



National Transportation Safety Board

Marine Accident Brief

Flooding and Sinking of Towing Vessel *Ms Nancy C*

Accident type	Flooding	No.	DCA18FM015
Vessel name	<i>Ms Nancy C</i>		
Location	Everett Lake, mile 832 on Lower Mississippi River, near Dyersville, Tennessee 36°3.71'N, 89°40.05'W		
Date	March 6, 2018		
Time	1630 central standard time (coordinated universal time – 6 hours)		
Injuries	None reported		
Property damage	\$667,306		
Environmental damage	>830 gallons of fuel and lube oil discharged into the water		
Weather	Clear, visibility 10 miles, winds west at 28 mph (gusting to 34 mph), wave heights 3–4 feet, air temperature 54°F, water temperature 48°F		
Waterway information	Lake Everett is a tributary of the Lower Mississippi River. Its mouth is at mile 832, near the town of Dyersville, Tennessee. The lake's water depth is 6–18 feet.		

On March 6, 2018, about 1630 local time, the uninspected towing vessel *Ms Nancy C* was moving and positioning cargo barges while operating in Everett Lake, a tributary of the Mississippi River, when a deckhand discovered water in a void at the stern of the vessel. While the captain and deckhand attempted to dewater the vessel, it sank in 15 feet of water. Both crewmembers disembarked to a barge prior to the sinking without injury. Damage was estimated at \$667,306.

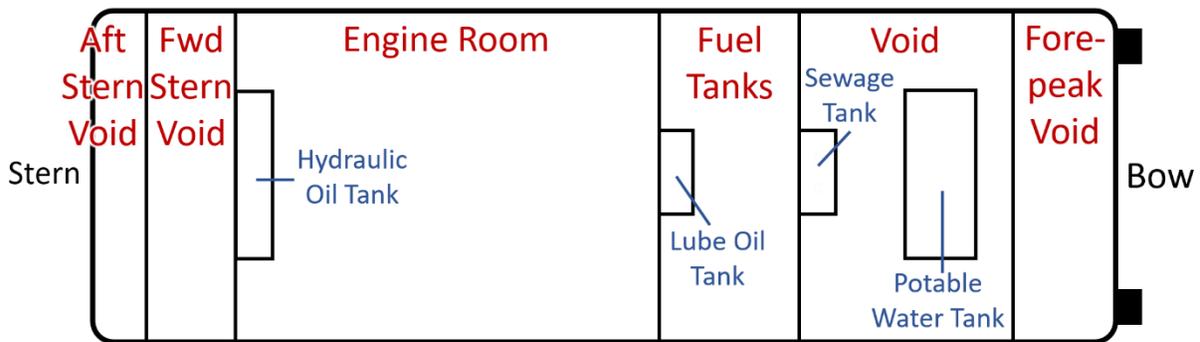


Ms Nancy C under way prior to sinking. (Photo by Frank Kammerer, towboatgallery.com)

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Background

The *Ms Nancy C*, a twin-propeller towing vessel, was built in 1979 by Superior Boat Works in Greenville, Mississippi, and originally named the *Ryan L*. The vessel was operated by several companies before being purchased in 1988 by Choctaw Transportation Company, which renamed it the *Ms Nancy C* and operated it as a fleet boat—a towboat used to assemble or dismantle tows consisting of multiple barges. The hull of the vessel contained the engine room, fuel tanks, a potable water tank, a forepeak void as well as three additional voids, one forward of the fuel tanks and two in the stern. The vessel was regulated under Title 46 *Code of Federal Regulations*, Subchapter C (Uninspected Vessels), at the time of the accident.



General space layout of *Ms Nancy C* (not drawn to scale).

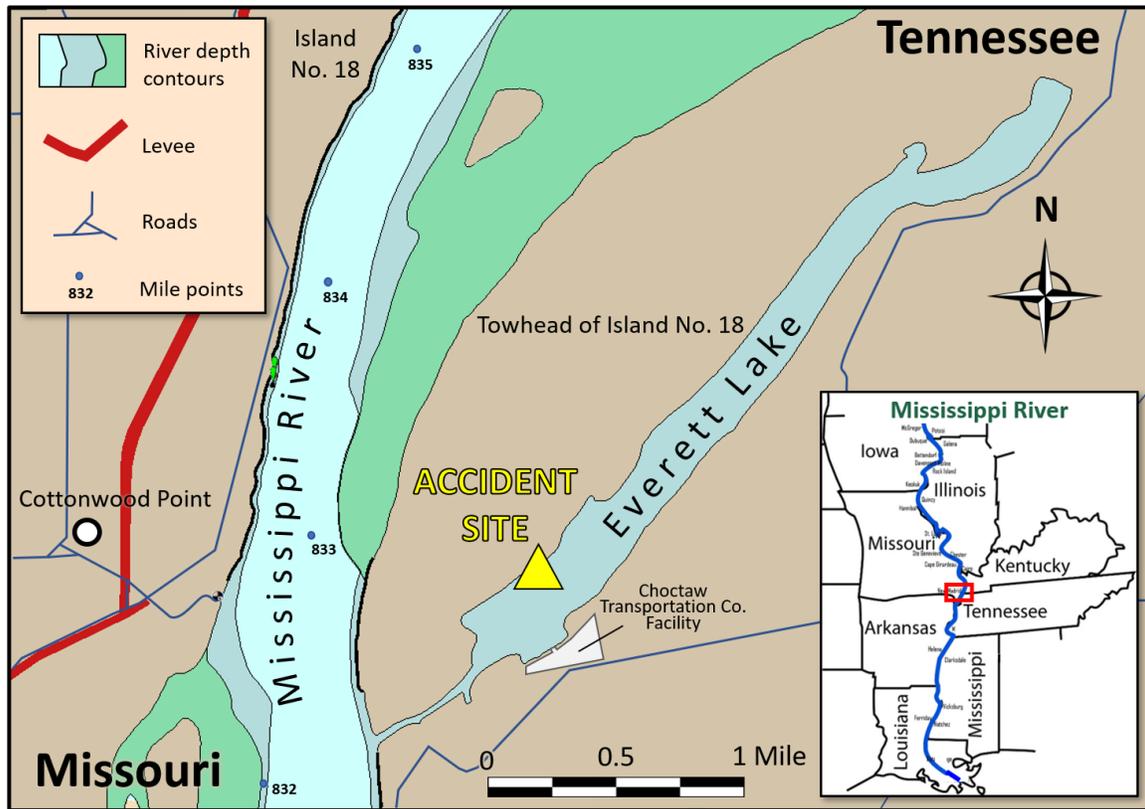
Accident Events

The *Ms Nancy C* had been laid up at the Choctaw Transportation facility at Everett Lake for several weeks prior to being placed back into service on the day of the accident. A company representative stated that Choctaw Transportation personnel monitored the condition of the vessel during the layup period. The day before the accident, while the towing vessel was docked at the company facility, the weather in the local area included rain and winds gusting up to 20 mph from the southeast.

About 0600 on March 6, the crew, consisting of a captain and deckhand, started operating the vessel and tending barges in the lake. While both crewmembers had worked on the *Ms Nancy C* previously, it was not the vessel they normally operated. The deckhand stated that he checked the vessel prior to getting under way, which included a deck walk, inspecting the engine room, and looking into the voids through openings that were accessible from the deck to ensure no excess water had accumulated. He stated that he found the decks, spaces, and voids to be in “acceptable condition.” The captain stated that he checked the operation of the controls on the bridge to ensure that the towing vessel was able to maneuver barges, but he did not conduct a deck walk or check any of the interior sections of the vessel.

During the day of the accident the winds were reported to be gusting up to 34 mph from the west, and waves were reported by both the towing vessel captain and the deckhand to be 3–4 feet with whitecaps. The captain was at the helm and the deckhand was on the main deck of the vessel while it was tending the barges.

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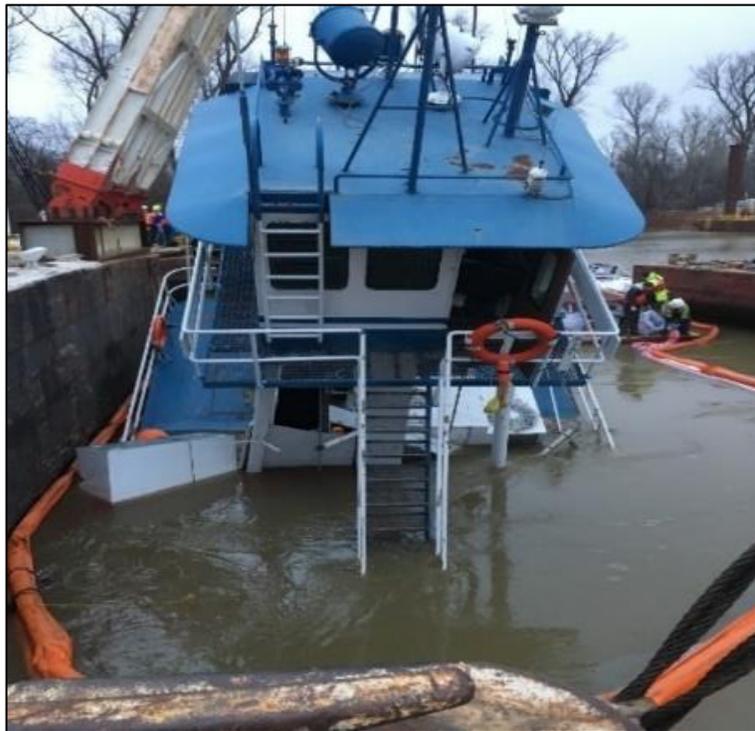
***Ms Nancy C* accident site. (Background from US Army Corps of Engineers Inland Electronic Navigation Chart cell U37LM829)**

After working tows throughout the day, about 1600 the *Ms Nancy C* was faced up to the barge *PBM413*, owned by Pine Bluff Materials, which was pushed into the west bank on Everett Lake. At that time, the deckhand, who was up in the bow, observed water coming over the starboard side of the vessel. The deckhand walked aft on the main deck and opened a small starboard-side access cover for the aft stern void. After removing the cover, he observed that the void was three quarters full of water. Consequently, he retrieved and placed a submersible electric pump through the access and into the void to remove the water. After starting the pump, the deckhand entered the engine room to check the two-propulsion shaft stern tubes to determine if they were leaking. He found that they were dry. He then returned to the bow of the towing vessel to continue to make it up to the barge. While on the bow, the deckhand saw that the condition of the vessel was getting worse, with more water coming over the side; he assumed that the pump was unable to keep up with the water entering the void. The deckhand went back aft, retrieved a second electric submersible pump, and opened a manhole cover (for an access large enough for a person to fit through), which was located center aft and also allowed access to the aft stern void. He placed the pump into the void and started it, noting that the space was now full of water.

The deckhand then notified the captain about the situation. In response, the captain went to the stern and observed that the vessel was taking on water, its freeboard was decreasing, and its initial starboard list was increasing. The captain and deckhand departed the towing vessel and went to a nearby work barge so that they could acquire a gasoline-powered pump with a larger (2.5-inch diameter) suction hose. However, before they could return to the vessel with the pump, the deckhand saw that the *Ms Nancy C* had heeled over to port. He recommended to the captain that they not return to the vessel; the captain concurred. Shortly thereafter, the *Ms Nancy C* sank by the stern, with the

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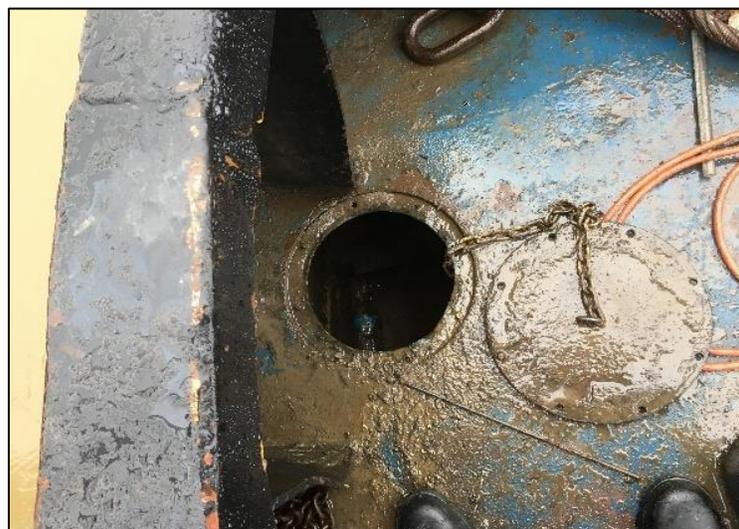
bow remaining connected to the barge with the facewires from the towboat. After the crew contacted the company's office, a boat was sent to remove them from the barge.



Ms Nancy C prior to salvage.

Additional Information

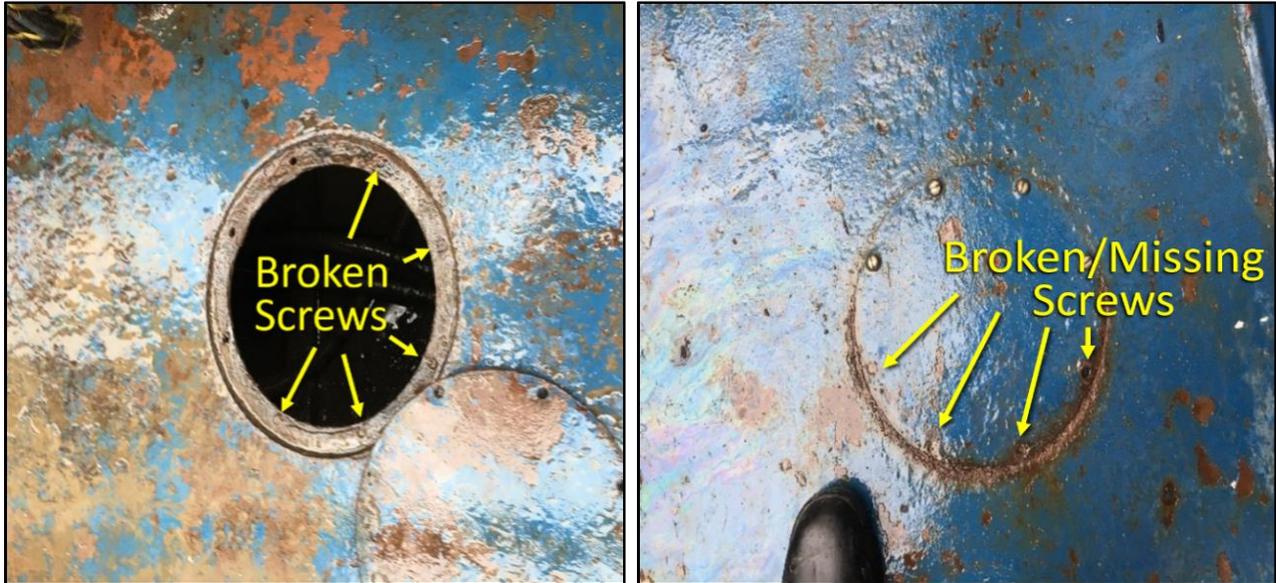
The *Ms Nancy C* was refloated 5 days later, on March 11. As the vessel was being raised, investigators noted that the access cover and manhole cover to the aft stern void that the deckhand had opened prior to the sinking were still open. The starboard access cover was connected to a chain that was attached inside the void. The electric pumps were still in place in the stern void accesses. Investigators noted that both pumps had been plugged into electrical receptacles located in the galley of the towing vessel.



Starboard deck access to aft stern void found open during salvage, with broken and missing access cover screws.

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A starboard-side access cover for the forward stern void of the *Ms Nancy C* was also found open when the vessel was salvaged. This cover was not one of the covers that the deckhand stated that he had opened prior to the accident. When investigators conducted an examination of the openings to both of the aft voids, they discovered several broken screws in the lip of each access. Other access covers located on the main deck were also examined. The covers were designed to be secured with eight screws; however, only two of the five access covers on the vessel's main deck were found secured with all eight screws. Further examination of the unsecured covers identified pitting and wastage along the edge of the covers and heavily scarred gaskets. In addition, all of the remaining manhole covers into the voids and fuel tanks were sealed with silicone sealant.



At left, starboard deck access to forward stern void found open during salvage. At right, port deck access to aft stern void, with broken and missing access cover screws.

The aft end of the towing vessel's deckhouse, where it met the main deck above the forward stern void, was examined for fittings or corrosion that could have allowed water to ingress. Investigators noted that there was significant steel wastage that extended from the port engine room door, around the aft side of the house, and up to the starboard engine room door. This wastage reached into the overhead of the forward stern void. The company that owned the towing vessel had welded doubler plates (patches) over the corroded areas; however, investigators found gaps between the doubler plates and the side of the house.

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Wastage and doubler plates as found on *Ms Nancy C* deckhouse. Top left: doubler plate over wastage below starboard engine room entrance. Top right: doubler plate over wastage below port engine room entrance. Bottom left: doubler plates over wastage on starboard aft deckhouse. Bottom right: closeup of starboard aft doubler plate showing gap between plate and wastage area.

Following salvage of the hull, the *Ms Nancy C* was examined again by investigators when it was drydocked. Investigators searched for any additional areas that could have caused water ingress into the towing vessel. The stern bulwark had several holes cut into it at the deck level that were used to prevent the collection of water on deck (freeing ports). The holes appeared to have been added after the vessel was constructed, and there were more holes on the starboard side than on the port. There were no holes or other breaches through the underwater portion of the hull, however, despite damage associated with barge operations and the sinking.

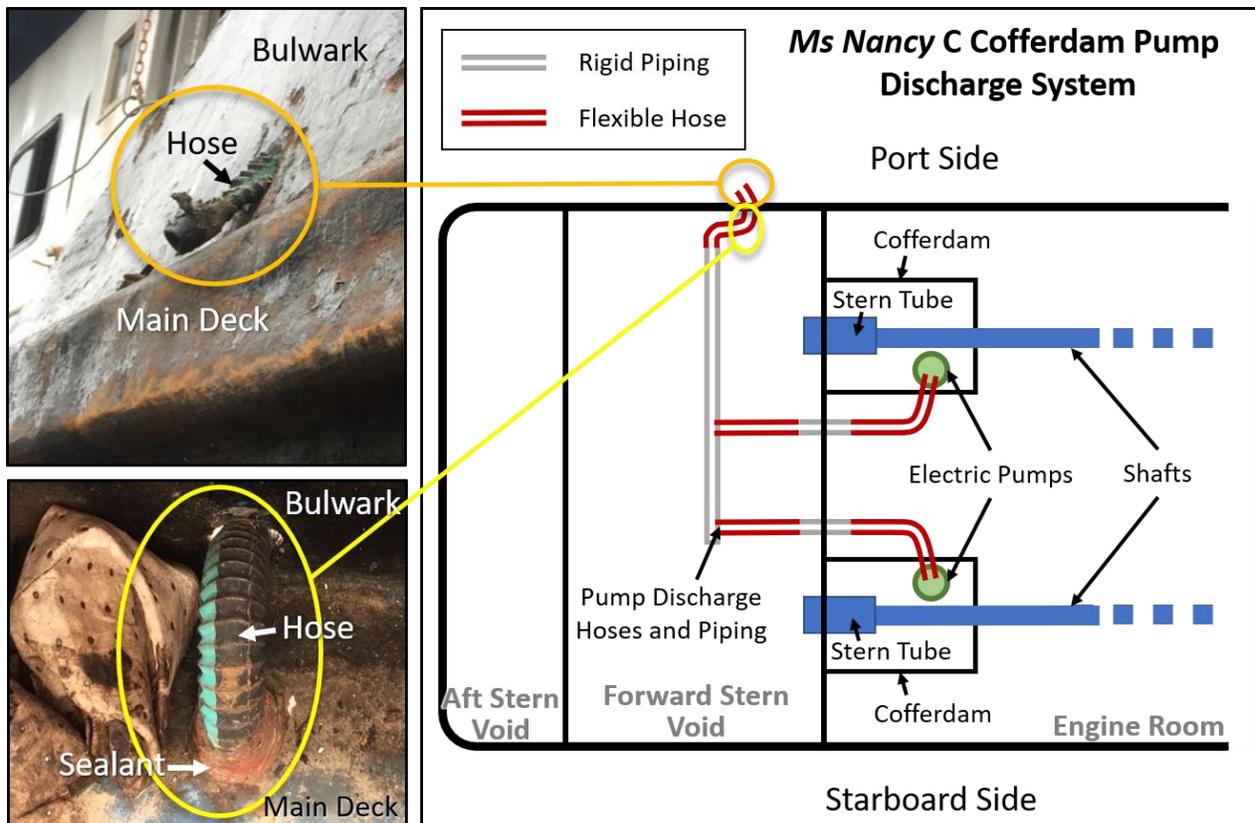
During the postaccident inspection of the *Ms Nancy C*'s engine room, cofferdams were discovered below each of the vessel's two stern tubes, through which the propulsion shafts ran. Float-switch-activated, positive-displacement submersible pumps were found in each of the cofferdams, indicating that the pumps were used to remove excess water leaking from the stern tube packing where the shafts passed through the hull. The two pumps were made for residential use. The starboard pump had a 40-gallons-per-minute output and the port pump had a 60-gallons-per-minute output.

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At left, pump in cofferdam below port shaft. At right, pump in cofferdam below starboard shaft.

Each pump discharged through a hose that was connected to a pipe welded in the bulkhead between the engine room and forward stern void. In the void, another set of hoses connected the bulkhead pipes to a single transverse pipe, which transitioned again to a corrugated hose on the port side of the void. The hose passed through a hole in the main deck above, then routed outboard through the port bulwark and overboard. The main deck hose penetration was made watertight by a sealant.



Cofferdam pump overboard discharge system (diagram not drawn not to scale). Photos on the left show, at top, the hose as it passed outboard from the main deck through the port side bulwark, and, at bottom, the discharge hose as it passed up through the main deck from the forward stern void.

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Investigators noted during their examination that the hose in the forward stern void that connected the port side pump discharge to the transverse pipe was leaking. The hose still contained water but was not under pressure. Also, sealant around the hose that ran from the transverse pipe to the overboard discharge had several small holes in it where it breached the main deck.

Investigators also found two unsealed (not watertight) pipe penetrations through the bulkhead between the forward stern void and the aft stern void. These holes were both about 36 inches from the bottom of the space and would have allowed water above these penetrations to move continuously between the forward and aft stern voids.



Bulkhead penetrations between forward stern void to the aft stern void.

The deckhand told investigators that it was common for the crew to pump water out of the aft stern void on a weekly basis. He also stated that it was not easy to remove the manhole cover to gain access to check for water in the center of the aft stern void, where the bottom was lower than the outboard portions of the void, and that the void was not regularly checked prior to the vessel getting under way.

Analysis

The bottom and sides of the *Ms Nancy C*'s hull were found to be in fair condition after the accident, and thus the hull was not considered a likely entry point for water ingress. There were indications, such as watermarks along the hull and the greater number of deck-drain holes located on the starboard stern bulwark, that the vessel typically operated with a slight list to starboard. The deckhand also noted that the vessel listed to starboard prior to its sinking.

Investigators discovered numerous potential sources of water ingress on the main deck, in the engine room, and in the voids. On the main deck, in addition to the two access covers that were opened just prior to the sinking, a third access cover to the aft voids was found open after the accident. The starboard aft access cover was connected to a chain and not secured by any of its retaining screws, which indicates that it was never permanently secured, and the chain was attached to prevent it from being lost. Other covers were missing the designed number of securing screws, and gasket material was scarred or hardened, preventing it from effectively creating a seal. Furthermore, silicone sealant was used around the covers in an apparent attempt to provide a seal. All of these factors suggest that the covers on the main deck with accesses to the aft voids could not effectively be made watertight.

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In the engine room, the installation of cofferdams fitted with pumps under the shafts indicate that the shaft seals were typically leaking. Although the cofferdams would have contained the water to a confined area in the engine room, a hose carrying the discharge water from the port pump was leaking as it passed through the forward stern void. Therefore, while water was being pumped out of the engine room, this hose would have leaked water into the forward stern void. Around the discharge hose where it penetrated the main deck, sealant had been poorly applied. The sealant application, which had holes, was potentially an additional source of water ingress into the forward stern void.

On the deckhouse along the engine room door sills, poorly installed doubler plates designed to address wastage near the seam between the deckhouse and the main deck created another potential source of water ingress from the main deck into the hull. Gaps between the doubler plates and bulkheads were large enough to have allowed water on deck to enter the vessel. The wastage, which extended into the overhead of the forward stern void, may have been the source of, or contributed to, the flooding of the space and the eventual sinking of the vessel.

Two penetrations found between the forward and aft stern voids rendered the bulkhead between the spaces non-watertight. Thus, water flooding one space would eventually flood the other space once the water level rose above the height of the penetrations. The deckhand stated that the aft stern void was about three quarters full when he first opened the cover, which was a level above the penetrations. Therefore, flooding of the forward stern void would have been ongoing. The flooding of the two stern voids would have increased stern trim and thereby decreased freeboard at the aft part of the vessel.

On the day of the accident, waves as high as 3–4 feet with whitecaps were reported in the waterway where the *Ms Nancy C* was operating. During normal operations, the vessel had a freeboard of about 2 feet. With the wave heights that day, it is likely that waves splashed against the port and starboard sides of the vessel as it was operating within the lake from approximately 0600 until the time of the accident at 1630. Rain and water from the waves that puddled on the main deck could have then entered the voids through the loose access covers or wastage at the aft portion of the deckhouse. Because the voids of the towing vessel were not fitted with any high-water-level alarms, the crew was not warned of the onset of flooding. In addition, the towboat had no fixed bilge system to remove water from the voids. Therefore, to dewater the spaces the crew had to remove the access covers to the voids and run portable pumps through the accesses.

By the time the deckhand realized that the towing vessel was taking on water by the stern, the amount of water entering the vessel had exceeded the capability of the two portable submersible electric pumps he rigged to dewater or mitigate the water ingress threat to the vessel. This quantity of water increased the stern trim and decreased the aft freeboard to a point where water on the main deck was able to freely enter the three open access covers to the stern voids, as well as through several other loose access hatches and poorly fitted doubler plates intended to cover holes created by deckhouse corrosion. As the vessel sank further, water would then have entered the engine room through wastage on the aft side of the deckhouse and over the sills of the open engine room doors.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the flooding and sinking of the towing vessel *Ms Nancy C* was inadequate maintenance of the vessel by Chocktaw Transportation Company, resulting in corrosion and the loss of watertight integrity on the main deck, which allowed uncontrolled water ingress into the vessel's stern voids.

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Vessel Particulars

Vessel	<i>Ms Nancy C</i>
Owner/operator	Choctaw Transportation Company
Port of registry	Dyersburg, Tennessee
Flag	United States
Type	Towing vessel
Year built	1979
Official number	614211
Classification Society	N/A
Construction	Steel
Length	64.5 ft (19.7 m)
Draft	6 ft (1.8 m)
Beam/width	23 ft (7 m)
Gross tonnage	82
Engine power; manufacturer	2 x 800 hp (596 kW); GM 12V-71 marine diesel engines
Persons on board	2

NTSB investigators worked closely with our counterparts from Coast Guard Sector Lower Mississippi River throughout this investigation.

For more details about this accident, visit www.nts.gov and search for NTSB accident ID DCA18FM015.

Issued: March 6, 2019

The NTSB has authority to investigate and establish the probable cause of any major marine casualty or any marine casualty involving both public and nonpublic vessels under Title 49 *United States Code*, Section 1131(b)(1). This report is based on factual information either gathered by NTSB investigators or provided by the Coast Guard from its informal investigation of the accident.

The NTSB does not assign fault or blame for a marine casualty; rather, as specified by NTSB regulation, “[NTSB] investigations are fact-finding proceedings with no formal issues and no adverse parties . . . and are not conducted for the purpose of determining the rights or liabilities of any person.” Title 49 *Code of Federal Regulations*, Section 831.4.

Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by conducting investigations and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report. Title 49 *United States Code*, Section 1154(b).