

A study to evaluate the status of petroleum hydrocarbon (PHC) pollution of Kingston Harbour, Jamaica, was carried out from October 1980 to September 1982, during which monthly surveys were conducted at five beach and seven aquatic stations. The occurrence and physical characteristics of different types of PHC residues - slicks and sheens, dissolved and/or dispersed (D/D) oil, and pelagic and beach tar were recorded. These residues were collected according to internationally recommended (I.O.C.)* techniques, extracted in hexane and analysed by spectrofluorometry. The fluorescence scans of the field samples of PHC residues were compared with those of the standard Venezuelan crude (V.C.) and its refined products (marine and automotive diesel oil, refined and regular gasoline, kerosene and heavy fuel oil). Artificial weathering of the crude and refined oils and field-collected pelagic and beach tars was done for 45 days, samples being collected periodically and analyzed by fluorometry for the purpose of aging the field samples.

A total of 23 spills were observed during the 18 monthly surveys; 52.2% of these were sheens and 47.8% slicks. The fluorescence scans revealed the presence of mainly refined oils in the sheens and crude oil in the slicks. The concentrations of D/D oil, the most predominant residue, ranged from 0 to $127.5 \mu\text{g l}^{-1}$ (mean $15.21 \mu\text{g l}^{-1}$) with diesel oil and gasoline identified as the main oil types.

Pelagic tar levels ranged from 0 to 0.362 mg m^{-2} (mean 0.009 mg m^{-2}), the oil found to be mainly weathered crude oil. The beach tar levels ranged from 0 to 14.5 g m^{-1} (mean 1.0 g m^{-1}), with some of the tar, especially samples collected from around the coastline, not being identified.

The biota (Isognomon alatus, Tethys sp., Ecteinascidia sp., Brachidontes sp.), collected from harbour sites with different pollution levels, were Soxhlet extracted and analysed quantitatively by fluorometry and qualitatively by gas-chromatography. The highest level of fossil contamination was found in animals from the more polluted areas. Mangroves (Rhizophora mangle) from a sheltered lagoon impacted by crude oil did not

recover, while those trees in the mangrove channel showed no adverse effects.

There was a direct relationship between the surface slicks and D/D oil due to the wind action in the harbour. The distribution patterns of PHC residues in Kingston Harbour revealed that spills and D/D oil residues were concentrated in the Middle Harbour region, the main sources of the pollutant identified as being from the Esso oil refinery, other industrial and urban outfalls and discharges from ships and tankers in port. Pelagic tar had highest levels in the Outer Harbour suggesting a source from the harbour approaches. Beach tar levels were highest on beaches with onshore winds.

The ecological impact of this oil pollution and the means of its regulation are discussed.