

San Juan harbor. They also cooperated with the agencies involved in the accident by allowing the use of their port facilities.

2. *Department of Justice.*—The Department of Justice initiated an investigation of the accident to determine who is liable for the expenses incurred by the federal and commonwealth agencies. A suit was filed in the San Juan Federal Court against the owners and insurers of the *Ocean Eagle*.

3. *Department of Agriculture.*—The fish and wild Life Division set up a refuse for a colony of 150 pelicans that were found in the swamps to the southeast of the San Juan Bay. A lanolin base detergent was used to clean the birds. Of the 150, 80 were sacrificed due to their poor conditions and 70 were treated and sent to the Humane Society. Of these only eleven survived. Also a survey of the pelican colony in the bay was conducted. The survey revealed that there were about 500 pelicans before the accident, but only 100 remained alive after the accident.

The Division is also evaluating the effects of the detergents on marine life, but the results of this study is not yet available. At present, there is no fishing at the San Juan Bay, about 50 fishermen were affected by the disaster. Their boats and equipment were also ruined. These persons were provided with economic aid to compensate the damage of their equipment.

4. *University of Puerto Rico.*—The Department of Marine Sciences sent its staff of scientists to advise the commonwealth agencies. They set up a mobile laboratory of marine biology near the Condado beach area to conduct toxicity tests on the marine life. The *SS Carite*, the Oceanographic vessel of the U. P. R., was loaned to the Department of Public Works for the application of adsorbents in deep seas. A report of their activities was prepared and submitted to the Department of Public Works.

5. *Puerto Rico Economic Development Administration.*—The Department of Tourism kept the Department of Public Works informed of the beaches affected by the petroleum near the hotels. They also instructed the hotel to follow the procedures established by the Department of Public Works to deal with the problem.

6. *Parks and Recreation Administration.*—The Administration assisted in the cleaning of the beaches under their jurisdiction and cooperated informing the Department of Public Works of those beaches affected by the slicks.

7. *Department of Health.*—The Public Welfare Division provided aid with funds from the emergency budget to all those fishermen affected by the petroleum.

Conclusions and Recommendations

The accident of the *Ocean Eagle* seemed at first glance as a worse disaster than the accident of the *Torrey Canyon* off the coast of England last year. Although this vessel was carrying less cargo than the *Torrey Canyon*, its proximity to the coast and the fast split of the hull combined with the unfavorable weather conditions did not allow sufficient time for analyzing the problem. Fortunately, the final position of the bow to the west of the entrance channel considerably improved the situation.

The rapid success of the salvaging and cleaning operations, just one month after the occurrence of the accident, can be attributed to the following factors: (1) the quick mobilization and close administrative coordination exercised by the Federal and Commonwealth agencies, (2) the fast scientific appraisal of the problem, (3) the unique locations of the bow and stern confining most of the petroleum spilled inside the harbor, and (4) the nature of the composition of the petroleum crude.

The petroleum crude spilled by the *Ocean Eagle* had characteristics very different from the Kuwait oil crude spilled by the *Torrey Canyon*. The cargo of the *Ocean Eagle* consisted mostly of a paraffinic-bituminous base petroleum crude with a volatile fraction of only 32 percent. After 24 hours of exposure to the tropical sun light, the volatile portion had evaporated. This characteristic combined with the proximity of the hull to the shores ruled out the possibility of igniting the petroleum.

The laboratory tests and the field experiences eliminated the use of detergents before the marine life was affected to a great extent. Adsorbents proved to be the most effective method of dealing with the problem under the present circum-