

SHIPWRECKED 50 YEARS AGO

The Lethal Heritage of the SS *Jacob Luckenbach*

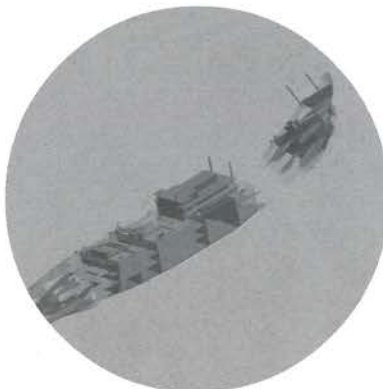
By Mary Jane Schramm

In the pre-dawn hours of July 14, 1953, in a dense fog, the SS *Jacob Luckenbach*, a C-3 cargo vessel en route to Korea from San Francisco, collided with its inbound sister ship, the SS *Hawaiian Pilot*, and sank to the sea floor below. The 469-foot *Luckenbach* was laden with heavy machinery and 475,000 gallons of fuel oil. It sank in just over 170 feet of water, 17 miles west-southwest of the Golden Gate Bridge.

Each captain had seen the other vessel's pip on his radar. The captain of the *Hawaiian Pilot* assumed that the *Jacob Luckenbach* was the San Francisco Lightship, which was in fact five miles further west. Each ship altered course slightly, the *Luckenbach* to port, the *Pilot* to starboard, bringing them closer and closer. By the time the vessels heard each other's fog signals and sighted their lights, it was too late. The shuddering impact convulsed the ships. The *Jacob Luckenbach*, its hull torn open, began to sink. Progressive flooding took it to the seafloor approximately 30 minutes later. The crippled *Hawaiian Pilot*, despite its deeply-holed bow, rescued the *Luckenbach* crew without loss of life and with only minor injuries. Back in San Francisco, the Marine Board of Investigation convened, finding the masters of both vessels negligent in that they did not plot a series of ranges and bearings that would have revealed the speed and course of the other vessel.

For decades the wreck sat, silently leaking its lethal cargo of oil. In 1993, the Gulf of the Farallones National Marine Sanctuary, through its Beach Watch volunteer program, instituted systematic surveys on coastal beaches from Point Año Nuevo to Bodega Head by a highly trained cadre of citizen scientists. Intermittent "mystery spills" tossed up tar balls and dead birds on beaches from Marin County to Monterey and west to the Farallon Islands, usually after major winter storms. Sanctuary staff and volunteers, and personnel from the California Department of Fish and Game Office of Spill Prevention and Response, periodically mounted special patrols and meticulously documented damage to wildlife resources.

On Thanksgiving Day, 2001, Farallones Marine Sanctuary Manager Ed Ueber received a report that birds had begun washing ashore laden with oil, dead or dying, from San Francisco down to Monterey County, centering in San Mateo County. Additional surveys were ordered, and more oil-fouled wildlife was found. The pattern of heavy storms followed by oil spills was once again playing itself out. Officials dubbed the incident "The San Mateo County Mystery Spill" but some Sanctuary staff termed it, "the Thanksgiving Spill that keeps on giving."



Model of the *Luckenbach* shipwrecked on the sea floor.
Source: PCCI, Inc.

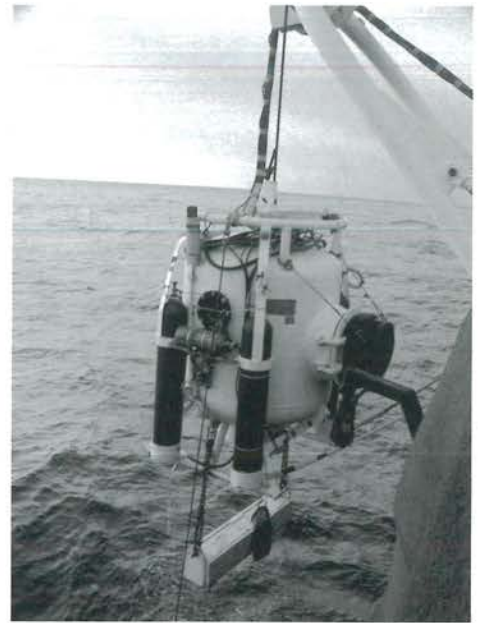
Finding the Culprit

Natural oil seeps were eliminated as a possible source. The Sanctuary is traversed by some of the busiest vessel traffic lanes on the West Coast. The oil could have been illegally discharged from a transiting vessel, or leaked from one of the many shipwrecks that litter the ocean floor. Because this latest incident bore a curious resemblance to spills dating back into the early 1990s, the investi-

gation focused on shipwrecks.

To determine the source and craft a response, a multidisciplinary team of engineers, biologists, chemists, meteorologists and government officials joined together from many agencies. Forming the Unified Command were the U.S. Coast Guard San Francisco Marine Safety Office, the California Department of Fish and Game's Office of Spill Prevention and Response (OSPR), the California State Lands Commission, and several divisions of the National Oceanographic and Atmospheric Administration (NOAA). NOAA's Office of Response and Restoration, Channel Islands, Monterey Bay and Gulf of the Farallones National Marine Sanctuaries, and the National Marine Sanctuary Program were key Command components. Robert Schwemmer, compiler of a database on shipwrecks throughout NOAA's Marine Sanctuary Program, preliminarily identified the *Luckenbach* as the spill source. Two volunteer divers were able to secure oil samples from directly above the wreck, and conveyed the evidence to the authorities.

Mary Jane Schramm, Gulf of the Farallones National Marine Sanctuary/NOAA, was the Sanctuary Logistics Lead and a Wildlife Observer for the lightering and wildlife efforts for the *Jacob Luckenbach* salvage operation.



A team of saturation divers, breathing a special mixture of oxygen and helium to prevent nitrogen narcosis, worked in hot water suits from a dive bell pressurized to 130 feet. They were transported in it at the end of each shift to a sealed, pressurized habitat topside to sleep and eat. These courageous divers, enduring chilling sea temperatures and strong currents, worked tirelessly plugging vents, fixing plates for pumps, and handling the pump and heating equipment. At the end of each month-long tour, they would undergo decompression. Source: Dan Porter

In February 2002, using state of the art gas chromatography analysis, OSPR determined conclusively that the *SS Jacob Luckenbach* oil “fingerprint” matched the oil found on these birds, and several other “mystery” spills that had fouled wildlife and beaches for at least a decade, since Beach Watch began and perhaps longer.

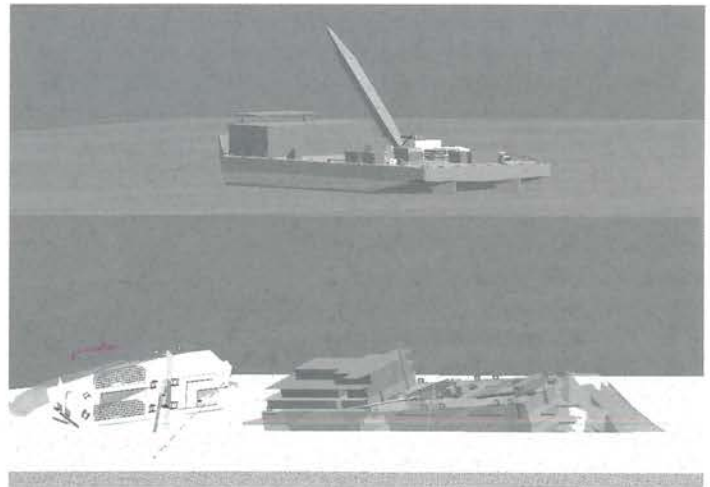
The Plan

The source of oil now confirmed, the agencies were faced not only with developing plans to address the oil removal (lightering) operations, but also coming up with a bankroll. The Luckenbach Steamship Company had been dissolved years earlier. However, for just such situations, the U.S. Coast Guard, in accordance with the Oil Pollution Act, maintains an “OPA” fund, and these funds were made available for lightering operations for the *Jacob Luckenbach*. The project was put out to bid, and awarded to Titan Maritime Industries.

The Gulf of the Farallones is one of the richest marine ecosystems on the planet. Its strong spring winds drive nutrients to the surface, where sunlight triggers a burst of productivity throughout the food web. However, these same winds can also roil up the seas into gut-churning peaks and valleys. The potential for rough seas notwithstanding, lightering work was set to commence in late spring, and end by early summer.

A crack team of experts was assembled, several of whom were veterans of the salvage of the *Ehime Maru*, the Japanese fishing training vessel that sank off Hawaii in February 2001 when a U.S. Navy submarine surfaced beneath it.

Titan Maritime Industries contracted with Global Diving and Salvage for surface and saturation divers and equipment. The engineering firm PCCI provided technical support and computer imagery needed to piece together the pictures of how the wreck lay. Based on diver reports, remotely operated vehicle (ROV) video, old vessel blueprints, and sidescan sonar images, engi-



A graphic depiction of the Luckenbach wreck and the barge operations above. Source: U.S. Coast Guard

neers developed three-dimensional computer simulated images of the wreck and debris field, hull cross-sections and interior compartments. Crowley Maritime supplied the logistics barge that was to become the nexus of field operations.

Heading up the Unified Command was Coast Guard Marine Safety Office Commanding Officer Cdr. Larry Hereth, who held daily briefings and coordinated efforts. The Coast Guard and OSPR conducted regular overflights to search for oil slicks.

Life at Sea: Living on the Barge

In the midnight hours of May 26th, 2002, the 400-foot by 100-foot Crowley Maritime support barge *CMC 450-10* headed out of San Francisco Bay for the wreck site. Seven hours later, six anchors, each weighing 15,000 or 20,000 pounds, were set. The U.S. Coast Guard established a one-mile safety zone



The Crowley Maritime barge CMC 450-10 served as command center and living quarters for the 50 or so men and women involved in the lightering and wildlife observation activities. Equipment and supplies were transferred to the barge, a floating industrial village, via crane. Source: Dan Porter



around the operations site, which was repeatedly violated by curious boaters eager for a closer look. In death, the *Luckenbach* became a celebrity ship.

The Crowley barge was the staging area and logistics platform, a miniature industrial village. It was also habitat to the 50-plus men and women who were the engineers, divers, ROV navigator, crew, and agency personnel living on the barge and working on the project. It was the field Command Center, linked telephonically and electronically to onshore offices and suppliers, to spouses and children. Members of the team would spend frustrating months at sea, the timeline protracted by unanticipated impediments to progress and new problems to solve.

“Unforeseen and Unforecasted Weather”

High seas plagued the project. To ease the strain on the barge’s anchor cables, the tug *Gladiator*, its tow wire linked to the barge, maintained a steady one-knot speed, 24 hours per day, into heavy oncoming swells. On Saturday, June 8th, huge seas hammered the barge. An excerpt from the U.S. Coast Guard “Daily Situation Report” reads:

“The unforeseen and unforecasted weather downturn was marked by strong wind and very rough seas. Beaufort Force 9 was maintained for several hours with steady wind speeds of 45 kts and gusts of 59 kts, were observed on the barge anemometer, while 60 to 70 kts were observed on the tug. Wave heights of 15-17-foot swells with 3-foot wind waves and random total seas of 25 feet were encountered by late afternoon.”



Broken anchor cables. Source: Dan Porter

Despite the tug, a fairlead tore and two of the anchor cables failed. The barge sought the safety of Drake’s Bay, where it hunkered down, unable to enter San Francisco Bay, which had been closed due to extreme sea conditions at the bar, an almost unheard-of occurrence. When the seas subsided, the vessel put into port. Five days later, the repairs completed, Captain Dan Porter steered her back out to resume operations. Meanwhile, NOAA was busy with weather forecasting and estimating oil trajectories in the event of a release.

Lightering Operations

Once at sea, the crew lost no time deploying the ROV. This would become the divers’ “guiding light” in the murky depths where visibility ranged from five to fifteen feet. The ROV video surveillance camera also recorded the divers’ work and probed cargo holds whose contents had destabilized, making access by divers extremely dangerous.

The oil lightering, or offloading, plan was to use 6-inch diameter hoses to siphon the oil up to the barge’s topside collection tank. Surface divers using standard SCUBA equipment found the decks and bulkheads of the forward section warped and torqued. The hull had broken into two pieces, not three as previously thought, the bow still connected at the port side. The wreck was buried to approximately the third deck level on the starboard side, mak-



Captured oil is pumped into the barge’s holding tank pending shipment to Seattle. Source: Dan Porter

ing the deep tanks and double-bottom tanks difficult to access and pump. Removal operations concentrated primarily on #5 and #5A deep tanks.

Instead of encountering oil of a fluid viscosity, the divers found oil that intense pressure, cold, and the passage of 50 years had transformed into the consistency of peanut butter left in the 'fridge too long. The divers at first wielded steam wands to soften the sludge, but these were only partially effective. Next, heat exchangers—electric coils that were “plugged” into the asphalt-like oil—superheated the oil to 270°F, which then had to be allowed to cool down to safe pumping temperatures. The exchangers also set up strange, unpredictable convection currents within the holds and tanks. Bit by bit, by trial, error, perseverance and innovation, the engineers of PCCI and others found the combination of tools and techniques that would ultimately prove successful.

Minor oil leaks occurred even before attempts at pumping had begun. Initially, oil rose in quarter-sized tar balls, with solid brownish cores surrounded by milky halos. As a former Beach Watch volunteer, it was distressing but intriguing to witness the phenomenon. These small burps of oil, if not collected or dissipated, might end up on a seabird or a beach, perhaps eventually on a Beach Watch data sheet. Most exciting was the prospect that this operation, if successful, might render those data sheets far less gruesome reading.

As lightering operations proceeded, other releases occurred. Most formed thin, evanescent sheets of rainbow colors that were quickly dispersed by strong breezes before they could be collected. At one point, a slick 2-1/2 miles long formed. If the consistency permitted, the Oil Spill Response Vessels (OSRVs) standing by would deploy absorbent pads to soak up the oil. Occasionally, solid pancakes of oil a foot in diameter would float up, which the crew retrieved with boathooks and nets.

Rich Wildlife Habitat

The Gulf of the Farallones National Marine Sanctuary is habitat to endangered species such as blue and humpback whales, and marbled murrelets, and it supports the largest breeding seabird population in the contiguous United States. A series of expert wildlife observers rotated out to the barge from OSPR and the Sanctuary. The Farallones Sanctuary observers systematically documented all wildlife around the wreck each half-hour from dawn to dusk.

If a major oil release were to occur, the use of chemical dispersants whose effects on wildlife are not known, would



Endangered blue whales were observed off the barge. Source: Dan Shapiro

have been considered. The presence of endangered species would be a factor in determining dispersant use. Fortunately, the spills were minor and the vexed question of dispersant benefit/risk did not arise.

At greatest risk from oil leaks were the common murre nesting on the nearby Farallon Islands. These penguin-shaped seabirds spend much of their time sitting on or diving below the surface, where they easily become oiled. When the murre chick fledges from its seacliff nest, it and its father will remain together in the area for several weeks. The common murre is the “poster child” of the avian world for human-caused mortality. Decimated in the 1850s by egg poachers anxious to cash in on gold-rich, protein-hungry 49ers, in the 20th Century many thousands of these deep-diving birds drowned in gill nets. When the oil tanker *Puerto Rican* broke up in the mid-1980s it disgorged gouts of crude oil all over Bay Area beaches and wildlife. Murrens again were hardest hit.

The wreck was a wildlife magnet. It had become an artificial reef encrusted with ghostly pale or bright pink sea anemones, corals, tubeworms and barnacles. Hundreds of rockfish swarmed about the wreck, seeking the safety of concealment, finding food. Hungry California sea lions ferreted them out and were constantly seen at the barge. Murrens, cormorants, and gulls appeared most often on the wildlife data sheets. Golden chrysaora jellyfish carpeted the area. Later in the season, humpback and blue whales, even orcas, and occasionally dolphins, visited the barge.

If the wreck was an artificial reef, the barge was an artificial island, a 40,000 sq. ft. haven for exhausted land birds lost in the fog during their southward fall migration. Suddenly finding themselves miles from land, the birds lit on the top deck, helicopter pad and rails, resting until it was time to push on. Many mornings, observers scaled the steps only to find scores of bright beady eyes fixed upon them.

The Outcome

In early October 2002, operations concluded. The Crowley barge returned to San Francisco, then proceeded on to its home port in Seattle with over 100,000 gallons of recovered oil. Perhaps an additional 29,000 gallons remain trapped in the wreck, and it may never be recoverable. It is hoped that over time, the shifting sands of the seafloor bed will form a cap over the remaining tanks and outlets—a shroud on the vanquished freighter.

The total cost of the project was set at \$19 million. The operation, originally slated to last just over two weeks, took nearly five months. Heavy seas were mostly to blame. Barge Captain Dan Porter commented, “Don’t forget, we were almost totally shut down by weather for half the time we were out there. The Gulf is notoriously rough: at nearly 38 degrees north latitude, we were sitting right on the edge of the Roaring Forties. If not for perseverance and a willingness to devise new approaches, this operation could have been a failure.”

The marine ecosystem had suffered, and the winter storms of 2002–2003 still yielded oil and damaged wildlife, but less than in previous similar storms. The threat posed by the sunken freighter has been diminished. The Natural Resources Damage Analysis is now underway. The Gulf of the Farallones National



Common murre father/chick pair in the foreground, barge in the background. Source: Dan Porter

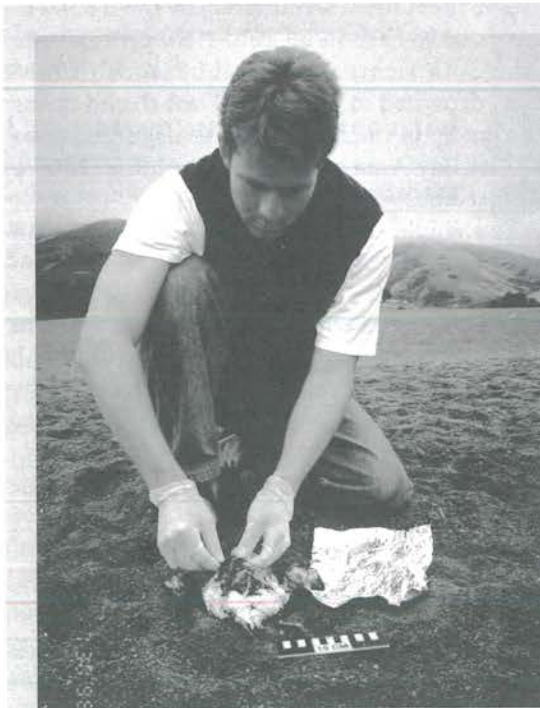


The tug Gladiator tows the barge back into San Francisco Bay. The Gladiator was also the tug that helped ease the anchor strain. Source: Dan Porter

Marine Sanctuary and other agencies are still looking into what other oil pollution events might be attributable to the *Luckenbach*. (The *SS Jacob Luckenbach* is only one of many shipwrecks in the Sanctuary, many of which still hold oil and other hazardous waste inside.)

This was a uniquely challenging, groundbreaking salvage operation. Farallones Marine Sanctuary Manager Ed Ueber noted, “This operation showed NOAA and the other agencies working at full throttle, effectively juggling natural, physical and legislative complexities.”

Only time will tell the ultimate tale of the *Jacob Luckenbach*. But we have moved closer to removing the worst of this threat, and that we must count as a success. □



Systematic “Beach Watch” Surveys

Wearied and fog-dragged, the volunteer clipped oiled feathers from a dead common murre he’d found among the beach wrack that festooned the high tide line. Carefully enfolding the feathers in foil, and tucking the packet into an evidence jar, the Beach Watch volunteer sealed the jar, signed the sealing tape, and trudged back to the car to complete the Chain of Custody paperwork. Routine, maybe even tedious, but this was one of several critical links in the chain of forensic processes that ultimately connected the sunken freighter *SS Jacob Luckenbach* to innumerable seabird mortalities and possibly other “mystery spills” and tarball incidents over the years. Beach Watch is a volunteer program of the Gulf of the Farallones National Marine Sanctuary. For information, call 415/ 561-6625, extension 307.

Source: NOAA