INTERMEDIATE/SECONDARY **ARTICLE: Underwater Oil Recovery**

During World War II, the U.S. Navy used oil tankers to refuel ships and planes assigned to overseas duty. These large refueling ships were vital to the success of the U.S. Navy fleet. One such ship, the USS Mississinewa, had only a brief stint of action, but it became important again many years later.

In May 1944, the Mississinewa began its tour of duty in the Pacific. It was 553 feet long and weighed 24,425 tons, and was home to a crew of 298 men. In September 1944, the U.S. took control of Japanese-occupied Ulithi, a well-protected lagoon with a series of islands located only 1,300 miles south of Tokyo. The U.S. had a large armada of battleships, aircraft carriers, destroyers and support ships in the area. Ulithi was used as a central supply and repair facility.

In November 1944, the Mississinewa was fully loaded with several types of fuel and lubricating oil needed for the ships and aircraft in the Ulithi lagoon. On the morning of November 20, a manned Japanese torpedo called a Kaiten, the underwater version of a Kamikaze, struck the Mississinewa, causing a massive explosion. Nearby ships rescued over 200 of the sailors and attempted to put out the ensuing fires. Unfortunately, due to the extensive damage, the ship sank into the lagoon.

For the next 57 years, the Mississinewa rested quietly on the bottom of the lagoon, serving as a home to many species of coral, fish, and other marine life. An unknown danger was lurking, however; the tanks of the ship still held almost two million gallons of oil and marine diesel fuel.

An independent team of divers located the wreckage of the Mississinewa 130 feet below the surface in the Ulithi lagoon in April 2001. They discovered that the ship lay upside down in two pieces on the ocean floor. Out of respect for the watery grave of about 50 Mississinewa sailors, the team did not enter the ship. A short time after this dive, a tropical storm hit the area. Oil began leaking from the piping in the ship, threatening the marine life, as well as the island ecosystem.

In August 2001, the U.S. government assembled a team of experts to survey the wreckage and determine the feasibility of stopping the oil leak. The leak was quickly located and successfully repaired. The team surveyed the wreckage, however, and discovered extensive corrosion on the piping. While this leak had caused minimal environmental damage, there was a real possibility of future leaks and greater damage.

By December 2001, another leak had been found and repaired. Anew survey estimated that nearly two million gallons of oil remained on board. A spill of this magnitude would threaten the marine life, including several endangered species, as well as the inhabitants of islands that rely on the fishing industry to sustain their way of life.

After considering a variety of options, the Navy decided that the best course of action was to remove the oil from the Mississinewa as it lay underwater. The oil offload operation began in early 2003. Divers drilled a 3.5-inch hole into the hull of the inverted ship and secured a valve over the hole. A large hose was attached, the valve was opened, and the oil was pumped out of the wreck up to a barge at a rate of 450 gallons per minute. When the accessible oil was pumped out, the valve was removed and the access hole was sealed.

In all, a total of 20 holes were cut into the hull to retrieve oil from the cargo tanks. Two additional holes were used to remove oil from internal tanks. It took four weeks to remove approximately 1.95 million gallons of oil from the 21 tanks, the engine room, pump room, and various piping. At the completion of the $4.5 million recovery project, an estimated 14,000 gallons remained onboard the Mississinewa in inaccessible locations.

Due to an innovative underwater approach, almost two million gallons of oil were recovered and a pristine marine habitat was preserved.

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