THE *ATLANTIC EMPRESS* SINKING—A LARGE SPILL WITHOUT ENVIRONMENTAL DISASTER

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ABSTRACT: *At 1900 hours on July 19, 1979, the 288,000-deadweight-ton (dwt)* Atlantic Empress *and the 207,000-dwt* Aegean Captain *collided in the Caribbean Sea. In the fiery aftermath of the accident, 27 crewmen lost their lives. There was a strong possibility that a total of 3.5 million barrels of crude oil would be spilled; this would have been the largest spill to that time. Nearby islands with their tourist beaches and coral reefs were threatened. And yet, even though the* Atlantic Empress *eventually sank after burning for 14 days, no oil came ashore and no indications of any environmental damage were observed.*

This paper provides a chronicle of the events of the days following the collision, including (1) activation of the Clean Caribbean Cooperative equipment stockpile, (2) airlifting 13 planeloads of firefighting foam, oil transfer gear, dispersants and pollution control equipment, (3) assembling an expert response team with an operation based on Trinidad, (4) providing four single-engine aircraft dispersant-spraying capability, and (5) mounting a major firefighting effort on board the burning ship.

The Atlantic Empress *was the largest ship ever to sink. However, through a coordinated response effort and considerable assistance from natural forces, no harmful pollution resulted.*

Introduction

The purpose of this paper is to describe a disaster at sea with a potential pollution threat of 3.5 million barrels (bbl) of crude—what could have been the largest spill of that time. The incident was a disaster in the fullest sense of the word, a collision of two Very Large Crude Carriers (VLCCs), with both badly damaged and on fire, a loss of 27 lives, and an immediate threat to nearby tourist beaches, coral reefs, and other sensitive areas. It was necessary to set in action a major response of men and equipment. This paper describes this incident and the response to it in a way that should prove useful to those who are engaged in spill contingency planning and who may be responsible for responding to similar situations.

Collision incident

At approximately 1900 hours on July 19, 1979, the *Atlantic Empress* and the *Aegean Captain,* both fully laden, collided in the Caribbean Sea in a position roughly 20 miles (mi) northeast of the island of Tobago (Figure 1). First reports indicated that the *Atlantic Empress,* 288,000 dwt, was carrying 276,000 tons of light crude oil bound for Mobil's Beaumont refinery, had 26 seamen missing and presumed dead, and was drifting, on fire, and surrounded by a large slick. The *Aegean Captain,* 207,000 dwt, was also reportedly seriously damaged, on fire, and had at least one casualty. The total capacity of both ships, 3.5 million bbl of crude oil, could possibly be lost in the immediate future. No additional reconnaissance was possible during the nighttime hours.

Mobil decision to respond

During the early morning hours of July 20, because of Mobil's ownership of the cargo aboard the *Atlantic Empress*, messages describing the situation began to arrive in Mobil's New York Headquarters. Since commuting hours had already begun, it was decided to assemble an emergency meeting of the Pollution Response Team at Headquarters to decide upon a course of action. Mobil decided to respond, although it was in no way responsible for the accident or even for the resultant pollution, but because it was probably in the best position to mount an effective response and because the owners of the *Atlantic Empress* had requested Mobil to respond. A five-man team, consisting of representatives of Corporate Environmental Affairs, Mobil Shipping and Transportation Co., and Public Relations, were on the first available flight to Port of Spain, Trinidad,

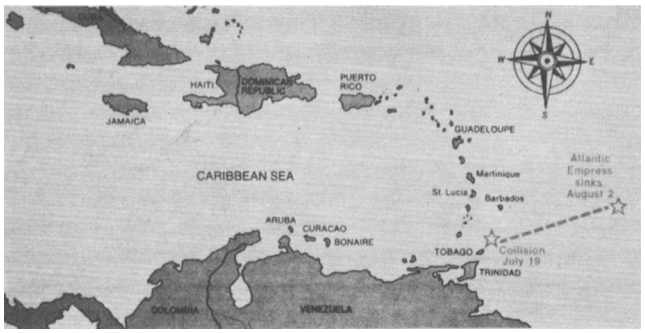

Figure 1. Collision site and surrounding areas.

the capital of the two-island nation of Trinidad and Tobago, scheduled to arrive early that evening. Before departure, contact was made with Coastal Services Inc., the contractor for the Clean Caribbean Cooperative (CCC) oil spill response organization (Alberts, 1979) of which Mobil is a member. Coastal Services, already alerted by a call from the Trinidad National Oil Company (Trintoc), also a CCC member, arranged to have five representatives join the Mobil team on the flight south, and began to ready equipment to be airlifted to the site as required.

Initial situation

Upon arrival in Port of Spain, an emergency meeting was convened at the airport between the arriving Response Team members and representatives of the Government (U.S. Coast Guard (USCG) and Ministry of Energy). Since little new information was available from the accident site, it was decided that first priority should be to arrange for an overflight at dawn the next day. It was also necessary to streamline customs clearance procedures so that supplies could be airlifted into Trinidad and to request clearance for the use of low-toxicity dispersant if required. Government representatives were most helpful in every way and promised to act on our requests as quickly as possible. Contacts were also established with, and offers of assistance obtained from, other CCC member companies with operations in the Republic, including Trintoc, Texaco, and Amoco. Coastal Services staff began to act upon the problems of obtaining vessels, aircraft, and the general logistics of the airlift and pollution response situation.

At first light on July 21, an overflight was made of both vessels and the general collision scene. The *Aegean Captain* (Figure 2) was located at approximately 11°30′N, 60°32′W under tow of the tug *Oceanic*. The fire had been extinguished, damage appeared confined to the starboard bow area, and a light-to-medium thickness slick about 10 mi in length and 2 mi wide was observed. The *Atlantic Empress* (Figure 3) was lying at about 11°30′N, 60°48′W, on fire along the entire starboard side of the main deck and with a list of about 10° to starboard. The slick in this area was also light to medium and covered an area

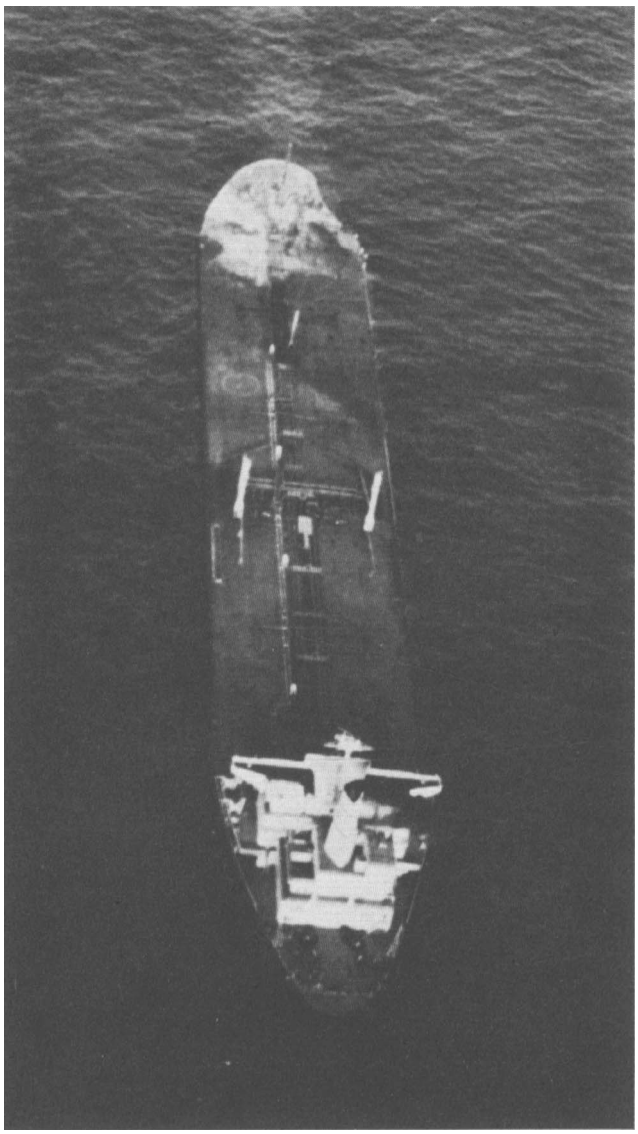

Figure 2. *Aegean Captain* following collision.

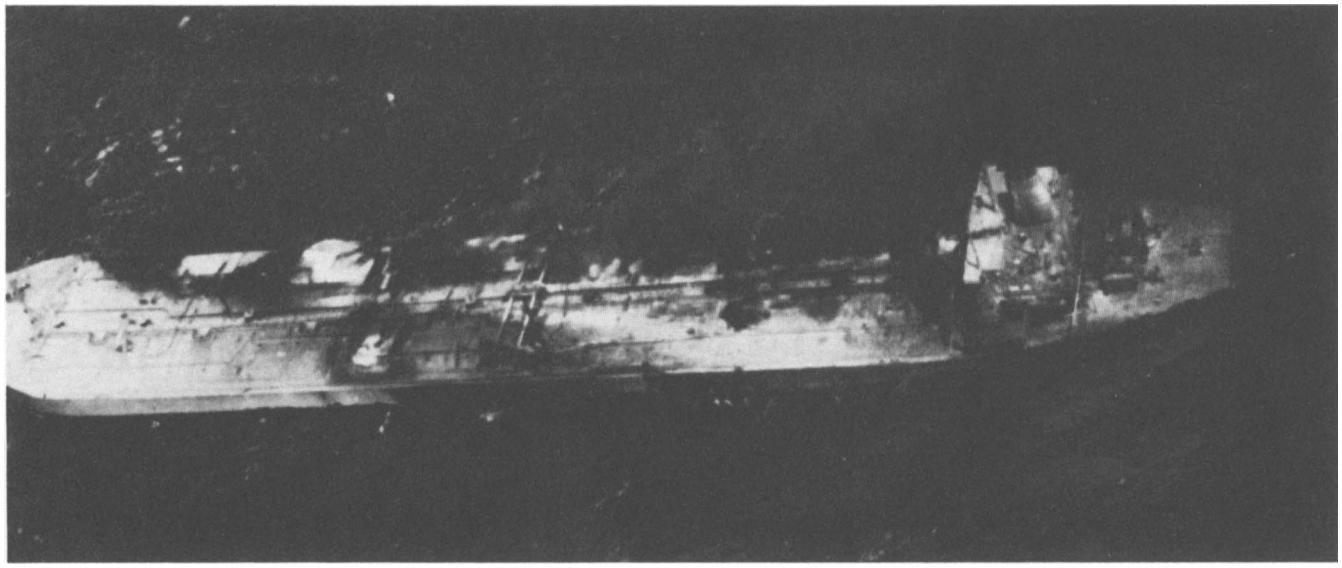

Figure 3. *Atlantic Empress* following collision.

about 2 by 15 mi. The oil was as little as 10 mi from the north coast of Tobago with winds estimated at 15 to 20 knots (kt) from the northeast.

Because it appeared that the slick would affect the tourist beaches and coral reefs of Tobago, it was decided to examine the possibilities of using aerial and vessel-mounted dispersant spraying to stop the oil movement with the wind while it was still in deep water. The logistics of mounting such an attack from the limited airport and dock facilities available, however, were not promising.

Response chronology

Saturday, July 21. Upon return from the initial overflight a meeting was convened, including all interested parties from the U.S. Government, Mobil, Coastal Services Inc., and Texaco. The following decisions were made:

1. Be prepared to spray dispersant on the leading edges of the slicks by first light on the next day, using four single-engine aircraft and as many vessels as could be located with appropriate spotter aircraft for control. Arrange for marine biologist consultants to help with spraying decisions.
2. Instruct the tug *Oceanic* to tow the *Aegean Captain* in a northeast direction.
3. Use the next available tug to try to stop the drift of the *Atlantic Empress*.
4. Bring two planeloads of dispersant from the CCC stockpile.
5. Put a DC-4 spray aircraft on full alert to travel to Trinidad.
6. Start to obtain lightering equipment and vessels. Full cooperation was received from the Government relative to this course of action. Contacts were also made with exploration and production operations of Amoco, who offered the use of their satellite communication equipment.

On the same day (July 21), the representative of the International Tanker Owners Pollution Federation, concerned with shipowner pollution interests, arrived and agreed that our planned course of action was reasonable, with the proviso that an observation overflight be made before the spraying operation was begun.

By this time, with the potential for one of the world's largest spills to date, pressure from members of the press had become very great and it was decided to organize a public relations effort. With the assistance of the Government Ministry of Information, this was done by Mobil and continued throughout the spill incident. At this time, accurate information on current conditions, pollution threat, and plans for action was disseminated.

A second overflight of the *Atlantic Empress,* late in the day on July 21, determined that the fire extended from the Number 2 tank to the after maindeck on the starboard side and across the maindeck. Accommodations were totally gutted. The tugs *Zwarte Zee* and *Smit Lloyd 114* had arrived and were starting to tow the ship in a northerly direction (Figure 4).

On the evening of July 21, representatives of the *Atlantic Empress* owners and her insurers had arrived and generally agreed to the plans for the next day.

Sunday, July 22. At first light, the observation aircraft, with Mobil, Texaco, and ITOPF representatives aboard, flew over the spill site. Surprisingly, the slicks had dissipated significantly, were not immediately threatening land, and new pollution from the two vessels was slight. This dramatic discovery was apparently the result of the light nature of the crude oil spilled, high water temperatures, a lessening of the wind, and a fairly strong current flowing parallel to the Tobago coast toward the west. The severe fire on the *Atlantic Empress* and the sternfirst tow of the *Aegean Captain,* which reduced structural stresses, also had the effect of minimizing additional spillage.

Figure 4. ***Atlantic Empress*—starting to be towed.**

A decision was made to delay any dispersant spraying operations and to monitor slick movement and size two or three times each day for changes. The airlift of dispersants, mechanical cleanup, firefighting and lightering equipment, and the dispatch of lightering vessels from the United States would also continue. Towing of the *Atlantic Empress* would be continued in a northeast direction pending the arrival of more extensive firefighting equipment.

At the request of the salvors, the Government agreed to allow the *Aegean Captain* to be brought to within 10 mi of Tobago for inspection by the USCG and an independent surveyor. The tug *Texaco Pleasance* was engaged to spray the slight trailing slick as this was accomplished. A total of 17 drums was used.

Casualty figures for the two ships were determined to be 25 missing on the *Atlantic Empress* and one missing on the *Aegean Captain*.

Public relations efforts remained very active. The major wire services, major United States and Caribbean newspapers, and numerous radio and television networks from the United States and Europe were given interviews.

Monday, July 23. An inspection was carried out as planned aboard the *Aegean Captain* with its objective being to determine whether the ship could be prepared for safe entry into sheltered Trinidadian waters for offloading. The *Texaco Pleasance* continued to spray a light slick which dissipated quickly.

The overflight of the *Atlantic Empress* found her 115 mi northeast of the eastern tip of Tobago, being towed in that direction by two tugs and listing to starboard with the top of the shear strake awash. The fire was burning as previously. As the ship rolled, the wind blew across the ship, carrying the fire across the deck. Two additional tugs were standing by with one spraying water on the vessel's deck in an attempt to cool it.

The slick from the *Atlantic Empress* (Figure 5) started out near the ship as light brown oil about the width of the vessel and was observable for 50 mi, at which point it was about 0.5 mi wide and just barely visible. The slick did not come closer than 10 mi to any land mass and was not heading toward any land.

Four flights of equipment, including dispersants, spraying equipment, communications packages, sorbents, and firefighting equipment had arrived at Port of Spain (Figure 6) and were being delivered to sites where they might be required. The Mobil tankers *Tasso* and *Vigilant* had been dispatched to stand by for lightering purposes (Figure 7). Media interest continued high this day.

Tuesday, July 24. The observation overflight located the *Atlantic Empress* about 135 mi northeast of Tobago and approximately 85 mi east of Barbados. The fire appeared to be slightly lessened with two tugs now spraying cooling water on the deck. Reports from the escorting tugs indicated that an explosion had occurred aboard the *Atlantic Empress* late the previous night, but no evidence of new damage was seen. Leakage still appeared to be at a low level, with the fire apparently consuming much of the oil. In fact, patches of oil astern of the vessel continued to burn for some time. Pollution was not observed closer than 20 mi from any landfall and movement continued toward open water.

Figure 5. Slick while towing the *Atlantic Empress*.

Figure 6. Cargo plane being offloaded.

Figure 7. Mobil tanker *Tasso*.

Five firefighters boarded the *Atlantic Empress* to begin to formulate a plan of attack. At this point, opinions varied as to the chances of the success of this effort, so it was desirable to obtain as much firsthand information as possible.

Wednesday, July 25. It was not possible to secure an observation aircraft with sufficient range to reach the *Atlantic Empress;* therefore, the assessment of the situation was limited to reports from the nearby tugs. It was reported that another explosion had occurred about midafternoon but that the fire had died down again to earlier levels almost immediately afterwards. It was concluded that some of the explosions of this type were probably fire/gas evolutions and would not cause extensive structural damage. The vessel now listed 10° to starboard with the rail about 5 ft above water level. The amount of escaping oil was still reported to be minimal and mainly coming from the Number 4 starboard tank. Oil continued to burn on the water surface because of the tremendous amount of heat present.

At the Port of Spain airport, and on land, the level of activity increased as plans proceeded to bring in about 100 tons of firefighting equipment to be transferred to the docks and loaded aboard tugs for delivery to the fire scene.

Thursday, July 26. The overflight found the *Atlantic Empress* at 12°10′N and 57°37′W, continuing to be towed in a northeast direction with three tugs lashed alongside now spraying cooling

water. The fire seemed about the same in intensity but appeared farther aft with the heaviest portion just ahead of the accommodation. The slick continued to be long and narrow, following the towing track, and continued to dissipate toward its furthest reaches. It now appeared that the slick originating from the actual collision had completely disappeared due to natural forces. At the airport, the fenders and other lightering equipment had arrived (Figure 8) and the first planeload of firefighting chemicals and equipment arrived in the evening. The tanker *Tasso* arrived to stand by for use as a lightering vessel. A specially equipped DC–4 (Figure 9) for spraying dispersant had arrived but was kept on standby at the airport in case large-scale dispersant operations should become necessary.

Friday, July 27, and Saturday, July 28. In anticipation of a major firefighting effort on July 29, activities centered upon the arrival of additional chemicals and equipment, moving these cargoes to the docks and loading them on tugs (Figure 10). One tug-load departed aboard the *Smit Lloyd 114,* followed by a second load aboard the *Neptune*. Towing of the *Atlantic Empress* and spray cooling continued.

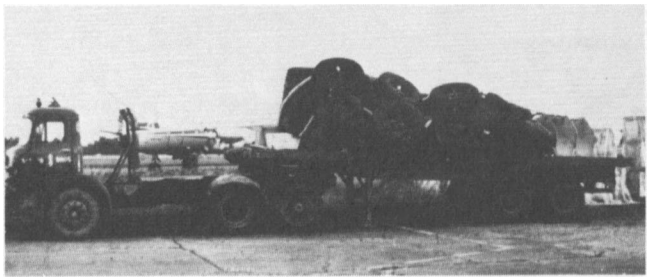

Figure 8. Lightering equipment.

Figure 9. DC–4 spray aircraft.

Figure 10. Firefighting chemicals being loaded on tug.

Sunday, July 29. With the arrival of the required equipment and generally favorable weather conditions, a major firefighting effort was made starting at dawn. With the vessel now located approximately 180 mi east of Barbados, any increased pollution that might result from extinguishing the fire would not threaten any land areas. The firefighters found the engine room of the ship basically intact and took steps to close water intakes, fire doors, and so on. The list was about 7° to starboard. The fire was concentrated mainly in Numbers 4 and 5 starboard tanks.

By afternoon, 41 hoses had been set up to help the tug sprays cool the decks, and the fire was being fought by 16 men using 12 foam guns and lashed nozzles. By evening, the fire in the Number 5 starboard tank was extinguished although the intense fire deep in Number 4 starboard tank still burned. Leaving the cooling hoses in place, the firefighters departed, planning to return the next day to renew their efforts. Ten minutes after the last man left the ship, at 2100 hours, a tremendous explosion shook the ship, sending flames 300 ft into the air. The blaze continued throughout the night.

Monday, July 30. At dawn, the damage aboard the *Atlantic Empress* was found to be extensive. The deck of the ship was blown open for 35 to 70 ft, starting at Number 4 starboard tank and extending to Number 5 port tank. The steel at the edges was curled upward 10 to 15 ft. Much of the firefighting equipment on-board was lost. Later, low-level overflights confirmed the damage and the generally continuing increased level of fire in those tanks now open (Figure 11). Pollution levels continued low as the oil continued to burn both on the water and in the whole aft section of the vessel.

Tuesday, July 31, and Wednesday, August 1. The condition of the ship continued to deteriorate with increasing flames and scattered explosions. It was estimated that Numbers 4 and 5 starboard and center tanks, plus Number 2 port tank, were now afire. Pollution was at a low point with oil burning in the water for 1,200 ft astern. The towing continued, however, and the destination of additional firefighting equipment was changed to Barbados, which would be closer to the burning ship than Trinidad.

Thursday, August 2. The *Tasso* arrived on the scene at 0545 hours and shortly after arrival, a large quantity of oil escaped from the *Atlantic Empress,* starboard side. It appeared that this oil came from the Number 5 starboard tank where the shell plating had given way. The vessel, which had been almost upright, listed to about 10° starboard and shortly thereafter, the tug *Zwarte Zee* let go the remaining towline. Prior to letting go, the vessel was being towed clear of oil burning on the water and the wind was being kept on the port side to limit the spread of the fire. Once the tow had been let go, the vessel stayed within the fire on the water and slowly swung around to present the wind on the starboard side, thus engulfing the vessel in flames. The action of letting go the towline signaled the end of any firefighting or salvage attempts. Throughout the day, the vessel continued to burn fiercely in a pool of oil, and the fire gradually engulfed the entire maindeck. At about 1600 hours, the *Atlantic Empress* listed to about 60° starboard and slowly commenced sinking stern first (Figure 12). By 1630 hours, the vessel had disappeared completely into the flames and smoke. Radar provided evidence that at least part of the vessel remained above water until 2110 hours when it sank. (For a brief period at about 1800 hours, the smoke and flames cleared slightly to reveal the entire forecastle head above water, bow

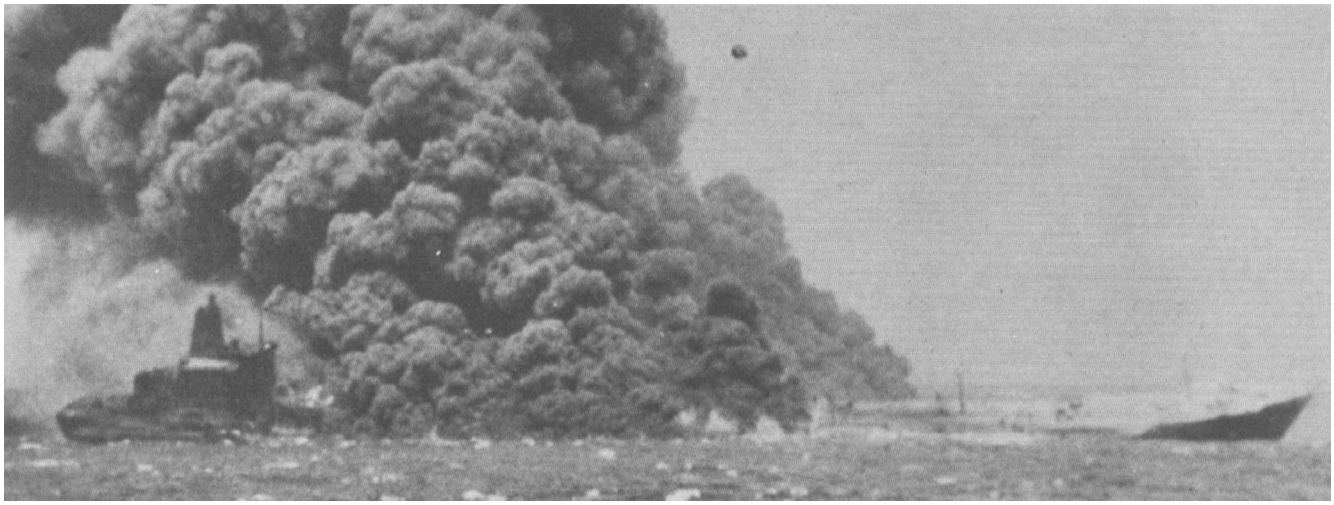

Figure 11. Condition of *Atlantic Empress* on July 30 after explosions.

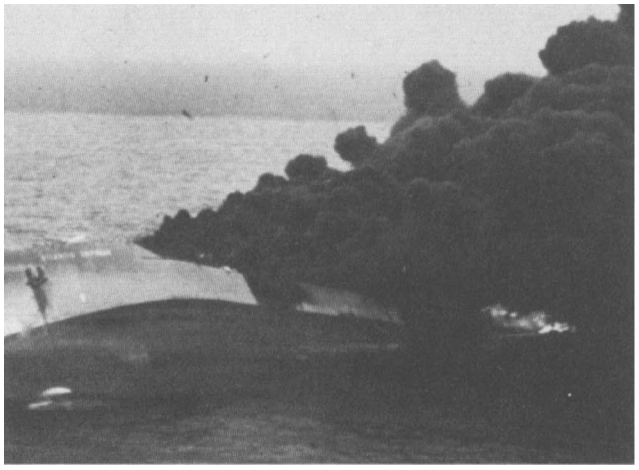

Figure 12. Sinking of *Atlantic Empress*.

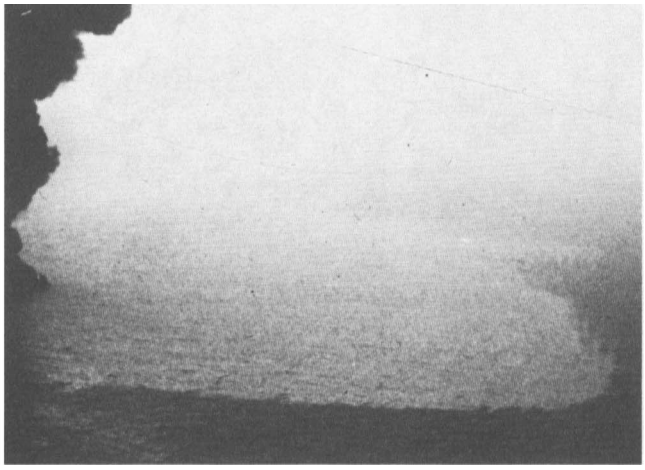

Figure 14. Pollution at time of sinking.

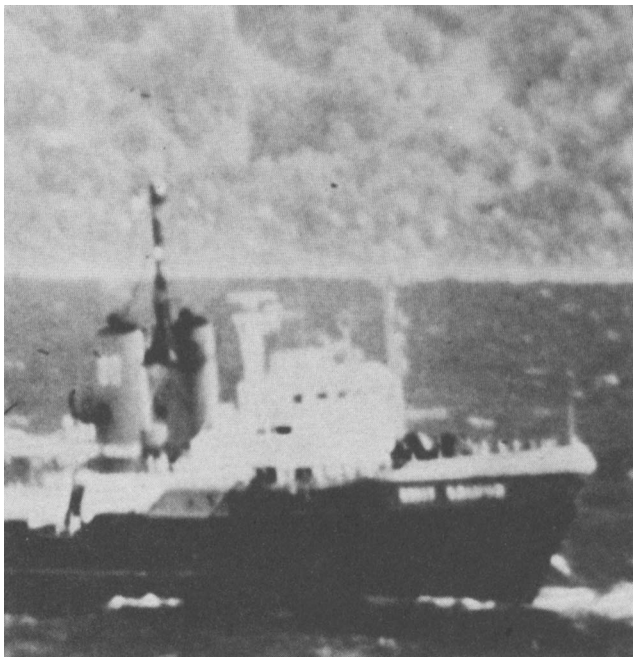

Figure 13. Fire following sinking.

skyward, and completely red hot.) The fire on the water continued to burn until about 2130 hours.

The *Atlantic Empress* sank almost exactly 2 weeks after the original collision in 14,000 ft of water, 260 mi east of Barbados and 350 mi east-northeast of Trinidad. By coincidence, the observation aircraft was overhead when the sinking took place. Flames extended 400 to 500 ft in the air, and the smoke column reached an altitude of 6,000 ft, drifting at least 80 mi to the west (Figure 13). Nearly all of the oil appeared to be burning in the fierce fire storm with little new air pollution (Figure 14) appearing during the time the aircraft could remain at the scene.

Friday, August 3. An early observation flight was scheduled to evaluate the slick at the sinking site and make plans to chart its movement even though it was not felt possible that any landmass could be threatened. No wreckage was visible at the sinking site. Although the slick covered an area approximately 30 by 60 mi, it was almost entirely composed of a sheen with very little brown oil evident. It was decided to leave one tug to follow the main body of the slick from the water and to schedule daily overflights until no traces remained at either the sinking site or of the drifting slick.

Sunday, August 5, to Thursday, August 9. The slick continued to be tracked by sea and air. As predicted by the 7-day life of the previous slicks, the main slick had completely dissipated over this period of time and had not approached any land. At the

sinking site, no new slicks appeared, leading to the probable conclusion that all of the oil on the wreck had been released at the time of the sinking. Meanwhile, the *Aegean Captain* had been successfully towed to Curacao for offloading.

Follow-up actions

Considerable work remained even after the last vestiges of the ship and its cargo had vanished. Unused equipment had to be returned to a central point for reshipment back to its sources, reports had to be filed, accounts had to be tabulated, and recommendations for improvements in future responses had to be made. As a result of our experiences with the *Atlantic Empress,* the CCC stockpile was updated to include additional radios, a small forklift with barrel-lifting attachment, slick-tracking buoys, a weather station, and additional dispersant-spraying equipment. The DC–4 aircraft for dispersant spraying was also contracted on a dedicated basis so that delays in dispatching it from other service would be eliminated.

Arrangements were made for the Landsat satellite to photograph the general area of the pollution incident for a period of several weeks to indicate whether any new oil was appearing. Upon analysis of the photographs, none was found.

Conclusions

The conclusions from this incident show that even an event of disaster proportions can be handled without serious pollution problems. Through a combination of preplanned response, good cooperation from all parties, selection of priorities to minimize pollution, and a lot of help from nature, the sinking of the *Atlantic Empress* did not contaminate any shoreline or significantly impact the environment of the ocean. In addition, lessons were learned that will lead to even better preparation for such events in the future.

References

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