



"CRISIS ON THE COAST"

Federal On Scene Coordinator's Report and Assessment of M/V NEW CARISSA Oil Spill Response

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Volume I



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PREFACE

Within the pages that follow, it is my desire and intention to provide the reader with a very comprehensive overview of the casualty that has been called the “Crisis on the Coast.” The grounding of the M/V NEW CARISSA was unusual in that the ship became grounded twice, the response set a precedent by burning the ship’s oil on board, and extraordinary means, including 69 rounds from a Navy destroyer and a MK-48 torpedo from a nuclear-powered submarine, were required to sink the ship in order to reduce the risk of a major oil spill. This document describes the “macro” issues we encountered and the lessons learned during a complex pollution response that spanned 106 days. This document also includes an in-depth discussion of some of the key issues that arose between the grounding on 4 February 1999 and my determination on 20 May that the substantial threat of a discharge had been mitigated.

Before I describe these issues and the lessons that we learned, I want to acknowledge the many people who were directly engaged in this response, as well as those who provided invaluable support to it. The collaboration of many fine individuals, organizations, businesses and agencies was essential to the success of this endeavor. To all of these fine people I say a heartfelt “Thank-you.”

The Incident Command System (ICS) and the Unified Command (UC) deployed during this crisis was a human, complex adaptive system brought together to effectively deal with a very dynamic and complex casualty. Together the UC rapidly called upon a number of federal, state and local agencies and other stakeholders and contractors to assist with the response. Before the incident ended, 58 different agencies and groups, and about 700 people, would lend their expertise and resources to the response and prove the value of a unified operation.

Two elements essential to the ultimate success of any major response operation are to properly identify the “enemy” and to know the primary objectives. Confronted by the grounding of the M/V NEW CARISSA, we determined that there were essentially three enemies: (1) the severe weather; (2) the 400,000 gallons of fuel on board, of which about 350,000 gallons was “Bunker C”; and (3) the progressive structural deterioration of the vessel. Understanding the enemy enabled the UC to develop appropriate primary objectives, which in turn dictated the overall response strategy and provided the basis for all major decision-making.

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The top priority objective was personnel safety, and I am gratified to report that there were no significant injuries to personnel engaged in the response, only a small number of minor injuries, and no injuries within the local community. The second priority objective was to minimize impacts to the environment, and even though about 70 thousand gallons of oil were spilled during the incident, we succeeded in preventing about 82 percent of the total volume of oil from blackening Oregon's shoreline and wildlife. (Of the approximately 400,000 gallons initially on board, we burned about 200,000 gallons and sunk aboard the bow about 130,000 gallons.) The third priority, to salvage the ship, was thwarted first by the weather and then was superseded by safety and environmental protection objectives.

Upon reflection, I believe that one of the most important and challenging jobs of the Federal On-Scene Coordinator (FOSC) today is that of providing leadership. A critical aspect of leadership is understanding that people are different from one another and knowing how these differences affect communications, learning and decision-making. It is essential that the FOSC optimize the abilities and inclinations of diverse individuals within the response organization in order to accomplish the mission.

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EXECUTIVE SUMMARY OF THE INCIDENT

THE GROUNDING

The M/V NEW CARISSA, a 639-foot bulk freight ship of Panamanian registry, was operated by TMM Co. Ltd., of Tokyo and owned by Green Atlas Shipping S.A. of Panama. On the night of 3 February 1999, there were 26 crew on board. The vessel carried no cargo as it was inbound from Japan to pick up 37 thousand tons of wood chips at Coos Bay, Oregon. However, a strong ocean storm, with winds that reached 39 knots and seas up to 26 feet, was hitting the Central Oregon coast that night. The Coos Bay pilot assigned to join the ship indicated that it shouldn't enter the bay under those conditions and that he would join the ship the next day. As the ship turned away from the bay, the captain ordered the crew to open the four empty holds, and anchored the ship about a mile and a half offshore. During the storm, the ship dragged anchor and drifted towards shore. The crew tried to weigh anchor and move the ship, but during the early morning hours of 4 February, it went hard aground about 150 yards off a stretch of remote, undeveloped sandy beach three miles north of Coos Bay, Oregon.

THE RESPONSE ORGANIZATION

The CG Marine Safety Office (MSO) in Portland, Oregon, received the report of the grounding from CG Group North Bend, Oregon, at 0900 on 4 February. The unit immediately activated its Crisis Action Center and began implementing its Incident Command System (ICS) watch quarter and station bill for a large-scale grounding/potential spill scenario. Personnel were immediately dispatched to form a forward command post in the Coos Bay area. The Captain of the Port at MSO Portland, who is the predesignated Federal On-Scene Coordinator (FOSC), activated a response organization headed by a Unified Command. The Unified Command (UC) was composed of the FOSC, the State Incident Commander or SIC (Mike Szerlog of the Oregon Department of Environmental Quality) and the Responsible Party or RP (William L. Milwee, a contractor for Gallagher Marine Systems, Inc.). The RP contracted Smit Americas, Inc. as salvor. Within hours, various spill and salvage experts were en route, including equipment and crews from the Pacific Strike Team, based in Novato, California, and a Scientific Support Coordinator, Dr. Sharon Christopherson, from the National Oceanic and Atmospheric Administration's Seattle office. Together the UC rapidly called upon a number of federal, state and local agencies, and other stakeholders and contractors to assist with the response. Before the incident ended, 58 different agencies and groups, and approximately 700 people, would lend their expertise and resources to the response and prove the value of a unified operation.

EVACUATION AND ATTEMPT TO REFLOAT

Initially the Unified Command agreed upon three objectives: (1) ensure personnel safety; (2) refloat the vessel; and (3) prevent the discharge of oil. Heavy surf and high winds throughout the next several days made boarding the vessel difficult and dangerous. Nonetheless, the crew of the ship was evacuated for safety reasons and salvage and response personnel boarded the ship via Coast Guard Air Station North Bend helicopters to conduct a structural assessment. Refloating the vessel was the preferred goal, as long as the vessel remained intact. However, the longer the ship remained grounded, the greater the risk of it leaking its load of nearly 400,000 gallons of fuel oil. Since it appeared that there were no salvage vessels in the vicinity of Coos Bay capable of pulling the ship off the sand, the SALVAGE CHIEF, a salvage vessel based in Astoria, Oregon, approximately 170 nautical miles to the north, was placed on alert. The crew began taking on fuel and provisions with the intent of proceeding directly to the scene. However, by the time the SALVAGE CHIEF was ready to depart Astoria, the same winter storm hitting Coos Bay had created hazardous conditions on the bar at Astoria, and its departure was delayed for two days. On 9 February, the SALVAGE CHIEF was on scene to attempt to pull the ship off the beach. But by then winds and waves had driven the M/V NEW CARISSA approximately 600 feet further shoreward, beyond the operational reach of the salvage vessel and its ability to safely anchor near the surf zone.

ENVIRONMENTAL RISKS AND A CHANGE OF OBJECTIVES

Because the ship could not be refloated promptly, the UC reassessed the risks and revised their objectives accordingly. Their revised objectives were to (1) ensure the safety of personnel and the local community; (2) minimize impacts on the environment; and (3) salvage the vessel. The environmental risks were substantial. The grounding was close to the South Slough National Estuarine Reserve within Coos Bay. The bay and the reserve contain highly productive marine life including extensive tide flats and provide habitat for migratory shorebirds, seabirds, and marine mammals. By day five, after incessant pounding in the surf, the ship began to leak oil, and small tarballs began to appear on ocean beaches. Beach cleanup and booming of sensitive habitats and marinas in the estuary were getting underway; oiled bird recovery and rehabilitation operations began as well.

On 10 February, the FOSC, SIC, RP, and salvor determined that trying to pull the damaged ship off during the severe storm forecast to arrive that night would probably cause hull failure. If that happened, the ship would likely release most of its oil product. The UC concluded that waiting to see what would happen to the ship's integrity that night was not an option they would accept. They determined to either try to pull the ship further ashore to facilitate lightering, or to attempt an "in situ" (on board) burn. After consulting with the Regional Response Team about the potential burn, the UC described the options to the resource agencies and environmental representatives aiding in the response. The UC explained that one of these two options would be selected in a few hours, and asked for a consensus recommendation as to which option would better protect the environment. Despite the many uncertainties facing them, the wildlife and habitat

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experts appreciated the necessity to act rather than to do nothing, which would increase the likelihood of a massive spill. They endorsed the UC's decision to burn. It was a tough decision, but as Teddy Roosevelt has been quoted as saying: "In any moment of decision, the best thing you can do is the right thing, the next best thing is the wrong thing, and the worst thing is nothing." This decision was also made easier when the UC determined on February 10 that the ship was already a constructive total loss.

THE IN SITU BURN

The primary concerns of the UC were the safety of the response crews and the safety of the local communities. Although preapproval protocols were identified and followed, as specified in the Northwest Area Contingency Plan, there were many safety concerns that had to be resolved before intentionally igniting over 400,000 gallons of fuel oil, approximately 350,000 gallons of which was "Bunker C." These concerns included air monitoring, detonation, use of burn accelerants, and evacuations of work crews, etc. A Coast Guard naval architect/marine engineer worked with a Navy Explosives Ordnance Disposal (EOD) unit from Whidbey Island, Washington, to identify where to place explosives on board to ignite and sustain the first ever "controlled" burn within the lower 48 states. The first attempt to ignite the oil failed, but the next day, 11 February, the Navy EOD team used 400 pounds of explosives to rupture the fuel tank tops and a locally brewed napalm mixture assisted with ignition and helped sustain the fuel burn. The fire burned for 33 hours and successfully consumed about half of the ship's fuel load. The risk of a major spill had been cut in half. But there were still an estimated 130-155 thousand gallons of fuel on board. Furthermore, due to the pounding surf, the ship had split into two pieces, a bow and a stern section. These sections began to drift apart from each other in heavy waves and wind.

LIGHTERING AND THE FIRST TOW TO SEA

The grounded vessel, broken in two, continued to release oil. The greatest risk came from the bow section, which carried the majority of the remaining oil. On 17 February, the UC decided that the most effective option to minimize and mitigate the further discharge of oil was to tow the bow section to sea and scuttle it. The RP requested that Smit Americas, Inc., the contracted salvor, refloat, tow, and dispose of the bow section where its impacts would be minimized: 248 miles offshore at a depth of about 1600 fathoms and a water temperature of 34 degrees Fahrenheit. This plan was approved by the FOSC and received the concurrence of the Regional Response Team. For the tow, the RP contracted the oceangoing tugboat SEA VICTORY, a 150 foot ocean going tug owned by Crowley Marine Services in Seattle, Washington. Smit Americas ordered an especially long, synthetic, floating towline to be flown in from Holland, with an ETA of 21 February.

The UC decided to remove as much unburned oil as possible while waiting for tow preparations to be completed. Lightering would be difficult due to the high viscosity of the oil (variously described as similar to thick peanut butter, molasses, or soft asphalt) and heavy surf. The main options were to: (1) pump oil into tanks and lift them by

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helicopter to shore; (2) warm the oil and pump it to shore; and (3) use a viscous oil pumping system to move as much oil as possible to shore tanks. Because of time constraints and the lead time required for options one and two, the third option was chosen. The lightering crews endured difficult and dangerous conditions in a heavy storm to pump about 110,000 gallons of liquid off the ship. Unfortunately, nearly all of the volume was found to be seawater. The lightering was secured on 22 February, with most of the 135 thousand gallons still on board, as the bow section was nearly ready for towing to sea.

On 23 February, a helicopter attempted to hook a towline from the tugboat SEA VICTORY to the bow section of the vessel, but high winds and heavy seas precluded hookup for another three days. Finally, on 26 February, the towline was attached and the tug began to pull with 7200 horsepower from its twin engines. Over the next three days, the bow slowly rotated and inched seaward, aided by high tides and scouring of the sand by heavy waves. It finally cleared the shallows on the evening of 1 March, and was towed out to sea. Following the bow was OREGON RESPONDER, a 209-foot oil-skimming vessel owned by the Marine Spill Response Corporation. However, high seas of yet another incoming winter storm forced the skimmer to return to port.

This was an unusually brutal winter storm, one that the weather people referred to as a “bomb,” with 60-knot winds and 30-foot waves. About noon, the storm sheared off the tug’s wind gauge after registering 65 knots (as reported by Captain Bill Lowery), which is a hurricane by the Beaufort wind scale. Then, about 50 miles offshore, after a tow of more than nineteen hours, the operation abruptly ended. At 1718, the 2¼ inch wire rope coming off the drum at the chafing plate parted at the stern of the tug, setting the bow section of the NEW CARISSA adrift. Booming and beach cleanup crews were mobilized as soon as the bow section started to drift shoreward. The bow drifted at up to 7 knots on a north-northeast course until fourteen hours later it went aground again at Waldport, Oregon, at 0700 on 3 March.

THE SECOND GROUNDING AND TOW

Environmental impacts from the second grounding on the ocean beach at Waldport could be severe. The bow grounded at the Governor Patterson Memorial State Park, a locale rich in marine, estuary and shore wildlife. Three species of birds in the area are listed under the Endangered Species Act: the bald eagle, peregrine falcon, and marbled murrelet. The nearby Alsea River estuary is a relatively undeveloped water body rich in clams and other sea life as well as commercial oyster farms. Just 16 miles north is Yaquina Bay, a highly productive estuary that is also home to the state’s largest commercial fishing fleet and the Newport Aquarium, which is dependent upon clean seawater. Before the bow section grounded, shoreline protective measures had been initiated a second time.

Storms once more impeded efforts to remove the bow section from the beach. But on 8 March, SEA VICTORY successfully pulled the bow off the beach, using a 2400-foot

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Navy towline. Accompanied by the tug NATOMA, owned by Sause Bros. Ocean Towing Co. Inc., SEA VICTORY towed the bow out to sea 280 miles by 11 March.

SINKING THE BOW SECTION

On 11 March, in an extraordinary joint effort by the CG and the Navy, the bow section of the M/V NEW CARISSA was successfully sunk 282 nautical miles offshore of Oregon in 1811 fathoms (nearly 11,000 feet) of water. The U. S. Navy EOD Mobile Unit ELEVEN Detachment Northwest worked with a CG naval architect/marine engineer to place aboard the bow section 380 pounds of plastic explosives, strategically located to initiate flooding. The explosives were detonated, followed immediately by 69 rounds from the aft 5" gun of USS DAVID R. RAY (DD 971), a 563-foot Navy destroyer. After about 40 minutes, the vessel had still not completely sunk. With night coming on and a significant storm building, the submarine USS BREMERTON (SSN 698) fired a single MK-48 torpedo, which the Combat Information Center (CIC) operators aboard the destroyer heard screaming toward the wreck. The bow tipped and silently slid beneath the surface. At its final resting place in deep water, at 34 degrees Fahrenheit, the thick oil should have minimal impacts to water quality or sea life. Although a surface oil slick was reported immediately following the sinking, the OSRV OREGON RESPONDER found nothing to skim. The mission was a success. Oregon's Governor John Kitzhaber celebrated the news by proclaiming March 11 to be "two-thirds of the NEW CARISSA at the bottom of the ocean day." Several overflights of the sinking have revealed no signs of oil pollution.

SALVAGING THE STERN SECTION

The stern is still aground at Coos Bay. Although the stern section included one fuel bunker tank, a diesel oil tank, and the engine room, most of its oil had already leaked or burned. However, a substantial threat remained from the oil on board; and thus approximately 20 additional day tanks, reservoir, crankcases, etc., were opened and cleared of oil. The oils were removed from the engine room by skimming, or pumped directly into temporary storage tanks for removal from the vessel. The removal operations were successful in removing approximately 14,000 gallons of an oil mixture, and over 100 cubic yards of debris from the stern section. As the operations began to move from a pollution response to a salvage operation, the Governor emphasized that it was in the public's interest to have the wreck removed from Oregon's beaches entirely. The RP committed to the Governor of Oregon to contract for the total removal of the stern, and to do so using a seaward approach. This methodology will ensure best "net benefit" for this environmentally sensitive and pristine area.

COMMUNICATION AND OUTREACH

The UC issued Decision Memos to document their decisions and consensus at critical points throughout the response. The memos communicated to everyone involved the reasons for the actions taken and how they would help attain the agreed upon objectives. They reduced confusion and established an important record of events. The UC also participated in extensive outreach efforts, including town hall meetings, to inform the

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local communities about the response and to listen to their concerns and ideas. Finally, the extensive use of the internet, on which almost all information was posted, has resulted in more than 1.25 million site hits and significantly reduced incoming questions and inquiries.

THE CAUSE OF THE SPILL AND ITS COSTS

A one-person board of investigation was convened in February to determine the cause of the grounding. The conclusions of that investigation are pending.

The costs of the cleanup has exceeded \$20 million, exclusive of future costs that may ensue from the Natural Resources Damage Assessment process and any third party claims. Federal costs of approximately \$6.3 million to date have initially been covered by the Oil Spill Liability Trust Fund; however, we will seek reimbursement from the responsible party. The responsible party carried environmental liability insurance of approximately \$23 million through Shipowner's Insurance & Guarantee Co. Ltd. of Bermuda; the Pollution and Indemnity (P&I) Club is The Britannia Club. The cost of wreck removal of the stern section, which the Coast Guard and its contractors safely accessed and on which oil removal operations were completed, is the responsibility of the ship's owners and is not subject to reimbursement by the Oil Spill Liability Trust Fund.

PREPAREDNESS AND THE HUMAN FACTOR

The response was built upon a solid foundation of planning and training which preceded the incident. For example, CG personnel, as well as many other response participants, had been trained in ICS in the classroom and in joint exercises with the Maritime Fire and Safety Association, the Columbia River Steamship Operators Association, and the Clean Rivers and Coos Bay Cooperatives. Many of the issues which arose--including in situ burning--had been anticipated and were discussed in general terms in the Northwest Area Contingency Plan (NWACP). The NWACP and Geographic Response Plans (GRPs) also provided general documentation of the resources at risk, and how best to mitigate those risks.

The human element was just as important as preparedness. The cooperation and partnerships of local, state and federal agencies, business leaders, and volunteers made the response a success. The working relationships and mutual respect necessary to perform a complex joint operation had been forged and cultivated in the years and months before this incident. As Vice Commandant VADM J. C. Card once said, "When you need a friend, it is too late to make one."

MAJOR LESSONS LEARNED

This section briefly articulates the primary lessons learned during the NEW CARISSA response. An in-depth discussion of major response issues and some additional lessons learned and recommendations are provided in Volume II. See the Table of Contents for the topics covered.

1. PLANS AND EXERCISES ARE ESSENTIAL
2. CRITICALITIES OF COMMUNICATIONS
3. THE INCIDENT COMMAND SYSTEM WORKS WELL
4. U.S. SALVAGE CAPABILITY NEEDS TO BE STRENGTHENED
5. BE CLEAR ON WHEN POLLUTION RESPONSE/COST RECOVERY ENDS
6. IN-SITU BURN AND SINKING ARE EFFECTIVE RESPONSE ACTIONS

If the three most important aspects of real estate are, “location, location, location” then it’s just as true that the three most important aspects of a major pollution response are “communication, communication, communication!” It is the common thread that runs through the first three lessons listed above. All six of the major lessons above will be entered into the computerized Coast Guard “lessons learned” database.

1. PLANS AND EXERCISES ARE ESSENTIAL

The Area Contingency Plans and Geographic Response Plans provide an essential foundation for a successful response. But it is important to become familiar with them before an incident, and their greatest value is realized by exercising them in local communities, so that the learning is shared with those with whom we will work in a real incident. These exercises should engage not only local, state, and federal agencies with responsibility for pollution response and emergency management, but also leaders in the maritime industry and environmental community. The lines of communication, mutual respect and understanding that develop during exercises help to forge professional relationships and friendships that are invaluable during a real event. Exercises are also ideal “laboratories” for learning how to work within the Incident Command System (ICS).

Our readiness to respond to the NEW CARISSA grounding was significantly aided by exercises we held within two years prior to this incident. One was a tabletop oil spill exercise in Newport, OR--only 17 miles North of NEW CARISSA’s second grounding. Additional exercises focused on dispersant use, including required air monitoring, and in-situ burning. All of these exercises had the added benefit of providing training in the Incident Command System (ICS). I recommend that future Area PREP exercises focus on appropriate integration of salvage operations into the ICS and into the Unified Command decision-making process.

2. THE CRITICALITIES OF COMMUNICATION

Communications can make or break every aspect of a response. Communication was one of the most important elements of the success of the NEW CARISSA response--it pervaded every aspect of planning and operations and helped shape public perceptions about the response and the Coast Guard. Some of the most significant lessons learned are the following:

Focus on making the right decision and making it for the right reason.

Be forthright: tell the bad news as well as the good news, and avoid speculation.

Document the most important decisions of the FOSC/Unified Command in memos and make the memos public - immediately.

Establish a Joint Information Center immediately and give the media 24-hour access to current information and an equipped facility in which to work.

Establish a high-capacity web site early and post nearly every major document related to the incident, including decision memos, photos, pollution reports, and press releases.

Finally, we need to increase the Coast Guard's radio communications capacity so that every MSO has access to sufficient mobile repeaters and portable VHF/UHF equipment--and highly trained staff to install and operate them - to guarantee reliable communications.

3. THE INCIDENT COMMAND SYSTEM WORKS WELL

The Incident Command System (ICS) and the related Unified Command (UC) worked extremely well. Ideally, participants in a response should have prior training in ICS or at a minimum receive some orientation to ICS upon their arrival at the incident in order to help them function most effectively within the response organization. The Salvage Group needs to work within the Operations Section, as laid out in the Oil Spill Field Operations Guide-- rather than "outside the box." It does not work well for the Salvage Group to report directly to the Responsible Party representative, for example. Coast Guard personnel should be assigned to the Salvage Group or be in the reporting chain between the Salvage Group and the UC, to ensure that salvage is integrated into the pollution response and is an effective tool of the joint operation. In addition, the FOSC should initiate an independent Coast Guard onboard survey of the vessel, its fuel and any hazardous cargo as soon as it is practicable and safe to do so.

4. U.S. SALVAGE CAPABILITY NEEDS TO BE STRENGTHENED

At the Propeller Club National Convention last year, the U.S. Coast Guard's Assistant Commandant for Marine Safety and Environmental Protection stated that it is widely accepted, in both government and industry, that about 80 percent of all vessel casualties and the resulting pollution are related to the human element. And each year, the cumulative costs of fatalities, injuries, oil spills and other marine-related losses are more than \$1.5 billion--by conservative estimates.

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Although the investigation of the grounding of the M/V NEW CARISSA is not yet complete, it is likely that human error was a major contributing factor in this casualty. It is an understatement to say that this spill greatly heightened interest in prevention, protection, and best response. In the spirit of that interest, we must focus more on salvage. It is often a significant part of a response and also of prevention--in terms of preventing a bad situation from becoming worse. Optimization of response preparedness is essential to minimize impacts to life, property and the environment.

In an atmosphere of declining resources and capability, we must find ways to reach our goals more effectively and efficiently. We must also remember that we are essentially an island nation with over 47,000 miles of shoreline (twice the circumference of the earth); that approximately 85 percent of all Americans live within 100 miles of these shorelines, that approximately 95 percent of the world's consumers live outside the U.S. and that 90 percent of all international commerce enters the United States by vessel. One can see from these facts that our nation's ports and waterways are the backbone of the U.S. intermodal transportation system. This system must include a national salvage plan.

We need a salvage plan more capable than that demonstrated during the initial stages of the NEW CARISSA casualty. It was my belief on 4 February, 1999 and it remains my belief today, that adequate and timely salvage capability would have significantly mitigated this "crisis on the coast." There are currently only two salvage vessels on the Pacific coast capable of refloating a large grounded ship, and neither was readily available to respond in this case.

I have two recommendations to strengthen U.S. salvage capability. First, I recommend that Commandant (G-MOR) meet with national leaders in the salvage industry to address the organizational, functional, contractual and communications issues related to spill responses, and to evaluate the adequacy of salvage assets for rapid response deployment to the scene of stranded vessels threatening to discharge a hazardous substance into the waters of the United States.

Second, I recommend that G-MOR, through our public/private partnership initiative, identify and implement a funding system which would provide rapid salvage vessel response coverage to protect the environmentally rich and sensitive coast of the United States.

5. BE CLEAR ON WHEN POLLUTION RESPONSE/COST RECOVERY ENDS

It is critical that the FOSC articulate to the State and the Responsible Party the distinction between pollution response on a grounded vessel and the removal of a wreck after the substantial threat of discharge has been mitigated. Wreck removal is not an allowable cost and therefore are not reimbursable by the Oil Spill Liability Trust Fund.

6. IN-SITU BURN AND SINKING ARE EFFECTIVE RESPONSE ACTIONS

The NEW CARISSA incident proved that in-situ burning is a powerful tool that can substantially reduce the risk of a major oil spill, and that oil can be effectively burned onboard a vessel with negligible environmental or human health impacts. Approximately half of the nearly 400,000 gallons of oil on board NEW CARISSA was burned, thus halving the risk of a major oil spill.

Sinking a ship laden with oil in deep, cold waters where it should have negligible environmental impacts is also an effective, albeit challenging means to reduce the risk of a spill in highly productive shallow marine waters. Navy assets were essential to both of these operations, and greatly appreciated.