

After various inspections, the Corps decided that both sections of the ship could be made sufficiently water-tight to insure flotation and towing to deep water. Heavy seas hindered salvage operations for five days, but on April 4th the Navy towed the bow section to sea and sank it in 600 fathoms of water about 8 miles north-northwest off El Morro.

The Murphy Pacific Salvage Co. finished the dewatering, patching, and floating of the stern on April 9th. The following afternoon the stern was sunk in 600 fathoms of water, some 9.2 miles north-northwest off El Morro. The stern lies about 2½ miles northwest of the sunken bow section.

After 38 days of around the clock work, the task was completed. Estimated cost of removing the crude oil, raising the two halves, and disposing them at sea was about \$700,000.00.

C. Activities of the Federal Water Pollution Control Administration

The members of the Federal Water Pollution Control Administration ad hoc disaster team worked mainly as technical advisors to the Department of Public Works, the U. S. Coast Guard, other federal and commonwealth agencies, and commercial establishments which asked for technical advice. An effort was made to try to coordinate the many diverse agencies which were concerned with pollution problem.

The FWPCA personnel maintained daily contact with the Coast Guard, Public Works, and other federal and commonwealth agencies. A FWPCA representative attended product demonstrations of the representatives from many chemical companies. Most contaminated beaches were inspected more than once to note pollution effects and changes. Aerial reconnaissance surveys were conducted with the Coast Guard and Department of Public Works.

The stern section was visited several times to inspect the pumping operations and evaluate the success of this activity.

The FWPCA representatives questioned the effectiveness of the detergents and warned the Department of Public Works about their harmful effect on marine life. They also inspected the beaches where detergents had caused quicksand condition along the shoreline.

2. ACTIVITY OF THE COMMONWEALTH AGENCIES

The task of cleaning and restoring the coastal waters and the beaches to their original condition was assigned to the Department of Public Works. A special unit was organized within the Department to perform these activities. The unit was designated as the Petroleum Emergency Office. The Office was staffed with specialized personnel recruited from the different bureaus of the Department. The principal objectives of this Office were: (1) the protection of the uncontaminated areas, (2) the elimination of the petroleum crude floating on the water, (3) the cleaning of the contaminated beaches, and (4) the removal of any precipitated crude from the bottom of the sea in bathing areas.

The first function of the Office was to prepare a comprehensive plan to cope with the problem. The coastal waters and beaches were divided into several sections according to their order of priorities and methods to treat each of these sections were carefully analyzed. Various aerial reconnaissance surveys were necessary to understand the magnitude of the problem and the trend of the petroleum movement. The plan was named "Operation Clean Up" and was executed immediately.

The next activity of the Office was to determine the most effective method to remove the petroleum from the water and the beaches. Since it was desirable to test all the available means either in the laboratory or in the field, both mechanical and chemical means were tested. Mechanical methods were tested in limited areas in the field, while chemical methods were tested in the laboratory for (1) solubility, (2) emulsion capacity, (3) adsorption capacity, (4) toxicity, (5) precipitation, (6) floating ability, (7) ease of recovery, (8) degree of activity, (9) emulsion stability, and (10) agglutination. The products were divided into four classes which were: (1) adsorbents, (2) solvents, (3) emulsifiers, and (4) combinations of the previous three. After most of the readily available products had been tested, a decision was reached to use only non-toxic adsorbents and mechanical methods to directly recover the petroleum crude from the water and beaches. However, this decision did not preclude the future use of any other products found more effective than the ones so far tested. New products continued to be tested in our laboratory for their corresponding evaluation.