

observing the cleanup operations, and making initial tests of the effectiveness of the commercial product, Eko-Perl. The remainder of the week, March 13-15, was spent working with Obras Publicas personnel aboard the R. V. Carite: first making field tests of Eko-Perl and later treating petroleum patches offshore of the harbor with Eko-Perl.

The following is a description of the distribution of the spilled petroleum as I observed it, together with a consideration of the factors affecting the distribution:

On the afternoon of March 4, the day following the break-up of the tanker *Ocean Eagle*, I first surveyed from the air the distribution of the spilled oil. A three-part pattern which was to continue development during the following two weeks was already apparent at that time.

Part of the oil spilled from the broken tanker at the entrance of San Juan Harbor was working its way into the harbor. During the following weeks a great deal of petroleum found its way into the harbor. Although it reached all parts of the harbor to some extent, including the Cane de San Antonio to the northeast, it was chiefly driven to the southwest by the prevailing northeasterly winds which caused large amounts of petroleum to accumulate along the shore at, and to the north and west of, Catano.

Another portion of the petroleum viewed from the air on March 4 had worked eastward along the coast. This material was transported by the alongshore currents resulting from the breaking of large swells generated by a storm in the Atlantic Ocean northwest of Puerto Rico. It is characteristic of such currents that their effects are limited to the zone of breaking waves and although the petroleum, which moved along shore to the east, considerably disturbed the tourist hotels along this shore, no great amounts of oil were transported by this means. During the next several days following the accident, the storm swells approaching from the northwest gradually diminished and the eastward transport of the petroleum ceased. During an observation flight on March 11, I saw very little oil east of Boca de Cangrejos and most of that which remained had been washed ashore.

The third portion of the escaped petroleum which was visible from the air on the afternoon of March 4 had worked offshore and somewhat to the west. A plume extended north from the harbor and another of Ensenada de Boca Vieja just east of Punta Salinas. These patterns presumably resulted from the tidal flushing of the harbor together with westward transport by the local northeast winds. This portion of the spilled oil posed a far greater threat than that which contaminated the already-polluted harbor or that small amount which had moved alongshore to the east. A week later, on March 11, I found that the plume off the harbor mouth extended several miles offshore, while long thin fingers of the oil spread back southwesterly from the plume, extending shoreward as far west as Punta Salinas. These streaks were apparently driven by the northeasterly winds.

OIL SPILL STUDY BY JOHN ZEIGLER

My participation in the oil spill study was primarily advisory. I attended meetings at Obras Publicas and expressed my opinion when it was asked for. I also talked about all phases of the operation with Pedro Gelabert and Sr. Cruz Pérez.

Of a specific nature I looked for some way to obtain a cheap scavenging material, particularly bagasse. The first experiments using bagasse by Mr. Scott failed because he used wet bagasse. We dried some and found that it would collect oil if placed directly on it but that it also collected water. I spoke with Dr. Goldberg about treatment of bagasse to make it hydrophobic and he said it should be easy to do. At any rate we did not press the use of bagasse because it was decided to use ecoverl. I continue to believe bagasse would work and be cheaper. I also was interested in the use of floating booms to keep oil from spreading onto specific areas. The booms I saw being used were working remarkably well.

Out of this disaster has grown my conviction that a major study of the longshore currents around Puerto Rico would be directly beneficial to the Commonwealth. The oil moved in directions along the coast opposite to the offshore prevailing set of the currents. These longshore currents move any kind of pollutant which gets in them.