

Leaching ability

When the three oil-soaked products were placed in the sun on white paper or on sand, it was seen that oil had leached from all three absorbants. On an approximate volume basis it seemed that Minstron had lost the most oil while Ekoperl and Pevatone each lost about equal smaller amounts.

Pevatone seemed to me to be potentially less effective than Ekoperl because most of the oil taken up adhered to the outside of the large particles allowing oil to come off readily when contact was made with any other material. This would, perhaps, make it more difficult to gather the Pevatone and would probably result in some recontamination with oil on sand, rocks, boats, etc.

Field tests were also made on the extent of leaching due to the action of waves on the beach. Both Pevatone and Ekoperl were tested and while oil leached off of both products, comparative results proved inconclusive.

Toxicity Studies of Absorbants

Compare to the detergents, all absorbants tested were considerably less toxic. Since Ekoperl appeared to be the least toxic absorbant, and also the most effective in absorbing oil, it was the product recommended for use.

FIELD OBSERVATIONS OF FISHES

On March 12, 9 days after the grounding of the Ocean Eagle, a two hour survey by small boat was made of part of San Juan Bay. The area covered extended along the shoreline from the San Antonio Channel south around Isla Grande to the J. F. Kennedy bridge; then west and north to Punta Cataño. During this period the following fishes were found dead:

- 15 *Opisthonema oglinum*—arenque, sardina
- 7 *Trichiurus lepturus*—machete
- 6 *Gobioides braussonneti*—gobido
- 2 *Centenraulis* sp.—anchoa
- 1 *Sphyræna barracuda*—picua brava
- 1 *Polydactylus virginicus*—barbudo
- 1 *Mugil curema*—jarea
- 1 *Chloroscombrus chrysurus*—casabe

In addition, during this same period, the following fish were observed in a state of stress: *Sardinella anchovia*—sardina, cascarua *Strongylura* sp.—agujon.

A few small schools of live *Opisthonema oglinum* were observed. Several fish in the school appeared to show evidence of lesions on the dorsum resulting in patches where the tissue underlying the skin could be seen. There were a greater number of fish of this species seen under the puente G. Esteves in the San Antonio Channel. The water here was relatively clear compared to the rest of San Juan Bay; probably because there is a good exchange of clearer water coming in from the NE via de Bañeario Condado.

2. On March 22, 19 days after the grounding of the Ocean Eagle I observed very large schools of *Opisthonema oglinum* among the docks of the Club Nautico. The number of fish present was estimated to have been over 100,000. Based on photographs and sampling of the population, it is estimated that there was at least a 95% incidence of fish with abnormal lesions. The fish were in varying stages of stress, with many of them showing abnormal swimming behavior, loss of balance, and death. Examination of these fishes showed that some of the lesions had progressed to such an extent that the vertebrae, ribs or viscera were exposed. The internal anatomy revealed a general deterioration of tissue. A small percent (less than 5) of those fish infected, showed some signs of healing and regeneration of tissue around the lesions.

At the present time, the causative agent responsible for these gross lesions is not known. Possibilities being considered at present are:

1. Effect by a toxic component of oil from the Ocean Eagle.
2. Effect by a toxic component of one or more detergents used in clean-up operations during the Ocean Eagle disaster.
3. Effect caused by a fungus or bacteria. It is possible that a component from either the oil or one or more detergents caused a disruption of natural protective skin mucus lining or scales, thereby allowing infection to spread to the underlying tissues. This problem is presently being examined. This fish is of particular concern because it is the prime bait fish used by fishermen in the area.
3. The ten species of fish observed to have been either killed or adversely affected, probably due to the Ocean Eagle disaster, undoubtedly represent only a fraction of the total fish that ultimately were damaged. Of these ten species, nine are of direct commercial importance.