# U.S. firms help clean Europe's waters

## Nalco and Hercules enter partnerships to supply chemicals and plants to ease European industries' pressing water pollution woes

**All of a sudden, Europeans are aroused about the polluted state of their principal rivers—such as the Rhine, the Seine, the Thames.**

This anxiety, reflected in the lengthening list of laws and regulations concerning discharge of industrial and municipal wastes, is creating a market of possibly $300 million/year for water treatment chemicals, equipment and processes.

Early leaders in the business of supplying these goods and services in Europe are Hercules (Wilmington, Del.), Nalco Chemical (Chicago) and Imperial Chemical Industries (London). Representatives of these companies are already active in five heavily industrialized nations—Belgium, France, Italy, the Netherlands and the United Kingdom. Germany appears to be next on their prospect list.

**Buying into the Territory:** Hercules has most recently entered the European market, having agreed just last August to acquire a 50% interest in a water treatment service company, Erpac S.A. (Lille, France). This gives Hercules' fast-growing, U.S.-based Environmental Services Division a toehold in a relatively untapped sales territory.

The other two companies made their full-dress debut in this business in '67, when they jointly organized Nalfloc Ltd. (London), owned 51% by ICI and 49% by Nalco. Since then this partnership has built some $35 million worth of industrial waste treatment units for manufacturers of chemicals, textiles, glass, candy and foods.

**Deterred by Tradition:** European governments have probably been ahead of U.S. political leaders in being aware of pollution problems. But up until recently, at least three factors have deterred European governments from launching a crackdown:

(1) Most citizens seemed less interested in having clean rivers than in having good jobs at busy factories and in holding taxes as low as possible.

(2) A strict pollution-abatement decree in one country would likely put that country's industries at a disadvantage in the intense international competition for exports.

(3) Many European industrial concerns have been discharging wastes into major waterways for many years—in some cases, for several centuries—and the practice seemed to have acquired a legality that no one disputed.

In such a situation, the general policy in Europe had been to regard certain rivers as little more than "open sewers" into which could be dumped freely any waste materials that were not flagrantly toxic. But lately the public attitude has changed.

**European Contamination Market:** In this new public-opinion climate, it's becoming clear that industries and cities will no longer be permitted to discharge untreated wastes into the nearest streams. A surge of activity in the designing and building of waste treatment facilities appears to be a near-term certainty.

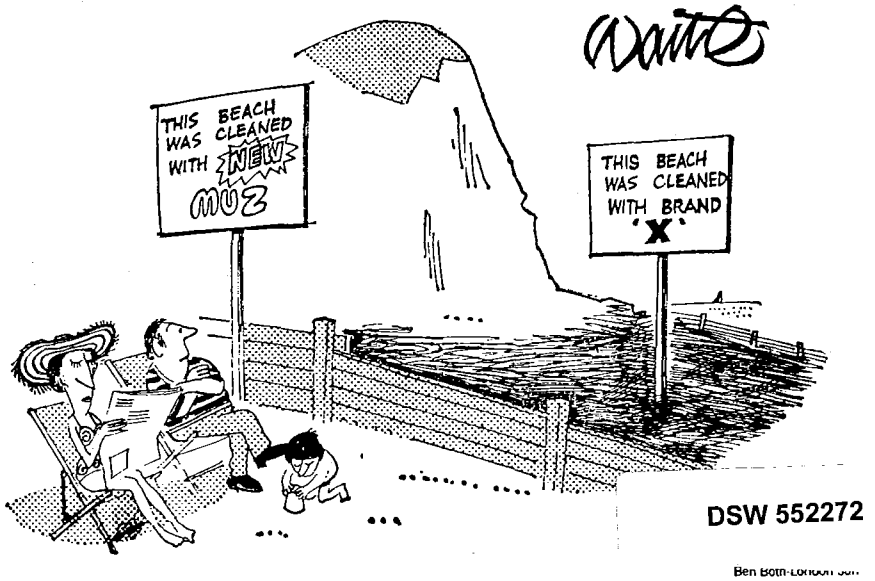
In many cases, the quickest treatment might involve the massive application of flocculants and other chemicals. Remarks one Hercules executive: "The potential market for water treatment chemicals in Europe is $100 million/year."

**Local Laws Are Gentler:** In Europe generally, local treatment regulations are usually less onerous than the national laws. This is the observation of James Priestley, chief engineer with Head-Wrightson Process Engineering Ltd. (Sheffield, England), a chemical engineering firm with which Nalfloc has a working arrangement.

Britain's water pollution regulations—more or less typical of those now going into effect throughout Europe—are based on two laws enacted within the past decade: the Public Health Act of '61, which governs the discharge of wastes into public sewers; and the Water Resources Act of '63, restricting effluents into rivers and creeks.

The '61 act empowers local authorities to charge a fee for taking and disposing of industrial wastes. It provides for the setting of temperature, pH and other conditions for such discharges, and for sampling practices. Under the '63 act, discharges into streams are controlled by 29 river authorities in England and Wales and by river purification boards in Scotland.

"An industry would be well advised to arrange for sewer discharge," Priestley observes, "because the requirements for discharge to rivers are usually 5-10 times as stringent."

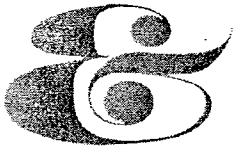



British chuckle over water pollution cartoons, but new laws are signs of their concern.



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# Phosphine Ligands



# Organo-phosphorus Compounds

**TRIMETHYLOLPROPANE PHOSPHINE ESTER**
(1-Ethyl-4-phospha-3,5,8-trioxabicyclo [2.2.2] octane)

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(Ethylenebisdiphenylphosphine)

**DIPHENYL-*p*-TOLYLPHOSPHINE**

**METHOXYDIPHENYL PHOSPHINE**

***n*-BUTOXYDIPHENYLPHOSPHINE**

**DI-*n*-BUTOXYPHENYLPHOSPHINE**

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**Covering the Waterfront:** Nalfloc's General Manager M.S. Timm, a biochemist who formerly worked on water treatment for ICI, asserts that Nalfloc is prepared to deal with every aspect of effluent treatment and control, including design, construction and operation of waste treatment plants. It has served companies in a wide range of industries—mainly in Britain, although some design work has been done for plants in South Africa and Nigeria.

Nalfloc's financing terms are flexible, Timm tells *CW*. The company has extended credit, but the normal arrangement is cash on a *pro rata* basis to coincide with phases of construction.

Biggest single waste problem for Europe's chemical companies, according to F.R. Jarrett, Nalfloc's assistant chief engineer, is solids separation and disposal. "All the principal processes, particularly ammonia making, end up with a sludge," he declares. "And for every part per million of biological oxygen demand (BOD), there's a half pound of solids."

A feature of many treatment plants designed by Nalfloc: the company's own polyvinyl chloride packing medium, Flocor, used in biological oxidation towers to reduce BOD in organic wastes. The firm's latest project is a $1.2-million plant to treat liquid wastes (2.4 million gal./day) from a food-processing plant in Yorkshire. Chemicals used in this plant: Flocor packing sheets, sulfuric acid, polyelectrolytes, bionutrients, lime, soda ash, chlorine and ferric chloride.

**Malinformed Management:** Priestley says his firm found that company executives frequently have little knowledge of the volume and composition of their plants' effluents. Types of effluents vary, as in these projects:

• Neutralization of caustic soda effluent from the mercerizing process in the Stevenson and Son Ltd. fabrics plant in Northern Ireland. Instead of the usual procedure, the use of relatively expensive mineral acid for the neutralization, Priestley's engineers devised an absorption tower in which waste carbon dioxide from the plant's boiler flue gas converts the caustic into soda ash and sodium bicarbonate, which are acceptable for discharge into a river.

• Neutralization of a large volume (up to 30,000 gal./hour) of acid wastes (1,500 ppm. sulfuric acid) from a battery manufacturing plant. Here the engineers installed a plant in which the acid is neutralized with limestone chips; the resulting carbon dioxide and gypsum are liberated and precipitated, respectively; and the clarified liquor is discharged to a river.

**Two-way Ocean:** Hercules recently set up a Water Management Division in Brussels. It is to coordinate water treatment activities with Erpac and with a new British subsidiary, Water Management Ltd. (London). The Brussels unit will offer services relating to water conditioning with chemical additives, calcium removal to prevent encrustation, and treatment processes for municipal water supply and waste disposal.

With at least two U.S. chemical companies operating in the European market, there's likely to be a stepped-up transatlantic flow of waste treatment technology. Hercules says its European affiliates will have access to new developments from its Environmental Services Division—"and vice versa, we hope."

## Saving Solvay salt

**A new process** for treating waste waters from Solvay process soda ash plants has been developed by the Dept. of Interior's Office of Saline Water (OSW).

The process, now being tested in 1-million-gal./day units treating waters containing 1,000 parts per million of salt at "several" plants around the country, consists of two basic elements. Both are said to be commercially available.

Desalting is first accomplished with a vertical tube evaporator so that the waters can be reused in the plant. Crystallization units then produce salts of calcium chloride and sodium chloride in solid form for possible resale or reuse in the Solvay process.

According to OSW Director Chungming Wong, a typical Solvay process plant disposes of about 2 million gal./day of waste water carrying about 800 tons of chloride salts.

An OSW spokesman tells *CW* that the plants now testing this process are considering putting full-scale units on-stream. But the costs of construction and operation have not been revealed. "Costs will vary," says the spokesman, "with plant location and salt content of the effluent." END



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