



UNITED STATES COAST GUARD

INVESTIGATION INTO THE CIRCUMSTANCES
SURROUNDING THE BARGE

MARIA T

O.N. 649301, DRAGGING ANCHOR WHILE UNDERTOW OF
THE TOWING VESSEL SCOTT TURECAMO O.N. 1067705,

RESULTING IN THE SEVERING OF THE EIGHT INCH
DIAMETER CENTRAL GAS AND ELECTRIC NATURAL
GAS PIPELINE, HUDSON RIVER, POUGHKEEPSIE, NY, ON
AUGUST 8, 1999, WITH NO LOSS OF LIFE



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Cement barge MARIA T moored on August 8, 1999. Anchor shows debris picked up as the anchor dragged along the bottom of the Hudson River. Photograph taken August 8, 1999 in Roseton, New York. (Exhibit 54)

1. Summary

On Sunday, August 8, 1999 at approximately 0904 in the morning, the anchor and anchor chain from the cement barge MARIA T severed an 8" Natural Gas distribution line that runs from the Central Hudson Gas and Electric facility in Poughkeepsie, New York, across the Hudson River. This distribution line supplied natural gas to residential and commercial customers between Poughkeepsie and Kingston, NY. No one in the crew of the Uninspected Towing Vessel (UTV) SCOTT TURECAMO, the UTV pushing the barge MARIA T, were aware that the anchor and all 7 shots of anchor chain had exited the chain locker on board the barge. The MARIA T lost its anchor sometime after its 0215 August 8, 1999 departure from Ravena, New York after loading a cargo of dry

cement. As the UTV SCOTT TURECAMO pushed the barge MARIA T, ahead, it also towed the anchor and chain along the bottom. The flukes of the anchor caught the 8" pipe. The pipe severed as the tow continued South on the Hudson River at a speed of approximately 6 knots. Natural Gas escaped from the pipe, rising to the water surface, causing the Hudson River water surface to behave as if it was boiling. No one was injured. Approximately 25 people were evacuated from the area as a precaution from the threat of escaping natural gas. The Waterway was closed for approximately 4 hours after the incident.

2. Vessel Data.

Name	SCOTT TURECAMO	MARIA T
Flag	US	US
Official Number	1067705	649301
Type of Vessel	Towing/Pushing Tug	Dry Cargo Barge
Gross/ITC Gross Tons	176/549	8865 / NA
Net/ITC Gross Tons	80/164	8865 / NA
Documented Length/LOA	116 ft / 121ft	420 ft /
Beam	36 ft	80.1 ft
Depth	15 ft	34.7 ft
Propulsion	Diesel	None
Horsepower	5600	NA
Year Built	1998	July 26, 1982
Place Built	Escatawpa, MS	Avondale, LA
Owner	Moran Towing Corporation	Blue Circle Inc.
Operator	Moran Towing Corporation	Blue Circle Inc.
Certificate of Inspection	NA	Issued March 30, 1998. New York, NY
Crew	Master (1), Pilot (1), deckhands (3), engineer (1)	None
Cargo	NA	Dry Cement (18,000 tons)
LPOC	Ravena, New York	Ravena, New York
NPOC	Boston, MA	Boston, MA

3. Background on the operation of the SCOTT TURECAMO and MARIA T

Blue Circle Cement operates four unmanned cement barges. The Moran Towing and Transportation Corporation provided the towing vessels to move the barges up and down the East coast of the United States. Turecamo Maritime, Incorporated provided this service until Moran Towing Corporation acquired Turecamo Maritime, Inc on May 1,

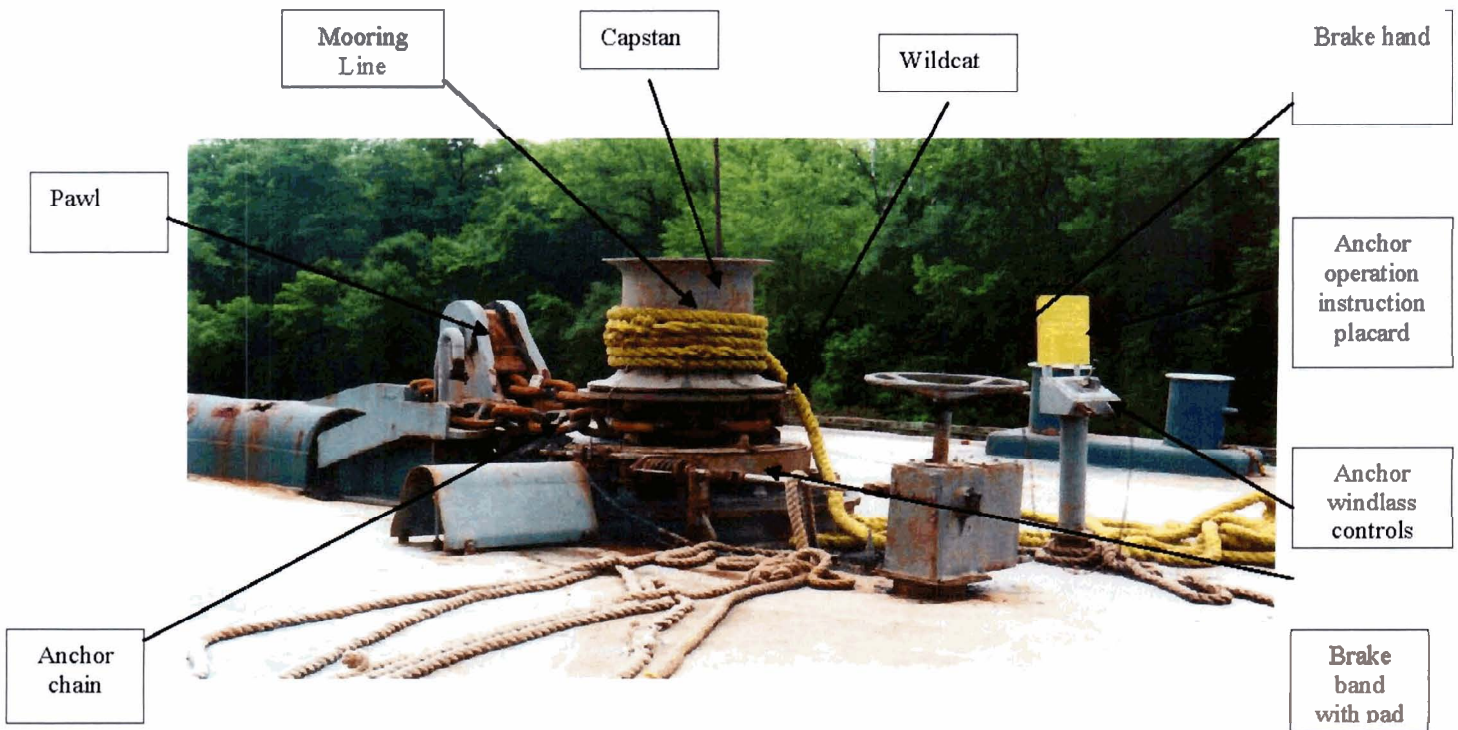
Subj: Barge MARIA T Dragging Anchor; Resulting in a Severed Natural Gas Pipeline in the Hudson River Near Poughkeepsie, NY on August 8, 1999; With No Loss of Life.

1999. Moran Towing Corporation was on call to provide towing services when needed by Blue Circle. No specific towing vessels were assigned to specific barges.

4. A Description of the Anchor Handling Equipment

The New England Trawler Equipment Company provided the anchoring equipment and arrangement for the MARIA T. (Exhibit 58)

The anchor and chain consisted of one fluked anchor weighing 4,500 pounds and 7 shots of 2-¼ inch anchor chain. The anchor wildcat and the anchor hawse pipe were located at the bow of the MARIA T on the starboard side. The weight of the anchor and chain from the end of the anchor to the wildcat weighs approximately 5 tons, when the anchor is properly housed. (Exhibit 17, 44, Page 886)

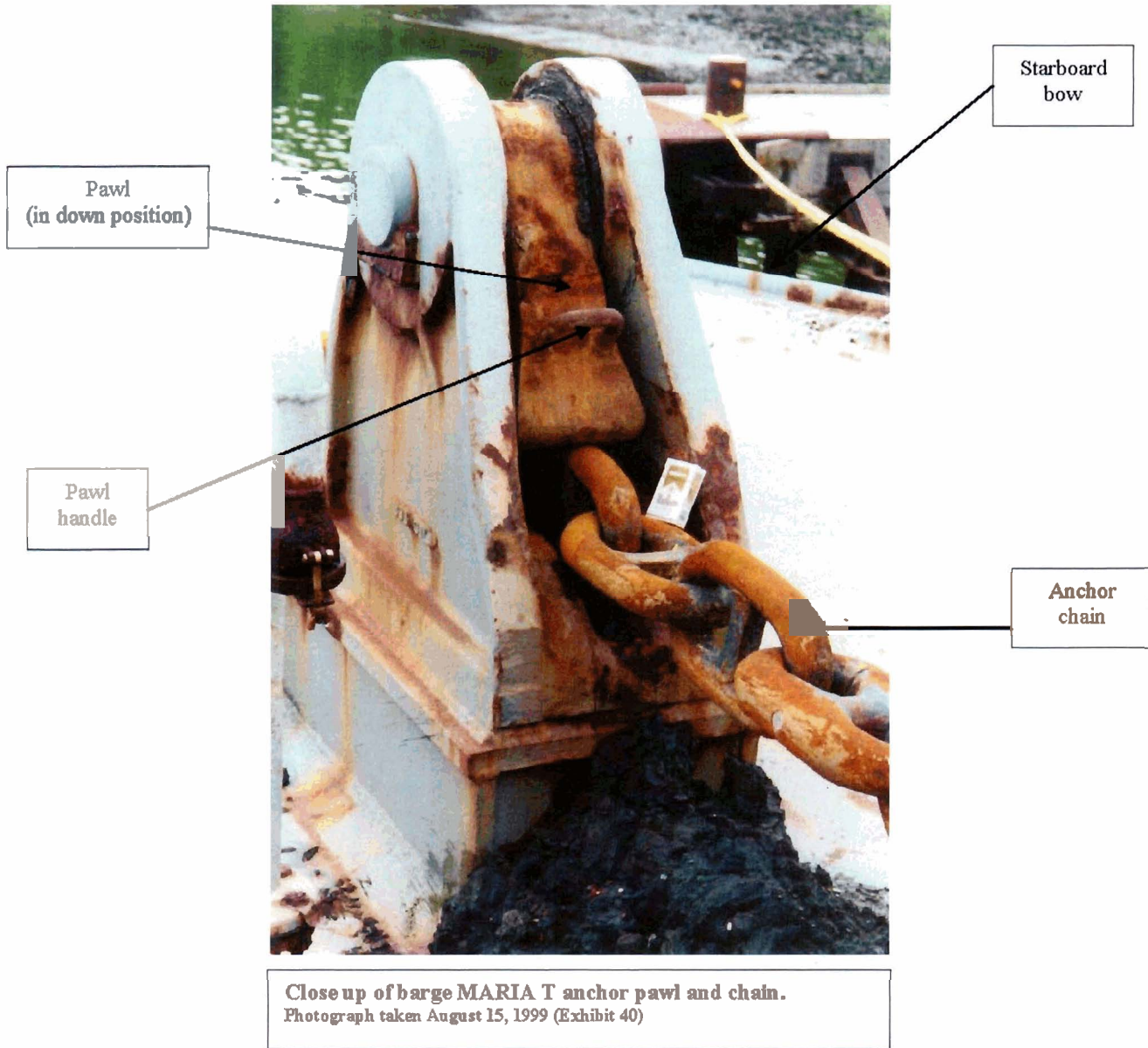


Barge MARIA T ground tackle equipment: view from behind wildcat looking towards the starboard bow. Photograph taken August 15, 1999.

The system included a manual and remote releasing system. The manual system consisted of the anchor brake and the pawl. The brake holding force equaled 48,000 pounds. A manual release of the anchor involved removing the Pawl or cats paw and releasing the brake by using a hand wheel adjacent to the anchor capstan. The anchor

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brake consisted of a brake pad that nearly encircled the diameter of the anchor Wildcat. As the brake tension released, the weight of the anchor would then cause the anchor to fall. (Exhibit 50, 58, Pg 800)

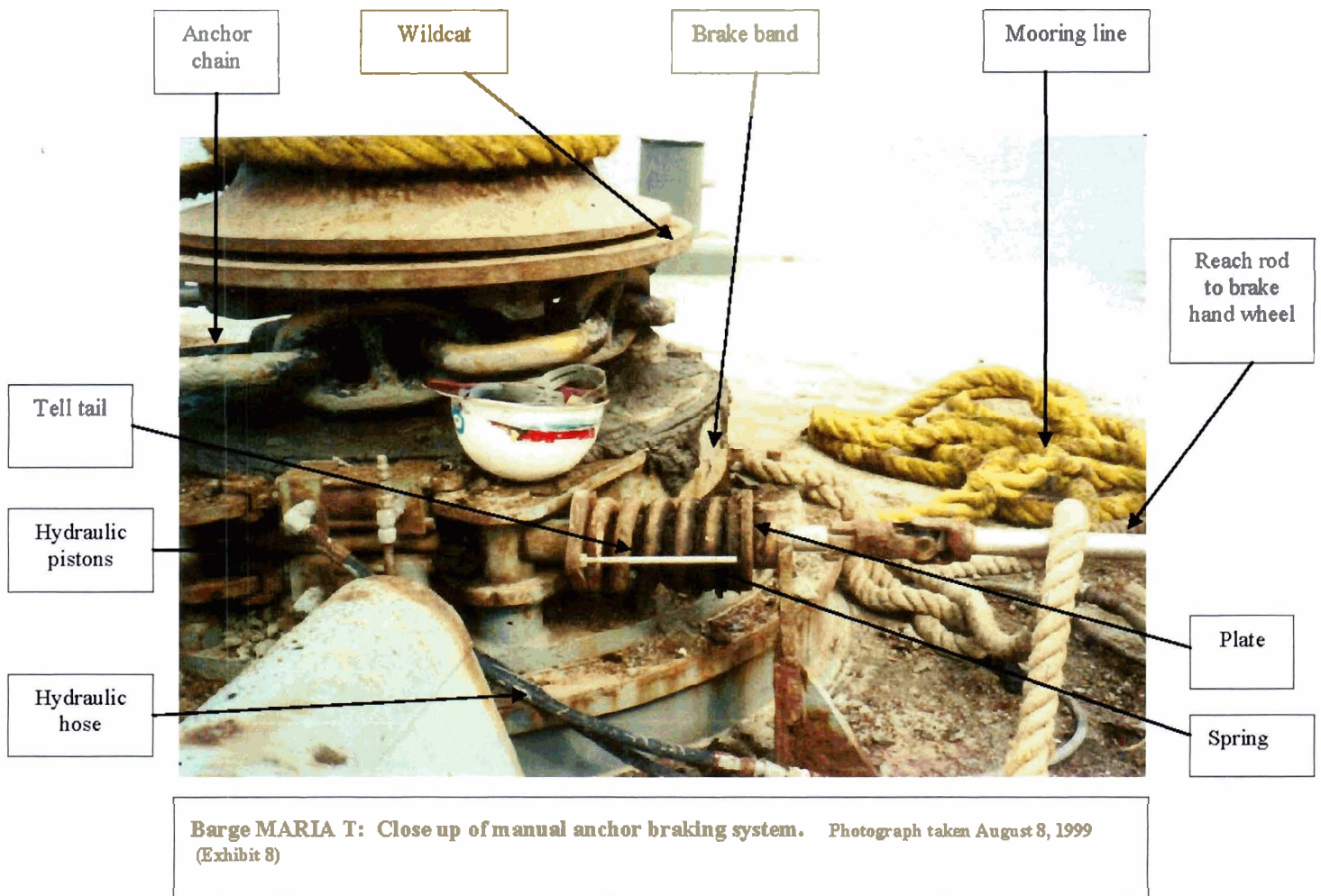


The brake wheel tightened or loosened a spring that provided pressure to the brake band. The MARIA T had a device for indicating when the brake was on or off. Exhibit 8 contains a picture of this arrangement. The plate at the after end of the spring (To the right as pictured in exhibit 8) would move in (to the left) or out (to the right), depending on whether the brake was tightened or loosened. The end of the tell tail indicator would have to line up with the after (right) side of the plate to indicate the brake "on". The end

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of the tell tail indicator lined up with the forward (left) edge of the plate at the after (right) end of the spring would indicate the brake is not applied. (Exhibit 8, 58, Pg 407)

To walk the anchor out, a pin is inserted into holes that connect the capstan to the wildcat. The brake is released and the anchor stays housed because the wildcat is engaged with the capstan by the pin. The windlass motor is then operated to rotate the capstan, engaged to the wildcat, to feed out chain. (Exhibit 50, 58)



The radio-controlled release of the anchor could be done from the bridge of the towing vessel. The radio must be turned on. A person would then punch in a four numbered code into the transmitter carried on the navigation bridge of the towing vessel. The signal activates a hydraulic pump in a compartment under the anchor capstan. The hydraulic pump provides 800 psi of pressure to a cylinder. The hydraulic pressure pushes a ram out of the cylinder. This cylinder lifts the brake band off of the anchor wildcat, allowing the

anchor to drop by gravity. The system installed on the MARIA T allows the hydraulic ram to keep the brake off for 20 seconds. This allows one shot of chain to let go. Each release of one shot of chain (90 feet) requires a separate transmission of the signal from the remote transmitter. (Exhibit 50, 58)

The four cement barges operated by Blue Circle, Incorporated, including the MARIA T use the same radio-controlled release system. Each barge receiver uses a separate code to release the brake. (Pg 908-910)

The MARIA T did not have any alarm or any other devices specifically designed to alert an operator when the anchor was released. No regulations require such equipment or installation. (Pg 808)

5. Natural Gas Pipelines in and under the Hudson River between Ravena, New York and Poughkeepsie, New York

The anchor completely severed the one 8" distribution line that carried natural gas from the Central Hudson Gas and Electric Facility in Poughkeepsie, NY to residential and commercial customers in between Poughkeepsie and Kingston, NY. (Pg 952)

Details of the severed line:

Owner	Central Hudson Gas and Electric
Installation Date	1931
Operating Pressure	60 psi
Installation	8-inch line, with some cover of the river bottom. Depth of trenching, not known (Pg 54).
Location	Poughkeepsie, New York

This was the second natural gas pipeline passed over by the MARIA T on August 8, 1999.

Divers sent to survey damage for Central Hudson Gas and Electric noted the 8 inch PK line severed. PK is a Central Hudson Gas and Electric designation that refers to Poughkeepsie Kingston (PK) line. The divers reported approximately 300 feet of the pipe had been bent and kinked. As of the date of this report the damaged line has not been repaired nor replaced. (Pg 943)

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Other Natural Gas pipelines between Ravena and Poughkeepsie included:

Owner	Iroquois Gas Transportation Company
Installation Date	1992
Operating Pressure	1442 psi
Installation	24 inch steel transmission line, concrete Jacketed and the top of the pipe buried 14 feet below the Hudson River bottom (8/13, pg 53).
Location	Athens, New York

This was the first natural gas pipeline passed over by the MARIA T on August 8, 1999.

Owner	Central Hudson Gas and Electric
Installation Date	1950
Operating Pressure	565 psi
Installation	8-inch transmission line, with some cover of the river bottom over it. Depth of trenching, not known (Pg 55).
Location	Poughkeepsie, New York

This was the third natural gas pipeline passed over by the MARIA T on August 8, 1999.

Owner	Central Hudson Gas and Electric
Installation Date	1950
Operating Pressure	565 psi
Installation	8-inch transmission line, with some cover of the river bottom over it. Depth of trenching, not known (Pg 55).
Location	Poughkeepsie, New York

This was the fourth natural gas pipeline passed over by the MARIA T on August 8, 1999.

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The next three Natural Gas pipelines South of Poughkeepsie included:

Owner	Central Hudson Gas and Electric
Installation Date	1992
Operating Pressure	750 psi
Installation	16-inch transmission line. Depth of trenching approximately 80 feet. Depth accomplished by directionally boring. (Pg 56).
Location	Wappinger, New York

This line South of Poughkeepsie was not passed over by the MARIA T on August 8, 1999.

Owner	Central Hudson Gas and Electric
Installation Date	1929
Operating Pressure	60 psi
Installation	One 4-inch and one 8-inch distribution lines. Depth of trenching unknown. (Pg 57).
Location	Newburgh, New York

These two lines South of Poughkeepsie were not passed over by the MARIA T on August 8, 1999.

6. Natural Gas Pipeline Regulations

Current New York State pipeline regulations require natural gas distribution and transmission lines traversing a river to be trenched to a depth of 24 inches under the river bottom, if covered with consolidated rock and 48 inches if covered in soil. The depth is measured from the top of the pipe to the bottom of the river. (16 NYCRR 255.327(f), Pg 73-74)

At the time of the installation of the severed natural gas pipeline in 1931, there were no such requirements to protect pipelines with cover.

7. Drug and Alcohol Testing

Due to the potential amount of the property damage incurred to the pipeline, this incident was classified as a Serious Marine Incident, per 46 CFR 4.03-2. Drug and alcohol tests proved [REDACTED]. This included the field sobriety tests of all the SCOTT TURECAMO crewmembers conducted on August 8, 1999 by the U.S. Coast Guard (Exhibit 63) and the Urinalysis testing for narcotics conducted of all the Samples collected from each of the SCOTT TURECAMO crewmembers on August 8, 1999. Greystone Health Sciences Corporation conducted the Urinalysis. (Exhibit 62)

8. Weather Conditions

Poughkeepsie, NY Weather: Clear weather, unlimited visibility, 80 degrees, and very light wind at approximately 0900, August 8, 1999. (Exhibit 61)

Ravena, NY Weather: At 0000, August 8, 1999 overcast with a light sprinkle. Calm wind. Rain continued and progressed to a heavier rain until at least 0600 August 8, 1999. (Pg 399-400)

9. Events at the Time of the Pipeline Break and Shortly Thereafter

At 0904 on 8 August 1999, Central Hudson Gas and Electric learned that one of their gas lines on the bottom of the Hudson River in Poughkeepsie, NY might have been leaking gas. Notification came from a phone call to the Central Hudson Gas and Electric Systems Operations Center. (Pg 938)

Central Hudson Gas and Electric dispatched an employee to investigate. The employee arrived on scene at approximately 0930 and reported that natural gas pipes had been damaged after he viewed roiling water in two locations. Roiling water describes water on the river surface greatly agitated as if it was boiling. (Pg 938)

At 0909 on 8 August 1999, The City of Poughkeepsie Police Department began receiving reports from witnesses of a gas main break just North of the Poughkeepsie Railroad Bridge (pg 31).

Witnesses reported to the police that they noted a gas leak in the Hudson River just after a tugboat, heading South, pushing a red barge had just passed through the area (pg 31).

At 0930 the City of Poughkeepsie fire department dispatcher notified Coast Guard Activities New York of a natural gas pipeline break just North of the Poughkeepsie Railroad Bridge. Coast Guard Activities New York launched the Coast Guard cutter WIRE and a Marine Safety Investigations officer and made Safety Marine Information Broadcasts advising of the Hudson River closure.

10. Closing portions of the Hudson River as a Safety Precaution

The City of Poughkeepsie notified the City of Poughkeepsie Police Department of a gas main break at approximately 0940, August 8, 1999 and requested the closing of the Hudson River. At the request of the police, The Coast Guard Captain of the Port based at Coast Guard Activities New York on Staten Island, NY, closed the river in the area of the accident. The area reopened at approximately 1100, August 8, 1999 after receiving notification from Central Hudson Gas and Electric that the flow of gas to the broken pipe had been shut down. Shortly thereafter the river was closed again because of a concern of live electrical lines that may have been disconnected by the dragging anchor (pg 29-34).

The Hudson River Reopened at 1309, August 8, 1999 after representatives of the New York State Power Authority examined wires wrapped around the anchor and determined the wires to be debris and not from an active power line (pg 39).

Agencies that responded to the leaking gas main included: The City of Poughkeepsie Police Department; Kingston Fire Department, City of Poughkeepsie Fire Department, New York State Environmental Conservation, Dutchess County Sheriff's Office, Ulster County Sheriff's Office, the U.S. Coast Guard and the New York State Police (pg 31/32).

11. Post Casualty Events

At 1015, August 8, 1999, The City of Poughkeepsie Police Department radioed the UTV TURECAMO and asked the tug operator of the possibility that the tug was dragging an anchor. The Captain dispatched a deckhand to the bow of the barge to visually check the anchor. The deckhand reported the anchor out of the anchor hawser. Upon hearing this report, the operator of the SCOTT TURECAMO stopped the tug and its barge, the MARIA T, just North of the Danskammer Power Plant (pg 32/33)

At approximately 1015, August 8, 1999, the Moran dispatcher radioed the SCOTT TURECAMO to alert the vessel crew that they may have dragged their anchor over the damaged pipeline in Poughkeepsie. Mr. [REDACTED] called the deckhand Mr. [REDACTED] from the galley and told him to check the anchor. He found the anchor out of the hawse pipe and the anchor was dragging against the hull of the MARIA T. The deckhand returned to the tug. Mr. [REDACTED] told the deckhand to bring in the anchor.

Mr. [REDACTED] left the bridge of the UTV SCOTT TURECAMO to view the situation on the bow of the MARIA T for himself. He saw the seven shot mark on the chain as Mr. [REDACTED] began to retrieve the anchor and chain. At this time no one on the bow of the MARIA T noticed any leaking hydraulic fluid. (Pg 131, 179)

Mr. [REDACTED], the Blue Circle, Inc. Marine Maintenance Manager, viewed the anchor at 1430, August 8, 1999. The anchor was hanging at the water's edge with debris on it that included wires. The pawl was down and the brake was not properly set. Mr. [REDACTED] said the tell tail indicator was an inch to an inch and a half from its proper set. (Pg 874)

Blue Circle, Incorporated employees examining the anchor equipment on August 8, 1999 did not identify anything that would have caused the anchor brake to not work as designed. This examination did not include dismantling any equipment. (Pg 928)

On August 8, 1999, Mr. [REDACTED] stated that after removing debris from the anchor, the anchor was brought back into the hawse pipe, the pawl put down and the brake applied by Mr. [REDACTED]. Mr. [REDACTED] said Mr. [REDACTED] left the spring plate approximately ½" from the end of the tell tail indicator. Mr. [REDACTED] said that Mr. [REDACTED] asked if the brake were set properly? Mr. [REDACTED] continued to tighten until he asked Mr. [REDACTED] again if the brake were set correctly. Mr. [REDACTED] said it was not, as he saw the spring

plate 1/8" from the end of the tell tail indicator. On Monday August 9, 1999 after conducting anchor tests in Bayonne, NJ, Mr. [REDACTED] stated that Mr. [REDACTED] again asked him if the anchor was set correctly. At that time Mr. [REDACTED] sighted a 1/4" difference between the spring plate and the end of the tell tail indicator. (Pg 875-876)

On the evening of August 8, 1999, at dusk, while moored in Roseton, NY, the radio controlled anchor drop was tested. The anchor was set for radio-controlled drop. Mr. [REDACTED] entered the codes into the transceiver in the pilothouse of the SCOTT TURECAMO. Shortly after entering the codes, hydraulic fluid began to spray from the line leading to the two hydraulic cylinders (Item number 58) used to release the brake remotely. The fluid was like a mist, spraying for a distance of 30 feet. During this test, the anchor did not drop because there was not enough hydraulic pressure to overcome the spring pressure of the manual brake. The hole in the hydraulic line was temporarily patched. No more anchor dropping tests were conducted that evening. (Exhibit 58, Drawing number R-13691, Rev C, Pg 179-181, 736-737)

The hydraulic fluid had leaked through a pin-hole caused by corrosion. On Monday, August 9, 1999 the leaking tubing was replaced. (Pg 185-186, 738-739)

At 1915 while the SCOTT TURECAMO and MARIA T were moored in Bayonne, NJ additional anchor tests were conducted. One test included setting the brakes and then paying the anchor out under power without releasing the brake. The anchor paid out with no noticed difficulty or unusual noise. Immediately following this test another was conducted. With the anchor slightly out of the hawse pipe because it had just been lowered by power, a radio-controlled release was attempted. The code was entered into the transceiver and the hydraulic cylinders opened the brake bands. The anchor did not drop with the brake released. The anchor eventually released during a second operation of the radio-controlled release. When the brake opened, it did not release until Mr. [REDACTED] kicked a portion of the anchor chain between the wildcat and the hawse pipe. The anchor then fell. (Exhibit 225, Pg 225- 239)

12. Tests Witnessed by USCG on Friday, August 20, 1999^{1,2}

On August 20, 1999 more tests were conducted on board the MARIA T. The barge was in the light condition, tied port side to a berth at Port Rensselaer, NY. The tests commenced shortly after 1300 and were completed around 1530.

The tests were conducted under the supervision of Blue Circle, Inc. The test was intended to show whether the anchor brake would hold the weight that it was supposed to

¹ The U.S. Coast Guard held the last formal proceeding of this investigation on August 25, 1999. The results from the August 20, 1999 tests were not presented at that time. At the end of the August 25, 1999 proceeding, the chairman and the parties in interest agreed to a process that included a letter documenting the facts of the test to the Chairman with a copy to all the parties in interest. The parties in interest would then had two weeks to address their concerns on the matter of the tests, to the chairman. (Pg 979)

² The results of three tests conducted on August 20, 1999 are contained in a Facsimile letter dated September 8, 1999 to CDR Michael Karr from Waesche, Sheinbaum & O'Regan, P.C.

have held during the transit down the Hudson River on the morning of Sunday, August 8, 1999, with the anchor system set for a remote drop to simulate the following conditions:

- The anchor was housed.
- The anchor brake was set properly.
- The pawl (Cats Paw) was up (i.e., not being used)
- The pin that unites the capstan and the wildcat was removed.
- The winch motor was turned off.

To simulate the above conditions a load was placed on the anchor brake by means of a chain fall and measured by a digital dynamometer. One end of the chain fall was shackled to the barge's towing bridle. The other end was shackled to a dynamometer. The opposite end of the dynamometer was shackled to a link of the relaxed anchor chain several chain links forward of the wildcat. During this stage of the test no load was on the anchor brake as the cat's paw was down and secured.

In order to determine whether the anchor brake slipped and the amount of any slippage, a perpendicular white line was drawn across the brake drum and the brake pad.

Blue Circle's intent was to place 17,000 pounds of load on the Barge's anchor brake. This load represented 170 percent of the load that the anchor brake is required to hold when the anchor system is properly set for remote drop. The 17,000 pounds takes into account any potential increase in that load that might be experienced from dynamic forces generated as the loaded barge was pushed down the Hudson River. The load the anchor brake is supposed to hold is estimated at 5 tons or 10,000 pounds. 4.5 tons or 9,000 pounds for the anchor plus 0.5 tons or 1000 pounds for the chain links and assembly which run between the anchor and the anchor brake when the anchor is housed.

The test consisted of setting the brake. The hand wheel was turned to set the brake until the face of the spring plate aligned with the end of the tell tail indicator. Load was placed on the anchor brake by means of the chain fall. The perpendicular white line was inspected for movement at each incremental 1,000-pound load. The amount of load on the anchor brake was continuously increased until the total amount of load reached 17,000 pounds. The anchor brake did not move or slip.

A second test was conducted. The above load test was repeated after releasing the brake until the end of the tell tail indicator aligned with the spring side of the spring plate and water was poured on the top side of the brake all around the brake pad. The brake was properly set and the load applied. The brake did not slip or move.

A third test was conducted. At the conclusion of the second test, a load of 12,500 pounds was placed on the anchor chain with the brake properly set. The hand wheel was turned to release the brake. After making 10 complete revolutions on the brake wheel, the brake was seen to slip. The brake slipped after the brake spring had been opened to a position such that the spring-side of the spring plate was approximately 7/8 of an inch in front, or forward, of the end of the tell tail indicator. The amount of slippage was measured to be

5/8 of an inch based on a comparison of the difference in the perpendicular white line on the brake drum and the brake lining.

13. The Voyage of the SCOTT TURECAMO and the MARIA T Prior to the Casualty

On Friday, August 6, 1999 at approximately 1820, the SCOTT TURECAMO relieved the tug JOAN TURECAMO of the barge MARIA T as the JOAN TURECAMO towed the MARIA T North in the Hudson River. This relief took place off of Hyde Park, NY. The Master of the SCOTT TURECAMO, Mr. [REDACTED], was operating the SCOTT TURECAMO at the time and through the docking of the MARIA T in Ravena later in the evening. (Pg 124, Exhibit 6)

The UTV SCOTT TURECAMO pushed the MARIA T in the notch. After setting up the push gear to attach the MARIA T to the SCOTT TURECAMO, deckhand [REDACTED] went forward on the barge MARIA T to check the navigation lights, the anchor lights and the anchor. Mr. [REDACTED] found the anchor pawl engaged. (Pg 414)

To prepare the anchor for Radio controlled release Mr. [REDACTED] engaged the windlass to pull the anchor chain in a few inches to relieve the pressure of the anchor chain against the Pawl. Mr. [REDACTED] then raised the Pawl. (Pg 414)

Mr. [REDACTED] testified that he checked the brake and found the pin and the spring plate in the set position. That is, Mr. [REDACTED] viewed the pin even with the after portion of the spring plate. (Pg 414-415)

Mr. [REDACTED] testified that he did not operate the hand wheel that controlled the tension of the brake. (Pg 414-416)

Mr. [REDACTED] responded, "quite a while on the MARIA T." when asked when was the last time he operated the anchor brake on board the MARIA T. Mr. [REDACTED] estimated that he had operated the MARIA T anchor brake approximately 30 times since October 1995. (Pg 416)

Mr. [REDACTED] testified that the other Blue Circle Cement barges use a light specially provided to indicate when the brake is on or off. The light comes on when the brake is released. The light turns off when the brake is set. (Pg 416)

There was no such special light on the MARIA T to indicate when the anchor brake was applied or not applied.

The MARIA T all around anchor light on the barge mast was designed to come on automatically when the radio-controlled device was used to drop the anchor. The switch for the anchor light included an automatic position. (Pg 417)

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The SCOTT TURECAMO pushed the MARIA T to the Blue Circle Cement loading terminal in Ravena, New York. Captain [REDACTED] turned the tow around so he could moor the barge port side to the dock at the Blue Circle Cement Facility in Ravena, NY, on the West shore of the Hudson River. The tow landed at Ravena, NY at approximately 2145, Friday night, August 6, 1999. (Pg 124)

After mooring the MARIA T at approximately 2145 August 6, 1999, the UTV SCOTT TURECAMO stayed in the vicinity of the barge and the terminal until departing from Ravena, New York at approximately 0215, August 8, 1999. (Exhibit 6)

The SCOTT TURECAMO crew put out the wires to moor the MARIA T. The tug crew did not do any other activities related to equipment on board barge MARIA T after its arrival in Ravena, NY. (Pg 586)

The UTV SCOTT TURECAMO remained in Ravena, NY on standby for all of August 7, 1999. At some time on August 7, 1999, the SCOTT TURECAMO provided 7,244 gallons of fuel to the MARIA T and 8,000 gallons of fuel to the towing vessel FRANCIS TURECAMO. (Exhibit 6)

At approximately 0000, August 8, 1999 the mate, [REDACTED] took charge of the watch on board the UTV SCOTT TURECAMO.

The UTV SCOTT TURECAMO logbook describes moving the Blue Circle Cement owned barge ALEDAIDE from the Ravena North Dock to the Ravena South Dock between 0045 and 0130, on August 8, 1999. (Exhibit 6)

14. Activities On Board the MARIA T After Its Arrival In Ravena, NY on August 6, 1999

Blue Circle Cement provided its loading and unloading personnel with a document titled CHECK-OFF LIST FOR DEPARTURE – BARGE. This check-off sheet contained 75 numbered items under 10 unnumbered headings. (Pg 636, Exhibit 57)

Blue Circle Cement used this check off sheet titled CHECK-OFF LIST FOR DEPARTURE – BARGE dated 8-7-99, during the loading of the barge MARIA T. (Exhibit 57)

The CHECK-OFF LIST FOR DEPARTURE – BARGE is filed with other documents related to the loading in the Marine Department of Blue Circle Cement. (Pg 636).

The Blue Circle Cement loading supervisor completes the Check off list. (Pg 637)

There are no specific instructions describing exactly what must be done to accomplish each of the Check-off list items. A new loading supervisor would learn by word of mouth from other loading supervisor during a person's training period. (Pg 637)

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Blue Circle Cement did not have any MARIA T anchor or any anchor associated equipment maintenance scheduled or work planned for August 6, 7 or 8 1999. (Pg 639).

Blue Circle Cement practice included a Blue Circle Cement employee taking necessary steps to engage the Pawl while a Blue Circle barge lay at a terminal. Sometime early Saturday, August 7, 1999, Mr. [REDACTED], an electrician working for Blue Circle Cement, visually inspected the anchor equipment and put the pawl down on the chain. (Pg 640-642)

Mr. [REDACTED], the Marine Maintenance Manager for Blue Circle, Incorporated described how he has engaged the anchor pawl in the past. He put the pawl down and then took in anchor chain until the pawl wedged up against a chain link to distribute the anchor weight to the pawl. Was the brake taken off when the chain was brought in? It depended on how far the wildcat needed moving. (Pg 640 - 641)

Exhibit 57 contains the check off list with the following information completed at the top of the form:

Barge: MARIA-T, Terminal: Ravena, Trip: 24-99-547, Date: 8-7-99. The bottom of the form included Engineer: (blank), Captain: the signature of Ted Ward, Date: 8-8-98. (Exhibit 57)

The 8-8-98 date should have read 8-8-99. (Pg 662)

Mr. [REDACTED] signed the check-off sheet as the Loading Coordinator/Supervisor. He had been employed in the position for approximately 5 months. (Pg 661)

Loading supervisors worked eight-hour shifts. The hours of the shifts: 0700 until 1500, 1500 until 2300 and 2300 until 0700. Each loading supervisor would pass along the check-off sheet to his or her relief. (Pg 664)

The instructions at the top of the form read, "WHEN COMPLETE, CHECK NUMBER. IF COMMENTS REQUIRED, CIRCLE NUMBER. COMMENT ON BACK. (Exhibit 57)

The check off sheet dated 8-8-98 at the bottom of the sheet did not show any of the 75 numbers checked or circled. There were 10 marks within individual numbered items. This included seven circles of the word "on" and "off" and the completion of three blanks. (Exhibit 57)

The check off list included the following that referenced the anchor or anchor equipment:

Upper Machinery Space – Fwd: Check off sheet item number 4. Radio Receiver "On" – Anchor Drop Enabled. "On" was circled.

Deck Items: Check off sheet item number 51. Anchor Lights Tested & Operating.

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Deck Items: Check off sheet item number 54. Anchor Chain Stop Off & Secured.

Records & Tug Instructions: Check off sheet item number 73. Have Tug Test Anchor Drop Device, If Possible.

Mr. [REDACTED] explained that Blue Circle, Inc. used their check-off sheet as a part of a process to ensure that equipment the company owned was in a satisfactory condition prior to departure. He expected each towing vessel crew to set the anchor equipment in a manner to meet that crew's particular operational desire. (Pg 668-670, 683-684)

Blue Circle, Incorporated did not have any instructions or manuals describing how to complete the Check-Off List for Departure (Exhibit 57). (Pg 762)

On the morning of August 8, 1999, Mr. [REDACTED] of Blue Circle Cement presented a Notice of Readiness to Mr. [REDACTED]. The notice reads: "Please be advised that the above mentioned vessel is loaded – unloaded and ready in every respect ready to depart from the dock of Blue Circle Atlantic, Inc. Blue Circle Cement on 8-8-99 At 0215 Hours." The document was signed by Mr. [REDACTED] and then signed by Mr. [REDACTED], dated 8-6-99. (Pgs 497-501, Exhibit 44)

Mr. [REDACTED] did not readily recall if he had signed the document. No specific employee from the towing vessel was assigned to acknowledge receipt of the Notice of Readiness Document. Mr. [REDACTED] signed that he accepted the document as a declaration from Blue Circle signifying that the barge is ready for sea. (Pg 495-497)

The watch routine of the crew of the SCOTT TURECAMO did not include any regular checks of the anchor to see if the anchor brake had held the anchor in place.

No crewman of the UTV SCOTT TUREMCAMO made mention of anything unusual having to do with the anchor from the time they picked up the MARIA T until after mooring the barge in Ravena, New York.

After mooring the MARIA T, tug crewmembers did not participate in the loading of Cement into the MARIA T.

At approximately 0145, August 8, 1999, Mr. [REDACTED] and Mr. [REDACTED] went from the SCOTT TURECAMO galley, to the MARIA T, to complete tasks related to getting underway. This included checking the port and starboard running lights, the amber flashing light, and the steering light installed on the bow of the barge. They then began taking in the six mooring lines beginning from the stern. After releasing the mooring lines, Mr. [REDACTED] stated they proceeded to the anchor, where they saw the pawl down. A normal mooring operation takes 10 to 15 minutes (Pg 401 – 402, 409)

Mr. [REDACTED] stated that he engaged the hydraulics to the Capstan, engaged the pin to the wildcat and then he operated the wildcat to bring the anchor chain in a few inches to release the pressure on the pawl so he could raise the pawl to the up position. (Pg 402)

Mr. [REDACTED] stated that he checked the brake and added two more full rotations to the brake hand wheel to ensure the end of the tell tail indicator was flush against the after portion of the plate. He also removed the pin from the wildcat so that the anchor was ready for a radio-controlled drop. (Pg 403)

Mr. [REDACTED] stated that he viewed the pawl resting on the yellow painted chain link. Placing the pawl on the yellow link was a procedure established for indicating that the anchor was properly housed. (Pg 408)

Neither Mr. [REDACTED] nor Mr. [REDACTED] viewed the anchor during their work on the barge during the morning of August 8, 1999 while the MARIA T was in Ravena, NY. (Pg 408)

The only way to view the MARIA T anchor in its fully housed position was to sight the anchor by looking down the MARIA T hawse pipe or lay down on your belly and peer over the starboard side of the deck. (Pg 615, Exhibit 15, Exhibit 54)

Mr. [REDACTED] relieved Mr. [REDACTED] shortly after the vessel departed Ravena at 0215, August 8, 1999. This took place about a quarter of a mile South of Ravena. (Pg 310)

Prior to relieving, Mr. [REDACTED] was getting a cup of coffee. He noted nothing unusual during the undocking. (Pg 311)

Mr. [REDACTED] reported that the ship did not proceed under any bridges, nor get close to any buoys and did not get close to any vessel traffic. (Pg 311)

Mr. [REDACTED] remained in the lower wheelhouse during his entire watch. Doors were closed and the externally mounted wheelhouse air conditioner was operating. (Pg 312-313)

Mr. [REDACTED] stated that the anchor lights did not come on during his watch on the morning of August 8, 1999. (Pg 315)

Mr. [REDACTED] relieved Mr. [REDACTED] at 0830, August 8, 1999. Mr. [REDACTED] stated that he noted the speed indicator on the radar read 6.5 knots. The throttles were full ahead. He and Mr. [REDACTED] discussed this as a little slow. Mr. [REDACTED] attributed the slow speed to a flooding tidal current. (Pg 125-126, 137, 145)

Mr. [REDACTED] piloted the vessel from the lower pilothouse, with the bridge doors closed. He used the externally mounted air conditioner to keep the pilothouse cool. (Pg 143)

Mr. [REDACTED] steered towards the center of the Poughkeepsie Railroad Bridge. (Pg 137)

Mr. ■■■ did not meet or overtake any traffic after he relieved the watch at 0830 August 9, 1999 until he learned of the pipeline accident. He did not pass through any bridges from the time he relieved Mr. ■■■ until he went under the Poughkeepsie Railroad Bridge. (Pg 138-139)

Mr. ■■■ proceeded to the MARIA T at approximately 0800 to store mooring lines. Mr. ■■■ was still stowing lines when Mr. ■■■ assumed the watch at 0830, August 8, 1999. (Pg 127)

Mr. ■■■ placed the SCOTT TURECAMO on automatic pilot in the vicinity of Blue Point, South of the Poughkeepsie Railroad Bridge. He did not notice anything unusual in the way in which the vessel handled. (Pg 127)

Mr. ■■■ heard a radio broadcast requesting the closing of the Hudson River North of the Poughkeepsie Railroad Bridge because of a pipeline accident. Mr. ■■■ noted he was South of this area when he heard the broadcast. (Pg 127-128)

15. Anchor Equipment Repair History

Mr. ■■■, the Blue Circle, Inc Marine Maintenance Manager believed that anyone discovering a problem with the operation of the MARIA T anchor, would report the problem to him. There were no outstanding items for repair associated with any of the MARIA T anchor equipment as of time of the accident on August 8, 1999. (Pg 643-644, 867 - 868)

An overhaul of the anchor equipment was conducted in December 1996 at a shipyard in Charleston, SC. The overhaul included replacing the brake linings.

Visual examinations were used to determine when to replace brake linings. There was no planned replacement schedule, or a schedule based on hours of operation. Brake linings were historically replaced before the bands were not suitable for use. (Pg 839)

Periodic maintenance included removing spacer shims (Item number 53, 54 as shown on Drawing) located on the bolt that connected the two brake band halves (Item numbers 51, 55) together. Two hydraulic cylinders (Item number 58) and the rod extensions that could move in and out of the cylinders connected the other ends of the brake bands. One cylinder was above the other. When using the radio-controlled method to release the brake, the rod extensions extended, pushing the brake bands away from each other and away from the wildcat (Item 41). This caused the brake band tension against the wildcat to decrease. The system is designed to allow the anchor to drop as the brake tension decreases. (Exhibit 58, Drawing number R-13691, Rev C; Pg 856-858)

If the shims were not removed at appropriate times, the anchor brake system would not operate as designed. The tell tail indicator (Item number 60) and Spring Plate (Item number 62) are designed to indicate the correct amount of braking strength based on the rod extension of the hydraulic cylinder extending approximately an inch to an inch and a

half out of the cylinder. This distance is maintained by removing spacer shims as the brake lining wears. If the rod extensions extended less than an inch out of the cylinder, and the end of the tell tail indicator were lined up with the Spring Plate, the brake would exert a holding strength less than designed. (Exhibit 58, Drawing number R-13691, Rev C; Pg 856-858)

Exhibit 58, paragraph 7.1.3 reads: The cylinders are initially set up with the rods extended an inch. DO NOT ALLOW THE CYLINDER RODS TO BOTTOM OUT. If the rod extension gets down to ½", remove shims (Pt.53 & 54) to restore the rod extension to 1". (Exhibit 58)

On August 8, 1999, one shim remained. (Pg 768)

16. Radio-Controlled, Remote Anchor Drop

The Master, Mr. [REDACTED] recalled an incident that occurred around 1990. The anchor and all of the chain came off of the MARIA T while he towed the MARIA T astern in the Atlantic Ocean. Mr. [REDACTED] viewed the anchor missing from the hawse pipe when the barge was approximately 30 miles offshore of Chesapeake Light on a voyage from New York to Jacksonville. Mr. [REDACTED] stated that they began investigating conditions on the barge after his Chief Engineer reported unusually high exhaust temperatures for the speed the tow was making good over the ground. (Pg 197-199)

After the 1990 incident Mr. [REDACTED] operated with the pawl down until he was satisfied that appropriate efforts were done to prevent the release of the anchor. (Pg 199)

Mr. [REDACTED] thought the anchor remote drop was a great idea for helping to avert a disaster in the case of an accident like a towing vessel engine failure or any other emergency where the barge gets away from the control of the UTV. He always operated with the anchor set for a remote drop. (Pg 200-201)

Mr. [REDACTED] said he had been told that the tug ELIZABETH TURECAMO had an incident with the MARIA T similar to the 1990 incident. Mr. [REDACTED] did not know any details. Mr. [REDACTED] said he had heard of the ELIZABETH TURECAMO incident from a mate employed by Turecamo Marine. He had not heard or dealt with similar incidents involving the other Blue Circle, Inc. cement barges. (Pg 218-219)

Mr. [REDACTED] explained the radio controlled system was installed to allow the release of the anchor to prevent the unmanned MARIA T from going aground if the tow line came apart, and the emergency towline could not be picked up. (Pg 766)

17. Other Anchor Information

Exhibit 58, the hydraulic system instruction book contains a drawing that shows the anchor properly set if the end of the tell tail indicator extends to the after portion of the spring plate. The placard posted on the bow of the barge next to the anchor windlass says

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to set the brake by turning the hand wheel until the end of the tell tail indicator is flush with the aft part of the spring. (Exhibit 7, 58)

Drawing number R-13691, Revision C, found in Exhibit 58 lists two different part numbers for the Spring (61) and the Spring Plate (62). (Exhibit 58)

18. UTV SCOTT TURECAMO Crew Experience

The Master, [REDACTED] held a U.S. Merchant Marine Officers License to serve as Master Ocean Steam or Motor Vessels not more than 1,600 Gross Tons. Radar Observer Unlimited. Operator of Uninspected Towing Vessels upon Great Lakes and Inland Routes. First-Class Pilot of vessels not more than 500 gross tons on New York Harbor, the Upper Bay from the Narrows to the Battery, the Hudson River from the Battery to Dave's Point, the East River from the Battery to 59th Street Bridge. This was the sixth issue of Mr. [REDACTED] Merchant Mariner License. The Coast Guard issues licenses every 5 years. (8/13, pg 120)

Mr. [REDACTED] began working on towing vessels in 1971. He obtained his first license in 1979. (8/13, pg 120)

Mr. [REDACTED] experience included working on vessels operating on the New York State Barge Canal, the Hudson River, and the Atlantic Ocean including voyages from Portland, Maine to Miami, Florida. Since obtaining his license, Mr. [REDACTED] has always served on board vessels as the Master or the licensed mate. (8/13, pg 121)

Mr. [REDACTED] began working for Turecamo in 1986. The Moran Towing Corporation acquired the Turecamo Towing Corporation. The Turecamo Towing Corporation no longer existed after August 1, 1999. He served as an alternating Master of the SCOTT TURECAMO since the vessel was built working a three weeks on/three weeks off schedule. (8/13, pg 121-122)

Mr. [REDACTED] entered the towing vessel industry as a deckhand with Moran Towing and worked there for 14 years. He then moved to Turecamo Maritime for the next 11 years. Mr. [REDACTED] obtained his first Coast Guard issued License in 1976. He was licensed as an operator of towing vessels and as a federal pilot. (Pg 307-308)

Mr. [REDACTED] was a commercial fisherman for 20 years before he began working on towing vessels as a deckhand in 1995. (Pg 397-398)

Mr. [REDACTED] worked in the towing industry as a deckhand for one year with Buchanan Marine and then four years with Turecamo prior to the casualty. (Pg 522-523)

19. Latent Conditions³

Blue Circle, Incorporated installed anchoring equipment on the Barge MARIA T so that the anchor could be remotely released from the pilothouse of the UTV towing the MARIA T. This remote system was installed to prevent the MARIA T from drifting ashore if its towline broke while underway. The UTV could release the MARIA T anchor, wait until the anchor caught on the bottom and then take steps to put a line back on the barge to retrieve the barge. When set up for remote release, this system relied solely on the application of the anchor brake to keep the anchor housed.

A traditional system of letting go the anchor includes two other devices to prevent the unexpected release of the anchor: A pelican hook or devils claw chain stopper holds the anchor on board by connecting a link of the chain near the anchor to the deck of the vessel and a pawl (cats paw) wedges against the anchor chain to keep the chain from sliding off of the vessel. A traditional release of an anchor would involve a crewmember(s) physically disconnecting the pelican hook chain stopper from the anchor chain and removing the pawl before releasing the anchor brake to allow the anchor to let go. Traditionally, these two chain stopper devices keep the anchor from letting go in case the brake does not hold.

In engineering a solution to address the hazard of a loss of the tow, no assessment was undertaken to address reducing the redundancy associated with a traditional ground tackle system from two to zero. The anchor system relied on a crewmember to properly set the brake tension for the anchor. There was nothing in place to warn of the accidental release of the anchor as a result of the failure of the crewmember to properly set the brake when the crew intended to run the barge with the anchor set for remote drop.

2. Captain [REDACTED], the master of the SCOTT TURECAMO, recalled that he experienced the loss of the MARIA T anchor in 1990, 30 miles off the Coast of the United States. He recalled that he ran with the anchor pawl down until he was assured that the anchor equipment had been checked. When Captain [REDACTED] learned that no problems were detected with the equipment he again began operating with the anchor set for remote drop, as before, even though no explanation for the loss of the anchor was detected. No organizational steps were taken to address the non-conformity of the anchor unexpectedly letting go.

³ Latent conditions—such as poor design, gaps in supervision, undetected manufacturing defects or maintenance failures, unworkable procedures, clumsy automation, shortfalls in training, less than adequate tools and equipment—may be present for many years before they combine with circumstances and active failures to penetrate the system's many layers of defenses. Latent conditions can lie dormant for a time doing no particular harm until they interact with local circumstances to defeat the system's defenses. See James Reason, *Managing the Risks of Organizational Accidents*, (Brookfield, VT: Ashgate Publishing Company, 1997) pages 10-11.

The 1990 incident appears similar to the August 8, 1999 dragging of the MARIA T anchor. No organizational assessment of the 1990 near miss was undertaken. An assessment of the 1990 near miss incident may have led to defenses implemented to prevent the accidental letting go of the anchor or the immediate notification of the accidental anchor release. Any defenses implemented may have prevented the August 8, 1999 accidental release of the anchor or alerted the crew of the loss of the anchor before the anchor dragged across the natural gas pipeline.

3. No one on board the UTV MARIA T knew that at some time after the 0215 August 8, 1999 departure from Ravena, NY and later that morning at 0904, when the anchor severed the natural gas pipeline, that the anchor and 7 shots of chain left the barge MARIA T. The loss of the anchor was not detected because:

There were no policies or procedures outlining what Mr. _____ and Mr. [REDACTED] should do during their six-hour shifts of work. These procedures, a description of tasks to perform could have included provisions requiring the crew go on board the MARIA T as a regular part of the watch routine, to check if the anchor remained in the hawse pipe.

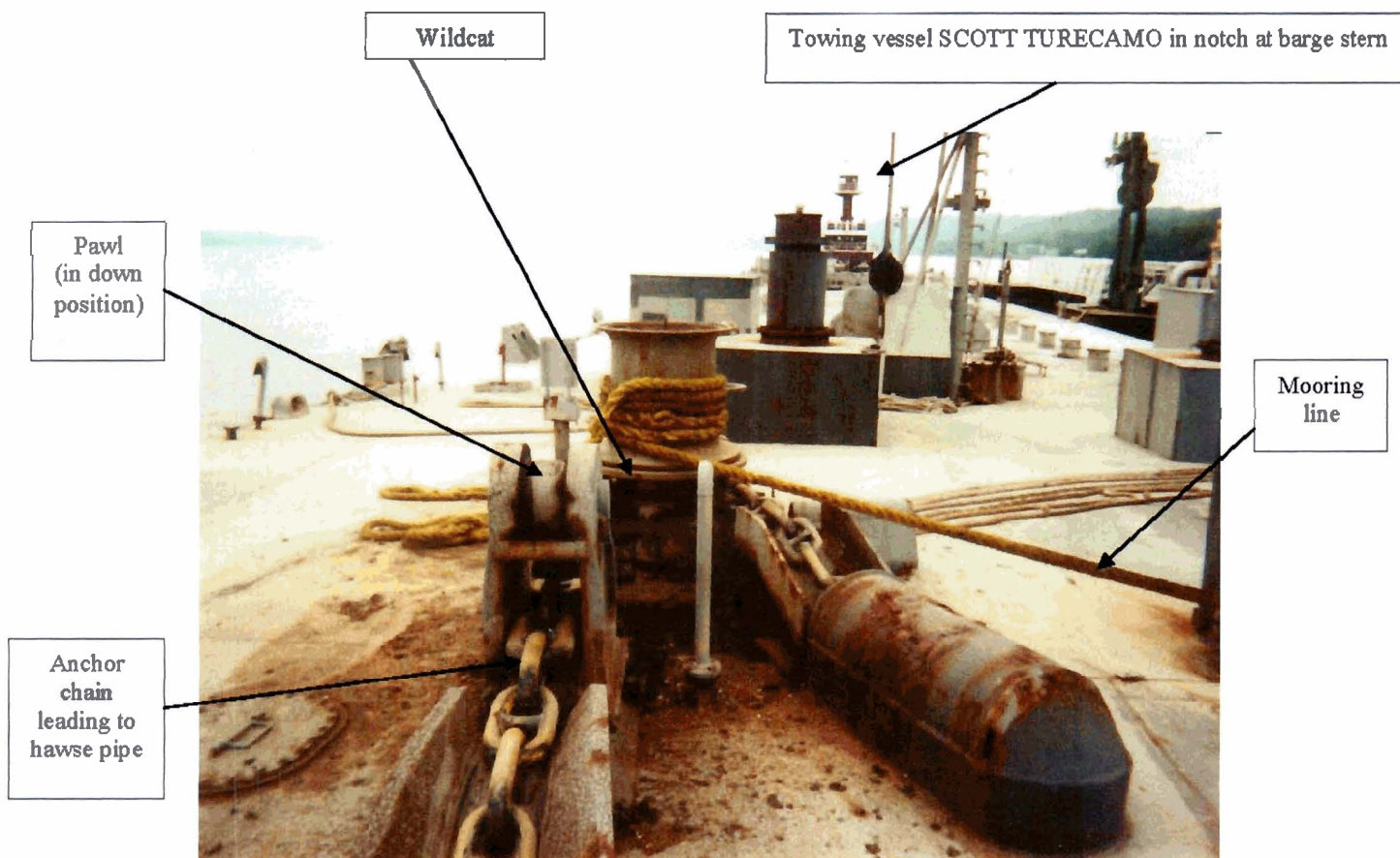
There was no way to view the anchor in the hawse pipe of the MARIA T from the barge or UTV without looking down the hawse pipe of the barge MARIA T or leaning over the bow of the barge.

4. Testimony revealed that the UTV SCOTT TURECAMO carried a copy of a publication titled *The AWO Responsible Carrier Program*. Testimony also revealed that none of the UTV SCOTT TURECAMO crewman knew of any written management Vessel Operating Policies/Procedures that addressed operating of the MARIA T with the anchor set for remote drop.

Turecamo Marine and Moran Towing both participate(d) in the American Waterway Operators Responsible Carrier Program. The AWO RCP is intended to improve marine safety and environmental protection in the barge and towing industry. The program aims to accomplish the objective by establishing preferred industry operating principles and practices as voluntary standards of conduct for barge and towing companies. The AWO RCP chapter II states that each company should document written policies and procedures covering, at a minimum, those items outlined in Chapter II. None of the outlined items covered anchoring policies or procedures. A system that forms an integral part of the routine of a voyage, such as the remote drop operation of the anchor, should have documented written policies and procedures.

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20. Work Environment—Human Factors Analysis



Barge MARIA T – Photograph taken from bow looking aft. Towing vessel SCOTT TURECAMO at barge stern, in the notch. Photograph taken August 15, 1999 (Exhibit 30)

1. Mr. [REDACTED] and Mr. [REDACTED] had been involved with many activities beginning at 0045 when, both men participated in unmooring and mooring the cement barge ADELAIDE that was moved from the Ravena North Dock to the Ravena South Dock. The UTV SCOTT TURECAMO log recorded that this task lasted from 0045 to 0130 August 8, 1999.
2. At 0145, SCOTT TURECAMO mate on watch told Mr. [REDACTED] and Mr. [REDACTED] to prepare the MARIA T for departure. This involved checking the operation of the navigation lights and taking in six mooring lines. Mr. [REDACTED] and Mr. [REDACTED] testified that setting the MARIA T anchor for remote operation was the last task they completed on the MARIA T and they did this as the MARIA T was pulling away from the dock.

3. Mr. [REDACTED] and Mr. [REDACTED] had been conducting the above work in the following conditions:

The task of setting the brake for remote operation was conducted at 0215 in the morning. The Circadian Rhythm graph associates this time with individual reduced alertness

Rain was falling during the morning of August 8, 1999 in Ravena, NY. The rain was reported as light to heavy. Allowing the physical environment on a vessel to exceed tolerable limits can increase the likelihood of an environmentally induced human error on that ship.

The tasks performed between 0145 and 0215 on board the MARIA T most likely saw the deck hands working at different tasks from the stern to near the bow of the 450 foot long vessel. This work had quickly followed the work they both participated in when moving the barge ADELAIDE from the Ravena North Dock to the Ravena South Dock from 0045 to 0130. They may have had too much to do. A process (deck hand duties) involving varied tasks over a large area in a short period of time could contribute to human error.

4. There was an inconsistency in the display arrangement between the MARIA T and the other three cement barges owned by Blue Circle, Inc. towed by the SCOTT TURECAMO. The MARIA T's procedure described lining up the end of the tell tail indicator with the after end of the spring plate to display the fact that the brake was properly set for remote operation. The other three barges used a light. If the light was on, the brake was not set properly. If the light was off, the brake was set properly. The fact that two different displays existed for one company's barges could contribute to human error.
5. Mr. [REDACTED], who testified that he correctly set the brake on the morning of August 8, 1999, said that prior to the accident, he had operated the brake on the MARIA T approximately 30 times. He also testified that his training was received on the job. When he first began working for Turecamo Marine (Now Moran), the UTV masters and other crewmen instructed him in how to carry out tasks involved with the cement barges owned by Blue Circle, Inc.

21. Conclusions

1. That the anchor of the MARIA T, dragged along the bottom of the Hudson River, caught, pulled and then severed the Central Hudson Gas and Electric 8" distribution line in Poughkeepsie, NY.
2. That at some point between the arrival of the MARIA T in Ravena, NY on August 6, 1999 and its departure on August 8, 1999, the MARIA T anchor brake tension was released such that it would not hold the anchor in its hawser while transiting down the Hudson River. This is based on the fact that the anchor remained in the

hawse pipe from the time the anchor was set for remote operation at 1820 on August 6, 1999 until the Barge's arrival in Ravena at 2145 later that evening.

3. That the MARIA T's anchor was in the hawse pipe when the MARIA T departed Ravena, NY on the morning of August 8, 1999. This is based on the fact that no one from the crew of the SCOTT TURECAMO or any of the employees of Blue Circle Cement reported that the anchor was not in the hawse pipe while the Barge was moored in Ravena between August 6 and 8, 1999.
4. That the anchor brake would have held the MARIA T anchor in the anchor hawse pipe on August 8, 1999, if the brake were set such that the end of the tell tail indicator lined up with the after side of the spring plate. This conclusion is based on the anchor drop tests conducted on August 8, 9 and 20, 1999 and the testimony that the anchor had remained in the hawse pipe on board the MARIA T on August 6, 1999. On August 6, 1999 the anchor remained in the hawse pipe held only by the anchor brake during the transit North on the Hudson River between Hyde Park, NY and Ravena, New York.
5. That Mr. [REDACTED] and Mr. [REDACTED]:
 - Did not know how to align the end of the tell tail indicator with the spring plate to assure the correct setting of the MARIA T anchor brake when the barge departed from Ravena, NY at 0215, August 8, 1999; or
 - Did not check the status of the anchor brake when the barge departed from Ravena, NY at 0215, August 8, 1999.

This conclusion is contrary to the testimony of both Mr. [REDACTED] and Mr. [REDACTED] who testified that they did assure themselves that the brake was set. Testimony from Mr. [REDACTED] regarding his experiences and interaction with Mr. [REDACTED] on board the barge following the casualty provided evidence that Mr. [REDACTED] may not have known where the end of the tell tail indicator should have been in relationship to the spring plate.

If Mr. [REDACTED] and Mr. [REDACTED] did know how to properly align the tell tail indicator with the spring plate, certain latent conditions described in section 19 and their work environment in the early morning of August 8, 1999 may have contributed to their not setting the anchor brake.

6. That there was no evidence to indicate that the anchor of the MARIA T came out of its hawse pipe due contact with another vessel, a bridge, or the dock in Ravena, NY.
7. That the infrequently used remote controlled anchor release system was not activated on the morning of August 8, 1999. A particular piece of evidence supports this conclusion. The hydraulic line that failed, and prevented the remote release of the anchor, during a test of the radio controlled anchor drop attempted

on the evening of August 8, 1999 would have likely failed during any accidental operation of the remote controlled brake release earlier that day.

8. That the crew of the SCOTT TURECAMO had the responsibility to arrange and use the anchor equipment as they best saw fit for the voyage intended.
9. That the failure of Blue Circle Inc. employees to properly complete their own barge departure checklist did not contribute to the cause of this casualty.
10. That the action of the Poughkeepsie Police to call the barge and the compliance by the master to comply with the request to check the anchor prevented further damage from occurring if the anchor would have crossed over the four and eight inch distribution lines that crossed the Hudson River in Newburgh, NY, approximately 15 miles from where the MARIA T stopped after notification.
11. That had the natural gas pipe that was severed been installed under newer installation standards requiring trenching, requiring the top of the Pipe to be 24 inches beneath the Hudson River Bottom, this casualty would not have occurred.⁴

22. Apparent Cause and Contributing Causes

1. The apparent cause of the casualty was the failure of the crew of the UTV SCOTT TURECAMO to correctly set the brake for the MARIA T anchor as the vessel departed Ravena, NY early in the morning of August 8, 1999.
2. A Contributing cause was the lack of training. Mr. [REDACTED] and Mr. [REDACTED] UTV SCOTT TURECAMO deckhands, did not know that to properly set the MARIA T anchor brake; the end of the tell tail indicator had to align with the after side of the spring plate.

If Mr. [REDACTED] and Mr. [REDACTED] did know how to properly set the MARIA T anchor brake, then a likely contributing cause was the failure of Mr. [REDACTED] and Mr. [REDACTED] to properly set the brake due to certain latent conditions and their early morning August 8, 1999 work environment that kept the two deckhands from making sure the end of the tell tail indicator aligned with the after portion of the spring plate. This failure could have included the failure of Mr. [REDACTED] and Mr. [REDACTED] to check the position of the brake.

⁴ Investigating Officer Comment: When government entities update regulations they measure the trade-offs regarding the costs to require the existing installations to comply with the new regulations versus the costs of any outcome the regulation(s) were designed to prevent. I have assumed that regulators conducted such an assessment when deciding whether to include existing pipelines laid directly on the river bottoms to comply with newer regulations that require trenching.

3. A contributing cause was the lack of the UTV SCOTT TURECAMO operating company to document the procedures necessary for its crewmembers to carry out their tasks associated with setting the anchor for remote drop operation.
4. A contributing cause was the lack of the UTV SCOTT TURECAMO operating company to document the procedures to verify that the anchor of the barge MARIA T remained on board and did not unknowingly let go.
5. A contributing cause was the failure of the company operating the UTV SCOTT TURECAMO to provide operating guidelines for its Master, when towing barges with remote anchor release systems.
6. A contributing cause was the failure of the company operating the UTV SCOTT TURECAMO to address changes to towing vessel operating procedures when the company began towing barges that could drop anchors remotely.

24. RECOMMENDATIONS

1. That the UTV SCOTT TURECAMO operating company, Moran Towing Corporation address the issues of this report listed under the Latent Condition section of this report. This may include the Moran Towing Corporation examining where they will operate barges with the anchor set for remote operation.
2. That the UTV SCOTT TURECAMO operating company, Moran Towing Corporation address the issues of this report listed under the Work Environment—Human Factors Analysis section of this report.

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