7, 1991, Caps Canaveral to Jupiter Inlet, predicted winds from the North to Northeast at 20-25 knots and seas building to 6-9 feet but higher in the Gulf Stream, with a Small Craft Advisory in effect.

145. The DACE REINAUER and the Barges entered the Gulf Stream east of Alligator Reef and were in the Stream by 0700 hours on October 7, 1991.

146. The DACE REINAUER and the Barges crossed the 100-fathom curve on October 7, 1991, at approximately 1930 hours EDT, and reached a point just outside the 20 fathom curve by 2230 hours.

147. On October 7, 1991 after 2230 hours EDT, the DACE REINAUER altered course to parallel the 20-fathom curve and the axis of the Gulf Stream.

148. On October 7, 1991, at 1900 hours EDT, Captain Edwards advised the Reinauer dispatcher of the DACE REINAUER’s course change, and also reported winds from the north at 15 knots and seas of 3-5 feet.

149. During Captain Edwards' communication with the Reinauer dispatcher on October 7, 1991, at 1900 hours EDT, Captain Edwards reported a six hour delay from the ETA previously established.

150. On August 25, 1993, Captain Edwards was interviewed by U.S. Coast Guard Ensign Payne in connection with a possible Coast Guard Personnel Action against Captain Edwards' Coast Guard License, due to the October 8, 1991 casualty involving the Barges.

151. During the August 25, 1993 interview conducted by Coast Guard Ensign Payne, Captain Edwards stated that Mate Boyles awakened Captain Edwards from his sleep at 0300 on October 7, 1991, and that Mate Boyles informed Captain Edwards of deteriorating weather conditions.

152. During the August 25, 1993 interview conducted by Coast Guard Ensign Payne, Captain Edwards stated that on October 7, 1991, 1700 hours, weather conditions continued to worsen, with winds from the North between 15-20 knots and seas of 4-6 feet.

153. During the August 25, 1993 interview conducted by Coast Guard Ensign Payne, Captain Edwards stated that on October 7, 1991, 1700 hours, Captain Edwards made the decision to seek safe refuge from the deteriorating weather conditions, at Port Canaveral, Florida.

154. During the August 25, 1993 interview conducted by Coast Guard Ensign Payne, Captain Edwards stated that he did not seek refuge in Fort Pierce because he was unfamiliar with the area and was concerned that the Barges were too large to enter Fort Pierce.

155. Captain Edwards did not, at any, time, notify the Reinauer dispatchers that on October 7, 1991, he had decided to seek refuge at Port Canaveral.

156. Based upon Capt. Edwards' altered course and reduced speed on October 7, 1991, the DACE REINAUER would have arrived at Port Canaveral at approximately 1200 hours on October 8, 1991 if no additional changes in speed

were made.

157. On October 8, 1991, at approximately 0150 hours, Captain Edwards notified Reinauer dispatcher John Paolise that Barge NUMBER TWO was not on the DACE REINAUER's radar and that the Barge apparently sank.

158. On October 8, 1991, at approximately 0205 hours, Reinauer dispatcher John Paolise advised William Anderson, Albert Reinauer and Jonathan Wales concerning Captain Edwards' 0150 hours communication reporting the disappearance of Barge NUMBER TWO from the DACE REINAUER's radar.

159. On October 8, 1991, at approximately 0213 hours, Captain Edwards contacted the U.S. Coast Guard Station, Fort Pierce, Florida, and notified the Coast Guard that Barge NUMBER TWO had sunk.

160. On October 8, 1991, at approximately 0345 hours, Reinauer Vice President Albert Reinauer retained Robert Bird of Hull & Cargo, Jacksonville, Florida, to coordinate salvage operations.

161. On October 8, 1991, at approximately 0700 hours, Jonathan Wales notified Water Transport's Steven Lush and Kenneth Binnix that Barge NUMBER TWO was presumed sunk about 14 miles off the eastern coast of Florida.

162. On October 8, 1991, at approximately 12 noon, Water Transport representatives Robert Mahar, Kenneth Binnix and Steven Lush arrived at Boston Towing's offices in Boston, where they were met by Jonathan Wales, Boston Towing General Manager Lee Kennedy and Boston Towing Port Superintendent Melvin Gouthro.

163. During the October 8, 1991 meeting at Boston Towing's Boston offices, the Water Transport representatives were advised that Barge NUMBER TWO had grounded on Jensen Beach, Florida, with approximately 40 feet of its bow section missing.

164. During the October 8, 1991 meeting at Boston Towing's Boston offices, the Water Transport representatives were advised that the bow section of Barge NUMBER ONE was hanging down in the sea.

165. On October 8, 1991, Boston Towing retained Boston attorneys Hoch & McHugh, who then retained Allen von Spiegelfeld, a Tampa attorney who went to Fort Pierce to represent the interests of Boston Towing and Reinauer.

166. On October 8, 1991, the U.S. Coast Guard, Miami, issued a Notice Of Federal Interest For An Oil Pollution Incident relative to Barge NUMBER TWO, which states it was signed for as received and acknowledged by Philip Chase on October 8, 1991, 1001 hours.

167. Philip Chase did not arrive in Florida until the early evening of October 8, 1991.

168. On October 8, 1991, at 1725 hours, the U.S. Coast Guard issued a letter to the "Master, Owner, Agent, or Person in Charge," of Barge NUMBER ONE, directing that the Barge could not be towed into the Port of Fort Pierce because "(i]nasmuch as you have been unable to adequately assess the present condition of the barge I cannot allow this transit which may possible hazard the navigable channel into Fort Pierce."

169. On October 8, 1991, at 1812 hours, Jonathan Wales transmitted a facsimile to Water Transport, notifying Water transport that the specific cause or the distress to the Barges was the Barges' unseaworthiness at the beginning of the Bareboat Charter.

170. By letter dated October 10, 1991, Water Transport notified Boston Towing and Reinauer of Water Transport's disagreement with the conclusions and claims set forth in Jonathan Wales' October 8, 1991 letter.

171. On October 8, 1991, at approximately 2045 hours, Philip Chase arrived at McCulley Marine Services, Fort Pierce, Florida, and met with Robert Bird and potential salvors.

172. On October 8, 1991, on or after 2045 hours, Boston Towing retained McCulley Marine Services to effect the salvage of the Barges.

173. Philip Chase arrived on Jensen Beach on October 8, 1991, at

approximately 2130 hours, where Barge NUMBER TWO was grounded.

174. When Philip Chase arrived on Jensen Beach on October 8, 1991, 2150 hours, Barge NUMBER TWO was surging shoreward in breaking seas of approximately 8 feet, and a wind of 20 to 25 knots was blowing directly on the Barge's beam.

175. On October 8, 1991, at approximately 2130 hours, John "Boo" McCulley and Bob Bird advised Philip Chase that Barge NUMBER ONE's forward rake deck was hinging in the seaway offshore and was anticipated to fracture free given the on-scene conditions of winds of 25 to 35 knots from the east to northeast and seas of 12 to 14 feet with frequent heavy showers.

176. After speaking with Attorney von Spiegelfeld at 2300 hours on October 8, 1991, Philip Chase telephoned Jonathan Wales and advised Wales of his observations concerning the cause of the casualty to the Barges.

177. At all times during his attendance at Fort Pierce, concerning the casualty to the Barges, Philip Chase considered himself to be protecting only the rights of his employer Boston Towing.

178. Based upon his prior experience in investigations for the Coast Guard, Philip Chase knew prior to leaving Boston for Fort Pierce on October 8, 1991 that the casualty to the Barges qualified as a "serious marine incident" under Federal law, which required mandatory drug and alcohol testing of the DACE REINAUER's Captain and Mate.

179. Boston Towing and Reinauer decided to utilize the DACE REINAUER to tow Barge NUMBER TWO by the stern off Jensen Beach and to move the Barge to the Indian River Citrus Docks in Fort Pierce.

180. On October 9, 1991, Philip Chase was advised by Robert Bird that Barge NUMBER ONE had lost its overhanging deck flap into the sea.

181. On October 9, 1991, at approximately 0900 hours, the DACE REINAUER attempted to approach Jensen Beach for purposes of salvaging Barge NUMBER TWO, but could not effect the salvage due to heavy weather and seas.

182. The DACE REINAUER moored at the Indian River Citrus Docks on October 9, 1991, at approximately 1200 hours, and remained moored until 1545 hours.

183. At approximately 1330 hours on October 9, 1991, Attorney von Spiegelfeld boarded the DACE REINAUER, where he reviewed vessel logs and charts and interviewed Captain Edwards and Mate Boyles before taking sworn statements of Captain Edwards, Mate Boyles and Engineer Daniel DuBrey.

184. On October 9, 1991, Attorney von Spiegelfeld remained on board the DACE REINAUER for approximately three hours.

185. While he was aboard the DACE REINAUER on October 9, 1991, Attorney von Spiegelfeld reviewed with Captain Edwards and Mate Boyles chart number 11009, which contained the positions, speeds and course of the DACE REINAUER for October 7-8, 1991, immediately prior to and including the time of the casualty.

186. After reviewing chart number 11009 with Captain Edwards and Mate Boyles aboard the DACE REINAUER on October 9, 1991, Attorney von Spiegelfeld had the Captain and Mate initial the chart, and then Attorney von Spiegelfeld took the chart off the DACE REINAUER.

187. The original chart 11009, reviewed and initialed by Captain Edwards and Mate Boyles, is missing and cannot be found.

188. On October 9,. 1991, while the DACE REINAUER was moored at Fort Pierce, Philip Chase reviewed the Tug’s log books and charts with respect to positions and sea states, and Chase also interviewed Mate Boyles.

189. After reviewing the DACE REINAUER’s log books and charts on October 9, 1991, and after interviewing Mate Boyles, Philip Chase concluded that at no time was the 6-foot maximum sea criteria exceeded.

190. On October 9, 1991, at approximately 1930 hours, Philip Chase was instructed by Jonathan Wales to attempt to corroborate weather information by all possible sources in order to focus on Boston Towing’s contention that

weather constraints were never exceeded during the tow of the Barges.

191. During their telephone conversation at approximately 1930 hours on October 9, 1991, Jonathan Wales informed Philip Chase that the Barges sustained failures due to improper design and/or workmanship.

192. On October 9, 1991, Boston Towing's Marine Superintendent, Melvin Gouthro, was dispatched to Fort Pierce after meeting for more than two hours with Jonathan Wales, Lee Kennedy and Timothy McHugh, the attorney for Boston Towing and Reinauer.

193. On October 10, 1991, the DACE REINAUER towed Barge NUMBER TWO off Jensen Beach and brought the Barge to a berth in Fort Pierce.

194. On October 10, 1991, at approximately 1300 hours, Philip Chase visited U.S. Coast Guard Station Fort Pierce and obtained weather and radio logs concerning the casualty to the Barges.

195. On October 10, 1991, Jonathan Wales engaged in a telephone conversation with Water Transport's James Sullivan.

196. On October 11, 1991, Boston Towing and Reinauer had decided to tender redelivery or the Barges to Water Transport effective at 0130 hours on October 8, 1991.

197. In Jonathan Wales' October 11, 1991 facsimile letter to Watson Driggs, Wales advised Driggs of Boston Towing's and Reinauer's decision to terminate the Bareboat Charter.

198. On October 11, 1991, at approximately 1218 hours, Jonathan Wales requested that Watson Driggs ascertain whether the Reinauer Fleet Policy underwriters would accept Boston Towing's and Reinauer's decision to terminate the Bareboat Charter and whether the underwriters would accept joint legal representation of Boston Towing, Reinauer and the Reinauer Fleet Policy underwriters, by Timothy McHugh and Allen von Spiegelfeld.

199. On October 11, 1991, Boston Towing terminated the Bareboat Charter and tendered redelivery of the Barges to Water Transport effective at

0130 hours on October 8, 1991, upon the ground that the Barges were not in good state of repair, in efficient operating condition, tight, staunch, strong and in all respects seaworthy.

200. On October 11, 1991, at 1700 hours, Barge NUMBER ONE docked at the Indian River Citrus Terminal in Fort Pierce, after being towed from offshore by the DACE REINAUER.

201. The Hull & Cargo surveyor who had performed the trip-in-tow survey for the tow of the Barges, Kenneth Lambertson, arrived at Fort Pierce on October 11, 1991, and advised Boston Towing and Reinauer that a metallurgist and a naval architect should be retained to determine the cause of the casualty.

202. Subsequent to Boston Towing's termination of the Bareboat Charter at 1600 hours on October 11, 1991, Water Transport's representative, Warren Chandler, took custody of the Barges in their damaged afloat condition at berth in Fort Pierce.

203. Beginning October 10, 1991, Warren Chandler of Martin, Ottaway and Chandler, Inc., performed surveys of the Barges.

204. On October 18, 1991, Water Transport transmitted a facsimile to Jardine in which Water Transport requested that Jardine notify the Reinauer Fleet Policy underwriters that Water Transport considered both Barges to be constructive total losses ("CTL") and that Water Transport was tendering abandonment of all Water Transport's rights, title and interest to both Barges to the underwriters in accordance with the Bareboat Charter providing for both Barges to be insured under the Reinauer Fleet Policy.

205. On October 21, 1991, Water Transport notified Boston Towing and Reinauer by letter that Water Transport considered both Barges to be constructive total losses.

206. Water Transport permitted surveys by representatives of the Royal Policy underwriters, NABRICO, Reinauer, and Boston Towing on October 22 and

23, 1991, while the Barges were in the damaged afloat condition at the Indian River Terminal, Fort Pierce, Florida.

207. On February 11, 1992, Water Transport notified Boston Towing and Reinauer that the Barges had been towed to Detyens Shipyard and that a final survey was scheduled for February 17—18, 1992.

208. During the February 17, 1992 survey of both barges while on drydock at Detyens Shipyard, Mt. Pleasant, South Carolina, surveyors representing the other parties did not agree on a repair program acceptable to Water Transport based upon full plate renewals.

209. On February 14, 1992, Water Transport presented its claim to the Reinauer Fleet Policy underwriters for constructive total loss of both Barges.

210. Partial plate repairs were completed on Barge NUMBER ONE on June 26, 1992, and on Barge NUMBER TWO on July 17, 1992.

ADDITIONAL FINDINGS OF FACT

Based on the testimony presented and the exhibits admitted during the bench trial, my additional factual findings pursuant to Fed. R. Civ. P. 52 are as follows:

211. Under ¶ 7 of the Bareboat Charter, Water Transport represented to Boston Towing that the Barges were seaworthy and ¶ 4(a) of the Vessel Delivery Agreement obligated Water Transport to ensure that the Barges were "seaworthy" and "capable of performing the voyage intended." (Vol. II, Stip. Exh.[5] 63).

[5] There were over fifty volumes of documents and depositions submitted at trial. Each set of volumes, was given a different name. The following are my abbreviations for each set:

"Vol. _#_, Stip. Exh. _#_" - Volume and Exhibit Numbers in

212. Under ¶ 9 of the Bareboat Charter, Boston Towing was not to "operate the Vessels beyond the navigation limits stated in the (Charter's) insurance policy" and ¶ 4(b) of the Vessel Delivery Agreement required Boston Towing and Reinauer as Tower to "exercise reasonable care in the receipt, handling, navigation and delivery of the tow." Id.

213. Under ¶ 11 of the Bareboat Charter, Boston Towing was obligated to "make all repairs necessary to keep the Vessels in the same condition as at delivery, except ordinary wear and tear or depreciation" and to redeliver the Barges to Water Transport "in substantially the same condition as when accepted by Charterer (Boston Towing), reasonable wear and tear excepted." Id.

"Stipulated Documentary Exhibits Arranged Chronologically".

"Vol. _#__, Supp. Stip. Exh. Tab Label " Volume Number and Exhibit Tab Label in "Supplemental Stipulated Documentary Exhibits Arranged Chronologically".

"_Name_ Trans. at ____ ln. " ____ Witness Name, and Page and Line location of Testimony in Trial Transcript.

" Name Tr. Exh. #" ____ Number of Exhibit marked At Trial by Named Witness.

"Vol. _#__, _Name Dep. p. ____" - Volume Number, Name of and Page in Witness Deposition contained in "Exhibits Stipulated to be Admissible Without a Witness".

"Def. Exh. , _Name_ Dep. p. ____" - Volume Label, Name of and Page in Witness Deposition contained in "Defendants' Proposed Exhibits";

"Vol. _#__, Plaintiff's Name Aff. at ____" – Volume Number, Witness Name and either Paragraph or Page Number in the "Plaintiff's Direct Witness Testimony Affidavits".

"Def. _Name__ Aff. ___" - Witness Name and either Paragraph or Page Number in the one volume of "Defendants' Direct Witness Testimony Affidavits."

Because of the voluminous nature of the record in this case, it is extraordinarily burdensome to cite the multiple locations in the documents, depositions and trial transcript for the facts I am finding. Instead, I merely cite one or two places in the record which contain a basis for each finding.

214. There are essentially two questions before me. First, did the defendants negligently tow the Barges or otherwise violate the terms and conditions of the Bareboat Charter? If so, were the defendants' acts the proximate cause of the damage to the Barges or were the Barges unseaworthy before the tow began? I address each question in turn.

THE TOWS

215. The Temporary Certificates of Inspection issued by the Coast Guard for the two Barges, permitted a "coastwise (tow) in fair weather only." (Vol. II, Stip. Exh. 56 and 57).

216. Although Lambertson, the Mull & Cargo surveyor, discussed with Robert Hill, Water Transport's naval consultant, setting a speed limitation for the tow, Lambertson did not place a specific speed restriction in his Recommendations but instead recommended a "coastwise voyage," that the "speed of tow be strictly regulated to prevent pounding" and that the Tug "[r]educe speed as necessary for this purpose". (Vol. II, Stip. Exh. 65 (emphasis in the original); Vol. 1, Plaintiff's Hill Aff. at ¶ 40. Compare also Strouse Trans. at 1296, ln. 20 to 1297, ln. 19 (he commonly sets a speed limit of 5 knots for tows of river vessels)).

217. The Hull & Cargo handwritten Survey Recommendations also contained a restriction providing that "[I]f sea conditions enroute are encountered in excess of six (6) feet, or forecast between ports of refuge, seek shelter until conditions improve." (Vol. II, Stip. Exh. 65).

218. Coast Guard regulations do not define "fair weather." (Atkinson Trans. at 440, ln. 17-22). Nevertheless, I accept the opinions of Kenneth Lambertson, the surveyor, and the various maritime experts who testified including Captain Atkinson and defendant's surveyor, Larry Earl' Strouse, that a reasonable seaman should have known that the barges were inland river barges, should have known that the six-foot sea and reduced speed restrictions of the Hull & Cargo Survey Recommendations needed to be followed

for this tow and should and would have known that sets above six feet were not fair weather for these Barges. (See Vol. XII, Lambertson Dep. pgs. 38-40 50; Atkinson Trans. at 440, ln. 13 to 441, ln. 20; Strouse Trans. at 1335, ln. 21 to 1336, ln. 18).

219. Even though the U.S. Coast Guard Temporary Certificates of Inspection were stored and maintained in an unlocked tube mounted on a tripod on the deck of each Barge and that Lambertson, the Hull & Cargo surveyor, had discussed the location and contents of the Certificates with Captain Edwards before he departed, the Captain never reviewed the Certificates. (See Undisputed Facts ¶ 79 supra; Vol. XII, Lambertson Dep. pgs. 41-42). Moreover, even though Lambertson informed him, Captain Edwards maintains that he did not know the Barges were limited to river service or fair weather travel and that even knowing this information, he would not have altered his route or conduct. (See Undisputed Facts ¶¶ 78 and 119 supra; Def Exh. "UJ", Edwards Dep. pgs. 96-98).

220. I concur with the opinion of plaintiff's expert, Captain Atkinson, that any experienced and prudent seaman would and should have known or would have taken the time to know what type of barges he was towing and would have known, from at least the surveyor's recommendations, that special care had to be taken with inland river barges. (See Atkinson Trans. at 440, ln. 13 to 441, ln. 20; see also defense witness Strouse Trans. at 1335, ln. 21 to 1336, ln. 18).

221. I also accept plaintiff's contention that the Coast Guard and Hull & Cargo restriction of the tandem tow to a coastwise route would and should have been understood by a reasonable and prudent seaman to have meant that the tow was required to navigate within or about 20 miles of land. (Def. Exh. "UG", Lambertson Dep. pgs. 49—51; see also Randall Trans. at 529, ln. 13—14).

222. During the Gulf transit of the vessel and up to about October *5,*

1991, the tow was approximately 150 miles off shore which would have taken at least 16 hours to get to land. (Atkinson Trans. at 514, ln. 8; 524, ln. 10-20; see Dooley Tr. Exh. A). This violated the coastwise tow requirements of the Coast Guard Certificates and of the Hull & Cargo Recommendations. Nevertheless, I do not find that this violation subjected the Barges to excessive pounding because sea waves averaged only about 3 feet during this part of the tow transit. (Dooley Tr. Exh. A). For the reasons I will more fully discuss below, I also do not find that this violation caused or contributed to the ultimate failure of the bows.

223. Commencing on October 6, 1991, at about 1500 hours, the Dace Reinauer navigated around the tip of Florida and began its northward route off the Florida coast. During this portion of the trip, the Tug stayed essentially within twenty miles off the coast of Florida. (Compare Dooley Tr. Exh. A and Davis Tr. Exh. 1). Nevertheless, at least as of Octobezt6, 1991, at 2030 hours, when weather reports predicted seas rising to 5-7 feet in the area the tow was headed (see Undisputed Facts ¶¶ 128-29 supra; Vol III, Plaintiff's Davis Aff. at pgs. 11-12 of the attached Report; Davis Tr. Exh. 5), the Captain should have sought refuge in either the port of Miami or after Miami, at Port Everglades or Port West Palm Beach. (Vol. II, Plaintiff's Atkinson Aff. at pgs. 96-99 of the attached Report; compare also Dooley Tr. Exh. A and Davis Tr. Exh. 5). The Captain should have known of these refugee ports both from his discussions with Kenneth Lambertson who told him the ports were appropriate for these barges or from the Coast Pilot, Volume IV, which was aboard the Tug during the voyage Undisputed Facts ¶ 113 and 114 supra; Def. Exh. "UJ", Edwards Dep. pgs. 153-155).

224. Instead, despite continuing predictions of deteriorating weather conditions (see Undisputed Facts ¶ 132-33, 135—36, 138—39, and 141—42 and Davis Tr. Exh. 5), Captain Edwards ignored the fair weather only requirement of the Coast Guard Temporary Inspection Certificate and the prohibition

against towing in forecasted seas in excess of six feet in the Hull & Cargo Survey Recommendations and did not appear to begin seeking refuge until at least October 7, 1991, at 2300 hours when he finally had the Tug alter course.[6] Undisputed Facts ¶ 147, 152-53 supra).

225. I do not credit the testimony of the crew of the Dace Reinauer, particularly Captain Edwards, that wave conditions during the tow never exceeded six feet. (See Undisputed Facts 1 189 supra). I have less reason to give defendants the benefit of the doubt on this issue since they lost' the original chart and log books for the pivotal weather days of October 7 and 8. (See Undisputed Facts ¶¶ 185-87 supra).

226. I credit the testimony of plaintiff's and defendant's weather experts that the reports of weather conditions at the time and the data generated by surrounding ocean buoys uniformly demonstrate that significant six foot waves[7] commenced on October 7 at about 1700 to 1800 hours and rose to eight feet at 0100 hours on October 8, 1991. (See Davis Trans. at 127, ln. 22 to 128, ln. 6; Davis Tr. Exh. 3 and 4a; Vol. III, Plaintiff's Dolan Aff. at ¶ 19—20; Dooley Trans. at 277, ln. 16—25). Thus, the Barges were subject to wave heights above six feet for over nine-and—a—half hours. (Davis Trans. at 127, ln. 22 to 128, ln. 6).

227. The Hull & Cargo requirement that six foot seas be avoided to prevent pounding was an obligation known both to Captain Edwards and specifically to Boston Towing. Lambertson had gone over the recommendations

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[6] I do not accept the statements of Captain Edwards to the Coast Guard investigator that he decided to seek refuge at Port Canaveral on October 7, 1991, at 1700 hours. (See Undisputed Facts ¶ 153 supra). Not only did the crew report that the Captain did not decide to seek refuge until October 8 but at 1900 hours of October 7 when he communicated with defendant Reinauer's dispatcher, the Captain gave no advice of his intent to seek refugee. (See Undisputed Facts ¶ 155).

[7] "Significant waves" mean the average of the highest of the one—third of waves in the area. (Davis Trans. at 148, ln. 11—13 and 178, ln. 5—11).

with the Captain and had told him to treat the Barges like a "crate of eggs." Lambertson also specifically told the Captain that pounding was a concern and that he should not wrinkle the bottom of these Barges.' (Def. Exh. "UG", Lambertson Dep. pgs. 34, 171-172; see also Undisputed Facts ¶ 78 supra). Moreover, the Boston Towing contract for the vessel delivery order, which was drafted by Boston Towing, indicated that the tow was to "avoid pounding." (Vol. II, Stip. Exh. 63).

228. Pounding is a known sea hazard and is known to cause significant damage to vessels. (See. e.g., Strouse Trans. at 1298, ln. 21 to 1299, ln. 12; 1308, ln. 10 to 1309, ln. 17; 1328, ln. 2-18; see also DiMilio v. Sheepscot Pilots, Inc., 870 F.2d 746, 748—49 (1st Cir. 1989)).

229. Captain Edwards, as a licensed and experienced seaman, grossly negligent in subjecting these inland river Barges to the forecasted and actual sea waves in excess of six feet off the coast of Florida from October 6 to October 8 and in violating the Hull & Cargo Recommendations and the limitations of the U.S. Coast Guard Temporary Certificates of Inspection.

230. At trial, defendants maintained that Hull & Cargo was retained solely on their behalf and not on behalf of or as a requirement of their insurance underwriters. Although Lambertson, the surveyor, addressed his report to Boston Towing and Boston Towing paid Hull & Cargo for the inspection (see Def. Exh. "UG", Lambertson Dep. pgs. 155-156), Lambertson was called for the engagement by one of the underwriters (Id., at pg. 25) and in various letters; Boston Towing, or its agents, specifically its insurance broker, affirmed and admitted that the survey was a precondition and requirement for the extension of policy coverage by the insurance underwriters. (See Vol. II, Stip. Exh. 32, 41, 50, and 55; see also Def. Exh. "TY", Gouthro Dep. pg. 63) (purpose of survey is to satisfy underwriters)).

231. Accordingly, I find that the Hull & Cargo Recommendations were an integral part of the navigation limits of the insurance policy and

incorporated by reference in ¶ 9 of the Bareboat Charter. Violation of the Recommendations and of the restrictions of the Coast Guard Certificates, therefore, constituted a breach of the Bareboat Charter contract. In any event, to the extent the Captain was made aware of the Recommendations of the surveyor, he did not use reasonable or prudent care in navigation by ignoring them.

Proximate Cause

232. Defendants maintain that the catastrophic failure of the bows of these Barges occurred because each Barge had a preexisting welding crack of at least 1/2 of an inch. According to defense experts, the cyclic wave pressure of seas even below six feet would have caused the cracks to grow and the bows to fall off when they did or shortly thereafter. In short, the Barges were unseaworthy and any extra pounding to the Barges from waves above six feet was not the proximate cause of the bow failures.

233. As is to be expected, plaintiff's experts contend that the bows failed because excessive pounding during the tow caused the bottom of the bows to fail.

234. Defense counsel during summations admitted that

> in a failure mode as complex a structure as these barges it is impossible ... to give ... a blow-by-blow description of how each single element of this structure failed. There is a certain randomness that takes over. We are talking about a 272-foot barge, 54 feet wide operating in a seaway. We have it operating in an area where it is experiencing 6-foot seas. And Professor Petrie told you there's a randomness. ... (No witness can) explain to you bracket by bracket or brace by brace, however it happens, it's impossible to do in a structure as complex as this in that scenario ...

(Pettingell Trans. at 1720, ln. 2—10, ln. 24 to 1721, ln. 1).

235. Defense counsel invited me to compare both the plaintiff's and defendant's theories of failures, compare them with the physical evidence and decide which made sense (Pettingell Trans. at 1720, ln. 17—20). The

difficulty in this case has been that neither side's theory completely explains the physical evidence and that the methodology employed by the experts on both sides has weaknesses in presumptions and data manipulation. For the reasons to be discussed below, however, I have not found the theory of the defense experts sufficiently persuasive and I credit the opinions of plaintiff's experts concerning the bow failure. I start with my conclusion that the design of the Barges was sufficient for the purposes of a coastwise transit in six or below sea states and then turn to my conclusion that defendants' evidence was not sufficient to convince me that welding cracks caused the failure of these Barges.

The Barge Design

236. The Barges were 272 foot long, 54 foot wide double hulled barges for inland service with a raked bow. The hull of each Barge was a standard NABRICO inland tank barge design, which has been in service since the late l970s. (See Def. Exh. "UN & UI", Nokes Dep. pgs. 38, 52—53, 272).

237. The NABRICO Standard inland tank barge design from which the Barges were constructed complied with U.S. Coast Guard certification requirements for petroleum tank barges, and the design has been inspected and certificated by the Coast Guard (Id. at pgs. 47—48, 61—66, 321).

238. There have been no prior instances of the NABRICO standard inland tank barge having its bow rakes fall off or suffering fractures at all four trunk corners. **(Iii.** at pgs. 303, 327—328)

239. These Barges, however, were modified by the addition of a stern notch, and a higher raised tank top, as well as specialized sludge handling equipment. (Id. at pgs. 36-41, 52-57, 100—102, 120—125).

240. Although the trunk height of these barges was raised from one foot to l'9" in order to accommodate necessary sludge equipment and cargo (Id. at p. 135), a raised trunk design is standard for river barge design and

approved by the ABS under its River Rules. (Randall Trans. at 621, ln. 4-8).

241. Nevertheless, if the location where the trunk joins the main hull, Frame 15 of the bow and Frame 89 of the stern, is not exceedingly well designed, problems can result for that location is a place where various forces act and create stress points or structural hard points. (See Def. Exh. “TE & UA", Hill Dep. pgs. 77—79; Def. Exh. “UN & UI”, Nokes Dep. pgs. 80-81, 300-302; Lorenz Trans. at 208, ln. 9-16).

242. NABRICO had put an insert or transition plate at the raised truck corners of its standard design barges because barges of this type used in asphalt service had experienced hairline cracking in the corners due to thermal stress caused by heating, expanding and contracting of concrete. (See Def. Exh. "UH & UI”, Nokes Dep. pgs. 300-304). As noted, the trunk corners are areas of significant stress in these Barges. (Lorenz Trans. at 209, ln. 15-18; Munchmeyer Trans. at 1074 A53, ln. 11 to A54, ln. 3). Stresses caused by heating are no different from stresses caused by cyclic loading. (Munchmeyer Trans. at 1074 A60, ln. 20; A62, ln. 1-9).

243. Other than the thermally-induced hairline cracks in the asphalt barges, however, NABRICO has had no complaints of any structural problems on the NABRICO standard design inland tank barge. (Def. Exh. “UN & UI”, Nokes Dep. pgs. 303-304).

244. While the Barges were still under construction, Boston Towing’s President Vincent Tibbetts, Jr. recommended a stern notch design compatible with Boston Towing tugs operating in Boston Harbor. (Vol. I, Supp. Stip. Exh. Tab BU).

245. Robert Hill, a naval architect employed by Enviro-Gro and a consultant to Water Transport, supplied NABRICO with the design of the notch; Robert Fellrath, a naval architect employed by NABRICO designed the structure and the framing. (Id.; Def. Exh. “UN & UI”, Nokes Dep. pg. 98).

246. NABRICO did not perform any calculations concerning the effect

that the addition of the notch or the raised trunk top would have on the weight distribution' curve or the structural load response of Barges NUMBER ONE or NUMBER TWO. (Def. Fellrath Aff. ¶ 8—12).

247. Moreover, NABRICO did no calculations to determine hull girder bending strength, bottom buckling, or motion or slamming of the Barges in a seaway, or any calculations as to the effect of the weight or anchor gear on the bow of the Barges as to their hull bending movement. Id.

248. Likewise NABRICO did no analysis relative to the Barges' experiencing structural fatigue at the trunk corners in an ocean voyage. Id.

249. Despite these design alterations and the increased trunk stress points, however, none of the experts who testified in this case for either plaintiff or defendant opined or concluded that the Barges as designed were incapable of making the ocean voyage intended if the barges had been kept to waves below six feet. (See. e.g., Lorenz Trans. at 245, ln. 9-22; Munchmeyer Trans. at 1074 A78, ln. 8-13). At worst, defendants' experts only opine that while the design of the Barges met ABS requirements, it did so in a marginal fashion (Munchmeyer Trans. at 1074 A35, ln. 20-25), and that the design provided only a small margin of safety from structural failure at the trunk corners and welds. (Munchmeyer Trans. at 1074 A38, ln. 1—16; 1101, ln. 4-19; Petrie Trans. at 1198, ln. 4 to 1199, ln. 7).[8]

250. I find, therefore, despite the increased stress points at the trunk corners and welds, that the Barges were seaworthy as designed.

Welding

[8] I do not credit defendants' contention that the taper of the transition plates at the trunk corners was a violation of ABS rules and a manufacturing or design defect which lead in any way to the failure in this case. I reject Masabuchi's and Munchmeyer's measurements of the taper and Accept the measurements of plaintiff's expert, Olsson that the tapers complied with ABS rules as they incorporate the American Welding Society Rules. (Compare Masubuchi Trans. at 883, ln. 13-16 with Masubuchi Trans. at 978, ln. 6—24; see Olsson Trans. at 1481, ln. 16 to 1482, ln. 7).

251. Testifying on behalf of defendants, Professor Koichi Masubuchi, an engineering and metallurgy expert, concluded that there were pre-existing cracks at Frame 15 of both Barges which resulted in the failure of the Barges during their transit. Professor Masubuchi opines that absent pre-existing cracks, there is no other explanation for the bows to have failed because insufficient force on the bows existed to cause a crack fatigue in the metal of the Barges. (See Masubuchi Trans. at 911, ln. 14-23; 923, ln. 22 to 924, ln. 6).

252. Based on poor welding around Frame 15 of Barge Number Two and on cracks around Frame 89 of the trunk corners or the stern of both Barges, Professor Masubuchi believes that cyclic wave loading caused pre-existing cracks to grow to the point that substantial structural damage occurred in the vicinity of Frames 15 and 89 on both Barges and would have occurred regardless of the heighten sea waves of October 7 and 8. (See Masubuschi Trans. at 843, ln. 13 to 844, ln. 15; 876, ln. 10—13; 933, ln. 19 to 934, ln. 4).

253. Professor George Petrie, a naval architect, has submitted computer generated models showing that cracks of 1/2 inch or above would have grown to catastrophic portions in wave heights as low as 3 feet. (Petrie Tr. Exh. 1, 2, 10-20). Professor Petrie however, also points to the poor design of the transition plates at the corner of the barge trunks and the lack of continuity of the transition plate and deck as factors which accelerated the growth of the pre-existing welding cracks. (Def. Petrie Aff. ¶¶ 4-7).

254. Examination of the bow rake structures after the casualty by defense experts disclosed intermittent welds at the deck junction at Frame 15 and under the side of the deck, use of backing bars to cure insufficient welding, slag on welds, puddling or improper melting of plates at Frame 89, and the presences of more welds on one barge than on the other. (See. e.g., Sprouse Trans. at 1278, ln. 17 to 1294, ln. 6). Moreover, one sample, 2AP,

taken from Barge No by Professor Munchmeyer, shows various welding faults.

255. Sample 2AP was located at the port corner of Barge NUMBER TWO. (See Petri Tr. Exh. 6). One of the faults noted in this sample was a one-inch surface crack which has been referred to as a shrinkage crack. (The Manslab Report, Masubuchi Tr. Exh. 3, Figure 12). There was also a void in the welding which was only visible in an an x-ray. (Id. at Figure 8; Masubuchi Trans. at 946, ln. 22—24)

256. Masubuchi, however, does not maintain that the shrinkage crack in sample 2AP or that the void was the cause of Barge Number Two's failure. (Masubuchi Trans. at 946, ln. 22 to 947, ln. 5; 947, ln. 12 to 948, ln. 10). Instead, he believes that the welding faults in this sample were of the type that existed in front of the transition plate and resulted in the bow failure. (Masubuchi Trans. at 983, ln. 4-18).

257. All of the welding faults described by defense witnesses raise concern about the quality of the welding on the Barges. (See, e.g., Strouse Trans. at 1278, ln. 12 to 1294, ln. 14). Nevertheless, Professor Masubuchi makes it very clear that only a surface crack could have caused the bow failures (Masubuchi Trans. at 997, ln. 21 to 1000, ln. 14) and I find it difficult to conclude that given the many inspections these vessels underwent during construction and before launching, that surface cracks of the type described by Professor Masubuchi on both Barges would have been missed. (Compare Masubuchi Trans. at 1074 Al, ln. 17-18 (cracks should not be missed "if people do good job").

258. As part of the "Maltese Cross" ABS classification, the ABS performed a continuous on-site inspection during the construction phase at the NABRICO shipyards in Nashville and Ashland, Tennessee. (Def. Exh. "UH & UI", Nokes Dep. pgs. 341-342)

259. The ABS inspected and approved the welding used to construct the Barges as being in compliance with the ABS River Rules. (Id. pgs. 340—341).

260. Moreover, the ABS inspected the Barges for damage after their respective launches and found the Barges to be in compliance with the ABS River Rules. (Id. at 342; Vol. II, Stip. Exh. 39 and 59).

261. In constructing the Barges, NABRICO employed welders certified by the ABS and utilized American Welding Society standard welds approved by the ABS. (Def. Exh. "UN & UI", Nokes Dep. pg. 328).

262. NABRICO maintained a welding quality control procedure which identified unacceptable welds and required that the ABS "sign-off" on the observed correction of any such welds. None of the welds identified in this NABRICO quality control procedure was in the area of any of the alleged failure points. (See Vol. II, Stip. Exh. 30).

263. Neither Captain Stickel, Captain Edwards nor Mate Boyles, who inspected the Barges and tows pursuant to the requirements of the Reinauer Operations Manuel (see Undisputed Facts ¶¶ 93-95 supra), indicated that the Barges were not ready for sea travel or that the Barges were unfit for the intended tow.

264. On or about October 1, 1991, Lambertson of Hull & Cargo surveyed both Barges. Lambertson inspected the deck and as much of the shell plating as he could see above water. Lambertson did not inspect the rake ends or cargo compartments because they had not been properly aired before his arrival. Outside of noting wrinkles and defects in paint not adhering, however, he concluded that both Barges were fit for their intended service. He did not report any welding faults or cracks. (See Vol. III, Stip. Exh. 106 and 107; Def. Exh. "UG", Lambertson Dep. pgs. 159—161).

265. Finally, in addition 'to all the other inspections during and after construction, before the Barges left New Orleans, Water Transport's naval architectural consultant Robert Hill spent five hours each day on two successive days, some of the time on his hands and knees, inspecting each Barge, including the trunk corners, for structural defects like cracks, and

Hill found no such cracks. (Hill Trans. at 1565, ln. 10 to 1569, ln. 6).

266. In short, no surface welding cracks were seen or reported during any of these inspections.

267. Professor Petrie testified that had any preexisting cracks been over ¼-inch in length, the Barges would have failed. (Petrie Tr. Exh. 10-15 and Petri Trans. at 1356, ln. 17 to 1359, ln. 9).

268. The only reported, undisputed pre-existing crack in the entire Masubuchi sampling was a 1/16" arc strike and the void in the plates. The other cracks were not necessarily pre-existing or of a greater than ¼—inch size. (See Olsson Trans. at 1501, ln. 6 to 1502, ln. 20).

269. For example, the one-inch shrinkage crack identified by Manlabs on Sample 2AP was described by Manlabs as having grown in fatigue. (Masubuchi Tr. Exh. 3, Manlabs Report dated June 7, 1994, at final page (report pages not numbered)).

270. Barge NUMBER TWO from which sample 2AP was taken had sat on a beach for three days being pounded by strong wind and wave action following the casualty. Boston Towing's Marine Superintendent, Gouthro, noted that the Barge bounced when it was pulled off the beach and that 1/8" aft end cracks were working or growing as the damaged Barge NUMBER TWO was pulled back to Fort Pierce, Florida. (Def. Exh. "TI", Gouthro Dep. pgs. 2-61 to 2-63).

271. Plaintiff's expert Olsson, who examined the Barges after the casualty, opines that the welds on the Barges were "good and adequate" and that the welding was not substandard on these Barges. (Olsson Trans. at 1490, ln. 24 to 1491, ln. 3; 1493, ln. 14—19)

272. I am not persuaded that the welding deficiencies noted by the defense witnesses were so numerous or qualitatively so poor in Barges of this size to compel the conclusion that pre—existing surface cracks large enough to cause the loss here were present in these Barges.

The Failure Mode -

273. Because of the light weight of the Barges and the effect of sea water on the bow, David Lorenz, one of plaintiff's expert naval architects and structural engineers, concluded that the load motions of the bow would be nonlinear or irregular and hence, not appropriate to a simple computer generated analysis. (Lorenz Trans. at 212, ln. 4 to 213, ln. 16). Therefore, Lorenz relied upon a model test which he believed to be the better method of analyzing the pounding or slamming loads on the Barges. (Id. at 213, ln. 17 to 214, ln. 20).

274. Lorenz conducted the model test by subjecting a replica of the Barges to the spectrum of sea conditions from data collected and generated by Buoy 41009, the National Data Buoy Center's nearest buoy within the weather radius and to the position of the tow during October 7, 1991 up to and including the time of the casualty on October 8, 1991. (Id. at 216, ln. 18-21).

275. Based upon a series of runs of the model at speeds of 5 knots in 7½ foot seas, the reported speed and wave range of the tow, Lorenz found significant upward slamming loads on the bows. (Id. at 231, ln. 7 to 232, ln. 9)

276. Because all hydrodynamic pressures on the bow are not measured by the model test, Lorenz estimated, based upon run 301, at 5 knots in 7½ foot seas, that there was a 20 pound per square inch ("PSI") slamming load on the bottom of the Barges. (Id. at 236, ln. 19 to 237, ln. 23; 368, ln. 3—19).

277. Lorenz also confirmed his estimate of a 20 PSI slamming load by performing rough calculations using the graphs and formulae contained in Technical and Research Bulletin 2-30: Notes on Ship Slamming, published by the Society of Naval Architects and Marine Engineers ("SHAME"), then taking the absolute lowest slamming load based upon the various calculations, and cutting it in half as a conservative low load. (Id. at 374, ln. 10-21; 599, ln. 3 to 614, ln. 12). From these calculations, Lorenz confirmed his

conclusion that loads as high as 20 PSI had worked on these Barges. (Id.). Although defense expert, Professor Petri, maintains that Lorenz improperly used the SNAME tables to calculate slamming loads (Petrie Trans. at 1253, ln. 8 to 1254, ln. 24), I understand that Lorenz only used the SHAME tables to confirm his conclusions from the model tests. (Lorenz Trans. at 599, ln. 3-9).

278. Lorenz also performed a finite element analysis on the bottom of the rake structure, from Frame 9 to Frame 12, to which he applied a 20 PSI static load. By the third iteration of this analysis of progressive failure, the Barges' entire bottom failed. (Id. at 1571, ln. 15—23; 1572, ln. 3 to 1573, ln. 4; 1578, ln. 1 to 1579, ln. 24).

279. Lorenz further performed a non-linear dynamic time domain analysis by which he concluded that loads of 20 PSI corresponding to run 301 of the model test, would result in a bottom failure of the Barge. (Id. at 1573, ln. 2-16; 1581, ln. 3 to 1582, ln. 5).

280. I note the defense argument that Lorenz's calculations were inaccurate because they were done on Frame 12 instead of Frame 15. Petrie opined that at Frame 15, where plaintiff's expert George Randall testified the failure in Barge Two occurred, a force of 30 PSI would have been necessary to deform the bows given the support structures surrounding Frame 15. (Petrie Trans. at 1370, ln. 7 to 1371, ln. 6). I acknowledge that frame 15 had more structural support than Frame 12. Nevertheless, I accept Lorenz's basic argument that 6-8 foot sea waves can cause sufficient pounding force to result in major damage at Frame 12 and that this alone could have caused the eventual failure of the bow. (Lorenz Trans. at 1579, ln. 25 to 1580, ln. 25; 1611, ln. 11 to 1612, ln. 5).

281. Retired Captain James A. Atkinson of the United States Coast Guard also performed calculations based upon Lorenz's conservative rake bottom loading at 20 PSI slamming pressures, and concluded that the upward

pounding force on the Barge bottom would be roughly 3.7 times the weight of the entire Barge and that the load would have been decidedly higher after waves exceeded 7 foot significant waves. (Atkinson Trans. at 429, ln. 2 to 431, ln. 4).

282. Although their opinions differed on the steps of failure of the bows, all of plaintiff's experts opined that excessive pounding was what caused the bottom failures of Barges NUMBER ONE and NUMBER TWO. (Vol. II, Plaintiff's Atkinson Aff. at pgs. 89-91 of the attached Report; Atkinson Trans. at 26, ln. 4 to 427, ln. 24; Lorenz Trans. at 391, ln. 14-15; Randall Trans. at 629, ln. 22 to 630, ln. 6; 548, ln. 17—23; Olsson Trans. at 1510, ln 24 to 1511, ln. 3).

283. Hull & Cargo surveyor Kenneth Lambertson, who examined the barges after the casualty, confirmed that one of the Barge rake bottoms had buckled, and that the aforesaid condition could be due to pounding. (Def. Exh. "UG", Lambertson Dep. pgs. 92—93)

284. Warren E. Chandler, the surveyor retained by Water Transport to assess the damage to the Barges and to coordinate repair programs, observed evidence of pounding aft of Frame 15, continuing from Frame 15 back to Frame i8 on both barges when they were put on dry dock. (Chandler Trans. at 397, ln. 8-10).

285. The fact that slamming pressures on the bottom of Barges of this type during exposure to ocean conditions can be sufficient to stove in or even create holes in the bottom, was confirmed by defendants' own expert, surveyor Larry Strouse. Strouse testified that he had personal knowledge concerning an 18-year old barge in which the rake bottom "dished up," or stoved in, after four hours of exposure to 8-foot seas and of other barges with significant damage from pounding. He also opined that structural members, weakened or broken from a bottom failure, could create holes in the bottom. (Strouse Trans. at 1298, ln. 21 to 1299, ln. 12; 1308, ln. 10 to

1309, ln. 17; 1328, ln. 2 to 1330, ln. 5).

286. Cases concerning structural failures to inland barges during tows in the ocean and open seas further confirm that pounding or slamming is a cause of bow failures and that such slamming impacts the rake bottoms to catastrophic degrees. See. e.g., DiMillo v. Sheepscot Pilots. Inc., 870 F.2d 746, 748—49 (1st Cir. 1989).

287. Concurring with plaintiff's experts, I find that the Barges both failed first in the bottom of the bow rake plating because of excessive pounding which lead to a gradual progressive failure of the bows and the gradual subsidence and tear-off of the decks.

288. Defense experts maintain that the structural failures of both Barges at Frame 89 demonstrate the existence of pre-existing cracks at the trunk corners. Plaintiff's experts opine, however, that these cracks were the result of "whipping", an engineering term referring to the vibrations throughout a barge by slamming loads on the bow. (Randall Trans. at 585, ln. 4 to 586, ln. 7; 734, ln. 11—15; Olsson Trans. at 1511, ln. 4—22). Although he claims that whipping could not have caused the failures at Frame 89, defendants' naval architecture expert, Professor Petrie, conceded that whipping does occur and that it doubles the bending moment in the stern. (Petrie Trans. at 1380, ln. 1 to 1382, ln. 13)

289. Lorenz also opined that water on the bow rake after the bow stoved in from pounding would have increased stress at Frame 89. Furthermore, the model test confirmed that slamming of the bow would cause greater bending moments in the stern area of the Barge. (Lorenz Trans. at 391, ln. 18 to 392, ln. 2; 1588, ln. 18 to 1589, ln. 3).

290. Lorenz concluded that the stress range increased 2½ times at the stern area when the sea states that the Barge was exposed to increased from 5.25 feet to 7.22 feet and that this would have been enough to cause the cracks at Frame 89. (See Vol. III, Plaintiff's Lorenz Aff. at p. 22,

Conclusions 2D & 3 of the attached Noble Denton Report).

291. I find that the cracks at the sterns of both Barges could be the result of whipping loads combined with sagging and hogging loads, and the vertical bending of the structure resulting from high seas, as analyzed by Lorenz and Randall, and I am unpersuaded by defense expert Petrie that whipping could not cause these cracks. (Lorenz Trans. at 1588, ln. 18 to 1589, ln. 10; Randall Trans. at 1644, ln. 14—22; 734, ln. 11—15).

292. Having weighed the expert opinion, I am unconvinced by defendants' theory. The sharp bend downward of Sample 2AP,[9] the almost uniformly bent up nature of the bottom brackets, and the rust marks on the brackets showing the upward push from below is physical evidence that defendant's theory can not explain (See Masubuchi Tr. Exh. 9; Vol. III, Stip. Exh. 113, Photo 51 and the October 21, 1991 Hull & Cargo Salvage Report of Barges NUMBER ONE and NUMBER TWO; Atkinson Trans. at 419, ln. 1-16; Randall Trans. at 552, ln. 20 to 553, ln. 7; 554, ln. 18 to 555, ln. 25). If there was a pre-existing crack prior to the tow which grew, then the bows should have ripped apart from the top down around the side of the barges to the bottom. There would have been insufficient pressure to bend the brackets on the bottom up once the deck was detached or to bend Sample 2AP at the edge downward as sharply as the physical sample itself shows. (See Atkinson Trans. at 420, ln. 14—18 (if the bows had fallen off from the deck, brackets should have been virtually straight). Only plaintiff's theory that the bottom pushing up and causing the deck to hang down and ultimately tear off from no bottom support can explain this physical evidence.

293. It is difficult to imagine how 6 to 8 foot waves which barely qualify as a storm could cause the catastrophic failure of these bows. I

[9] I credit the expert opinion of Olsson that the sharp bend of this sample could not be from a manufacturing process defect as postulated by defense expert Petrie. (Olsson Trans. at 1482, ln. 11 to 1484, ln. 8).

understand the defense argument that such waves should not have generated enough force to cause the metal fatigue which caused the bottoms to fail as they did. What is clear from all of the expert testimony, however, is that seas of 6 to 8 feet generate a great deal of force capable of damaging even brand new Barges. Defendants' own expert Strouse confirmed that such waves can cause significant damage and that damaged internal support members can create holes. (See paragraph 281 supra). I also accept Professor Lorenz's thesis that water in the rake bow after the bottom failure created an additional load upon the bows assisting the failure. (Lorenz Trans. at 1586, ln. 6—12).

294. In summary, I find that Barges NUMBER ONE and NUMBER TWO were seaworthy for the intended one way tow from New Orleans to Quincy, Massachusetts when delivered by Water Transport to Boston Towing in accordance with the Bareboat Charter.

295. I also find that Boston Towing, Reinauer and the Tug DACE REINAUER were negligent in their towage of the Barges by failing to comply with the Barges' U.S. Coast Guard Certificates containing restrictions governing the tow and by failing to comply with the Hull & Cargo Recommendations.

296. The damage suffered by the Barges were the direct and proximate result of Captain Edwards' negligent navigation of the Barges into weather and sea conditions for which they were not designed.

CONCLUSIONS OF LAW

297. This court has original subject matter jurisdiction over the in personam maritime claims alleged against Boston Towing, Reinauer, and the in rem claims against the Tug Dace Reinauer in this action pursuant to 28 U.S.C. § 1333(1) and supplemental and pendant party jurisdiction over the common law and state statutory claims pursuant to 28 U.S.C. § 1367. Venue is proper in this district under 28 U.S.C. S 1391(b).

298. I adopt herein any Finding of Fact previously set forth which might more properly be deemed a Conclusion of Law.

299. 46 U.S.C. 5 3313(a), in relevant part, requires that: "(d)uring the term of a vessel's certificate of inspection, the vessel must be in compliance with its conditions, ..."

300. Under the Pennsylvania rule, violations of statutory requirements place the burden of proof upon Boston Towing and Reinauer to establish, by a preponderance of the credible evidence, that the statutory violations could not have been a cause of the casualty. The Pennsylvania v. Troupe, 86 U.S. (19 Wall.) 125, 136, 22 L.Ed. 148 (1874); Tug OCEAN PRINCE. Inc. v. United States, 584 F.2d 1151, 1160 (2d Cir. 1978), cert. denied, 440 U.S. 959 (1979).

301. For the reasons previously discussed, I find that defendants through their agent Captain Edwards knowingly violated the fair weather restrictions of the U.S. Coast Guard Temporary Certificates of Inspection.

302. I also find that Boston Towing, Reinauer and the Tug DACE REINAUER have failed to show by a preponderance of the credible evidence that the Barges were unseaworthy or that their violations of 46 U.S.C. § 3313(a) could not have been a cause of the casualty, and therefore, Boston Towing, Reinauer and the Tug DACE REINAUER have failed to rebut the presumption of negligence under The Pennsylvania rule. The Pennsylvania, 86 U.S. (19 Wall.) 125 (1874); Tug OCEAN PRINCE. Inc. v. United States, 584 F.2d 1151, 1160 (2d Cir. 1978), cert. denied, 440 U.S. 959 (1979) (citations omitted).

303. I further find that defendants' violation of the fair weather restriction was a direct, proximate and legal cause of the bow failures.[10]

[10] Although Captain Edwards and Mate Boyles refused to submit to drug and alcohol testing after the Barge casualties and no report was submitted to the Coast Guard as required by 46 U.S.C. § 6101(b), I find this evidence insufficient to conclude that alcohol or drugs were used by the crew during this tow and I do not find the violation of § 6101 to have been a proximate

304. For the reasons previously discussed, I find that Boston Towing, Reinauer and the Tug DACE REINAUER breached ¶ 4(b) and ¶ 9 of the Bareboat Charter by failing to operate the vessels in accordance with the Hull & Cargo Tow Recommendations or to exercise reasonable care in the handling and navigation of the tow.

305. I also find that Boston Towing, Reinauer and the Tug DACE REINAUER breached ¶ 11 of the Bareboat Charter by failing to make necessary repairs and to return the Barges to Water Transport in Boston in the same condition as when delivered to BTT in New Orleans, normal wear and tear excepted.

306. I further find that defendants' violation of the Bareboat Charter contract proximately caused damage to Water Transport.

307. As of the commencement of the Bareboat Charter and during its stated term, Boston Towing and Reinauer were bailees of the Barges. Consolidation Coal Co. v. United States Steel Corp., 364 F. Supp. 1071, 1073–74 (W.D. Pa. 1973).

308. There is a presumption of negligent bailment and breach of the Bareboat Charter on the part of Boston Towing and Reinauer because Water Transport has proven delivery of the Barges to Boston Towing and Reinauer in good condition, and damage to the Barges during the charter period. Compass Marine Corp. v. Calore Rigging Co., 716 F. Supp. 176, 180–81 (E.D. Pa. 1989); Consolidation Coal Co. v. United States Steel Corp., 364 F. Supp. 1071, 1074 (W.D. Pa. 1973); Banks v. Chas. Kurz Co., 69 F. Supp. 61, 67 (E.D. Pa. 1946).

309. I find that Boston Towing, Reinauer and the Tug DACE REINAUER have not rebutted the presumption of negligence on their part because they have not proven by a preponderance of evidence how the damage to the Barges

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cause of the bow failures.

occurred and that Boston Towing and Reinauer's negligence did not cause the damage, or however the damage happened that Boston Towing and Reinauer's fault had no part in it. Compass Marine Corp. v. Calore Ringing Co., 716 F. Supp. 176, 180-81 (E.D. Pa. 1989); Consolidation Coal Co. v. United States Steel Corp., 364 F. Supp. 1071, 1074 (W.D. Pa. 1973); Banks v. Chas. Kurz CO., 69 F. Supp. 61, 67 (E.D. Pa. 1946).

310. Boston Towing and Reinauer are therefore liable to Water Transport for negligent bailment of the Barges.

311. Boston Towing, Reinauer and the Tug DACE REINAUER had a non-delegable duty to provide a qualified Master of sound judgment and discretion for the intended voyage of the Barges. Boudin v. Lykes Brothers Steamship Co., 348 U.S. 336, 339 (1955); Tug OCEAN PRINCE$_4$ Inc. v. United States, 584 F.2d 1151, 1155 (2d Cir. 1978), cert. denied, 440 U.S. 959 (1979).

312. Captain Edwards' obligations included the requirement to assess the nature of the undertaking he assumed and to be sufficiently knowledgeable about the Tug DACE REINAUER, the Barges and the interaction of the Tug and Barges upon the sea and weather. See Id.; National Transport Corp. v. Tug ABQUIAO, 418 F.2d 1241 (2d Cir. 1968); N.P. Howlett, Inc. v. Tug DALZELLIDO, 324 F. Supp. 912, 917 (S.D.N.Y. 1971); Aiple Towing Co., Inc. v. M/V LYNNE E. QUINN, 534 F. Supp. 409, 411 (E.D. La. 1982).

313. A tug also has an obligation to utilize available weather reports in order to operate in a manner consistent with foreseeable risks, and the Captain of a tug is chargeable with knowledge of weather predictions, whether he knows of them or not. Tug DALZELLIDQ, 324 F. Supp. at 917; DiMillo v. Sheepscot Pilots, Inc., 870 F.2d 746, 748-49 (1st Cir. 1989); M/V LYNNE E. QUINN, 534 F. Supp. at 411-12.

314. I find that the gross disregard by Captain Edwards of the U.S. Coast Guard voyage restrictions of a "in fair weather only" tow; Edwards' gross disregard of the Hull & Cargo Recommendations' tow restrictions;

Edwards' failure to ascertain and to take into account in towing the Barges that the Barges were designed for river service; and, Edwards' towage of the Barges into forecasted sea conditions for which the Barges were not recommended, transcend ordinary fault and constitute proof of incompetence rendering the Tug DACE REINAUER unseaworthy based on the acts of the Tug's Master. Tug OCEAN PRINCE. 584 F.2d at 1155— 56; The CYNGNET, 126 F. 742 (1st Cir. 1903); In the Matter of Ta Chi Navigation (Panama) Corp.. S.A., 513 F. Supp. 148, 159 (E.D. La 1981), aff'd, 728 F.2d 699 (5th Cir. 1984); In the Matter of the Complaint of Delphinus Maritime. S.A., 523 F. Supp. 583, 595 (S.D.N.Y. 1981).

315. I find that the Tug's unseaworthiness was a proximate cause of the damage to the Barges.

316. I finally find that the acts of Captain Edwards constitute negligence on the part of Boston Towing, Reinauer and the Tug DACE REINAUER which proximately caused damage to the Barges and render them liable to Water Transport. Sheepscot Pilots, 870 F.2d at 748; M/V LYNNE S. QUINN, 534 F. Supp. at 411—12; Tug DALZELLIDO, 324 F. Supp. at 917.

CONCLUSION

For all of the reasons discussed herein, I find Boston Towing, Reinauer and the Tug Dace Reinauer liable to Water Transport under its various contract and tort claims for the damage to Barges Number One and Two. The parties have advised me that they thought they might be able to stipulate to the type and amount of damages and submit memoranda of the disputed damage issues. I also note my observations in footnote 1 supra that I need further briefing from the parties as to which claims the McDermott rule applies and how I should apply it. I remind the parties that the measure or apportionment of damages does not have to be the same under each claim.

Finally, at the end of the liability trial, there was some discussion

about involving me in settlement discussions. Because this is a bench trial, I will not participate in such talks but if the parties would like me to appoint a Magistrate Judge or Mediator for that purpose, I will do so. By October 20, 1995, the parties should either write to me or schedule a telephone conference with my Deputy so we can discuss the nature and extent of the damages trial and its date. I do have available trial time in November and potentially in December.

SO ORDERED

Dated: New York, New York
September 28, 1995

SONIA SOTOMAYOR
U.S.D.J.