

MARINE OUTFALL - A POSSIBLE SOLUTION TO STOP RIVER POLLUTION?

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A very controversial and loud ecological debate took place recently in Israel. A large chemical factory in Haifa, has been discharging for many years its effluents, containing heavy metals and nutrients (table 1) to a nearby river that carries its water to Haifa Bay. Lately, a special authority for this river was established, aiming at reviving the dead river. All the polluting plants were ordered by the Ministry of the Environment to take action and stop discharging their wastewater into the river. The chemical factory mentioned above, claimed that after considering all possibilities, the only plausible solution to its effluents is to build a marine outfall. The proposed outfall is 3 km long, carrying all the toxic effluents directly to the center of Haifa Bay at the Mediterranean Sea. The plant was asked to prepare an environment impact study and hired specialists from Israel and abroad who did a comprehensive risk assessment study for the planned outfall. The main conclusion of this study was that the expected damage to the fauna and flora of Haifa Bay is minimal. However, the proposed outfall was heavily attacked from all directions, mostly on a principle basis and to a lesser extent, on the ground of the environment impact study. The main opposers to the outfall were:

- 1) Israel Greenpeace representatives who suggested to close down the plant that produces mainly fertilizers for agriculture. They are principally against using artificial fertilizers and suggest to use compost instead (this is a world wide approach of Greenpeace to artificial fertilizers)..
- 2) The fishermen of Haifa Bay who were afraid that the fish may absorb toxicants from the water. They suggested to leave the situation as is. The reason for this is that heavy metals sink in the river while nutrients flow to the sea and enrich the impoverished waters of the bay. The effluents carried by the river to the sea, contain nitrogen and phosphorous from other sources as well, that are essential to the marine food chain in Haifa Bay.
- 3) Marine biologists who were not convinced by the risk assessment findings and suggested to have more comprehensive studies for a long period. They insist on using the local species of Haifa Bay instead of basing the risk assessment on EPA's data, as was done by the plant's specialists.
- 4) People "who care" that usually suspect and object to any plan developed by a powerful and interested company.
- 5) Experts from different fields that suggested to move the plant away from the bay and locate it somewhere in the Israeli desert, where land based solution to the toxic effluents should be adopted.

Although the Minister of the Environment declared he may do so, it was clear that in no circumstances the plant will be closed as it employs many workers and is not losing money. Finally, the Minister of the Environment realized the problems (mainly the political ones) and decided to reject the outfall possibility. He provided the plant several years to find a land based solution to the toxic effluents. This means that the river, which is the most polluted one in Israel, will continue to receive toxic effluents for a few more years and the plans to recover it are postponed for the time being.

Apparently, after the Minister's decision, the plant "found out" ways to recycle part of the effluents and reduce both toxicants and nutrients to a large extent.

In the last elections, the Israeli government was changed and the new environmental minister is reconsidering the marine outfall plan. It should be noted that other plants pollute this river as well, including Haifa wastewater treatment plant that discharges the surplus reclaimed effluents and sometimes even raw sewage to the river. The new proposal considers using a larger marine outfall for industrial (after pretreatment) and municipal wastewater (only as emergency outlet).

As hundreds of marine outfalls exist in the Mediterranean sea and all over the world, the main question addressed to the workshop is whether marine outfall should be rejected out of hand in all cases of toxic effluents or, maybe in some cases, it is better than land based solution? This is a rather complicated issue in our case, as neither side involved in the debate described above was acting completely in good faith.

Table 1: Chemical composition and annual disposal of the plant's effluent.

Chemical	Average Concentration (mg/l)	Annual Disposal (tons/year)
Nitrogen	500.0	1,095
Phosphorus	750.0	1,640
Arsenic	0.340	0.745
Cadmium	1.300	2.845
Chromium	5.500	12.05
Copper	1.500	3.285
Fluoride	550.0	1,205
Lead	0.280	0.615
Mercury	0.014	0.030
Nickel	4.800	10.50
Silver	0.140	0.305
Zinc	31.00	67.90