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## **ABSTRACT**

Cleanup of Erika oil spill has generated huge amounts of waste presently being treated on the site of Bossènes in Donges. It is commonly estimated that the waste contains about two hundred thousand tons of sediment, mainly sand and gravels. Cleanup operations following the Amoco Cadiz wreck also gave way to removal of considerable amounts of sediments on the northern coast of Brittany. At this time, oiled sediments removed from beaches were buried, after treatment, for the best in former quarries, for the worst on tidal marshes all along the coast. Sterilisation of natural environments was added to pollution. In the present case, sediments have been integrated the waste disposal program and are currently being treated on an ad hoc site. This solution, however, cannot be seen as an improvement. Indeed, the main problem linked to sediment removal is induced erosion that results from the lowering of the level of beaches treated this way. In this case, as in the previous ones as well, it's almost impossible to determine the origin of dumped sediments since no reliable quantification occurred on sites where removal was conducted. For the same reason, in the future, it will be difficult to assess if erosion occurring on any particular beach is due to cleanup or not. Nevertheless, in the years following the Amoco and Tanio spills, kilometers of rip-raps and defense walls were built up on beaches treated this way. Therefore, sediment removal has a direct cost the one of transport, storage and washing, plus an indirect one, uneasy to assess, linked to the construction of rip-raps and sea walls, and of course a visual environmental impact. Alternative solutions do exist, but they have been seldomly applied during this spill, mainly because most of the people involved in the cleanup fail to understand hydrodynamics and sedimentological processes on beaches.

During the first stages of the cleanup, before the set up of the logistic of Plan POLMAR-TERRE, benevolents and municipalities employees, first present on scene, did practice chronological sediment removal. Locally also, in the relative chaos prevailing in the first stages of cleanup, some municipalities organized removal by full loaded trucks. During the second stage of cleanup, at the approach of summer, elimination of every single residue of oil became an obsessive objective for most of the municipalities depending on tourism. To collect particles scattered or buried all over beaches, belt screening devices were used as a magic tool. Used in a clever way, this device collects oil buried in the sand. In the present case, most of the time they have been



used any hold how, on wet sand, on gravel beaches. On some beaches, such as the one of La Baule they went back and forth on the same sections of the beach for days, when one time was enough. Consequently, huge amounts of coarse and wet sediments were removed. In addition, the overuse of these devices resulted in breaking up the residual oil in micro particles impossible to collect and in scattering them on parts of beaches that did not suffer the initial impact. Finally, all the beaches « cleaned » by these devices were submitted to an ultimate cleanup, by a technique that, implemented in Loire-Atlantique, could have been used on a large scale in the first stages. This technique, the surf washing, consists in relocation of oily sediments, buried or stranded too high on the shore, in the breaker zone. Seldomly used during the Amoco spill, more often during the Exxon event, this technique has been widely experimented in North America. Based on a good understanding of hydrodynamics and morpho-sedimentology, it allows rapid elimination of weathered oil by abrasion. The resultant pollution is insignificant. It also allows remobilisation and reflotation of liquid oil, but requires in this case the set up of material to collect the oil. In the case of Erika the gummy oil was trapped by 2mm-mesh net. In the area of La Baule –Guérande, more than two hundred thousands tons of sediment were traected that way. Consequently, although this area was the most impacted of the Atlantic coast, it is not the one where the removal was maximum, and on some beaches heavily oiled the sediment budget was unaffected. More over the cost of such operations is the one of machinery plus the purchase and disposal of nets or sorbent material. It supresses the cost of transportation, storage, treatment of sediment and beyond the one of protection of coast line against erosion.

**Keywords :** Oil spill, cleanup techniques, sand screening, surf washing, subsurface oil.

