REGULATION OF WATER POLLUTANTS

Prabir Ganguly
Centre for European Studies, VSB-Technical University of Ostrava, Ostrava-Poruba, The Czech Republic

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Summary

Regulatory practices in water protection uses three legal techniques avoidance or minimization of discharge of listed substances to water body by licensing process by setting quality standards for different types of waters based on their uses, emission standards of industrial facilities and standards for processes and products. Techniques are applicable to combat marine, inland and groundwater pollution.

The regulations developed so far indicate that the sources of pollutants are so varied that it will take a number of years to fix limit values for all known pollutants, as only a few have been set so far. Experience also shows, that the structure of the water industry is very important for abatement of water pollution and earlier system of integrated water management does not help. It is necessary to separate the regulatory role from the administrative and of the industry.

1. Introduction

Water in its natural source is never pure and contains in solution and suspension many substances. In this context, the identification and assessment of pollution presents obvious difficulties. Accepting that as well as considering contamination from various natural and man-made sources, and that natural waters have a range of self-cleansing and regenerative processes, the two essential features of pollution in the context of water would seem to be that it is of human origin and excessive in quantity (having regard to the toxicity of its contents and the naturally occurring powers of regeneration). Against this background, the definition of pollution contained in EC Directive

76/464/EEC may be worth noting and may be extended to define water pollution in the following way:
[Water] pollution means the discharge by man, directly or indirectly, of substances into the aquatic environment, the results of which are such as to cause hazards to human health, harm to living resources and to aquatic ecosystems, damage to amenities or interference with other legitimate uses of water.

The definition as presented above can be used to define water pollutants which are:
Substances, when present in the aquatic environment, cause hazards to human health, harm to living resources and to aquatic ecosystems, damage to amenities or interference with other legitimate uses of water. Substances regarded as water pollutants may come in various forms, including:

- deoxygenating materials, such as, sewage and other organic materials such as wastes from agricultural or industrial processes,
- nutrient enrichment from fertilizers, particularly nitrates and phosphates,
- solid wastes, which may impede flows, or block out light for growth,
- toxic materials, such as heavy metals, toxic organic chemicals, pesticides, etc.,
- disease-carrying agents, such as pathogenic bacteria, and
- heat, which may affect biological conditions and deoxygenate water.

The effects of any potential pollutant vary according to the size, temperature, rate of flow and oxygen content of the receiving waters, as well as the local geology and the presence of other pollutants and any resulting synergistic effects. The use made of a particular water body is very important in deciding whether it can be said to be polluted, and this factor has great impact on the attitude of the regulators to set particular standards and their enforcement.

As gradually the percentage of public water supply from groundwater is increasing, today's regulations of water pollutants should aim not only at the control of surface waters but should encompass the control of liquid discharges to land.

The sources of pollution are also varied. In case of inland waters, for example:

- controlled discharge from facilities which have obtained consent for discharge to water. Many of these will involve toxic materials or organic pollutants;
- sewer discharge with discharge consents. The organic contents of these discharges are highly polluting;
- discharges from agriculture;
- discharge of waste water from mines (which are often highly contaminated);
- accidents and spillage (because of improper storage and transport);
- leachate from waste sites;

In case of marine pollution, the usual sources are:

- Vessel source pollution, such as dumping of wastes, discharge of various forms of oil including used oil, rinsing of tanker containers and the release of sea water serving as ballast in empty tankers. Accidental pollution caused by accidents, including grounding of oil tanker or loss of cargoes containing dangerous substances.
- Atmospheric pollution.
- Dumping, that is deliberate disposal of wastes at sea.
- Exploration and exploitation of the deep seabed.
- Land-based pollution (which has been defined as pollution of maritime zones by discharges from coastal establishments or or any other source situated on land or artificial structures, including pollution transported by rivers into the sea).

2. Principles of Regulating Water Pollutants

One of the difficulties in setting a uniform water policy is that water, although a basic resource like air, is unlike air, water is not useable unless it is collected, treated and supplied, and even after use, it must be collected with other wastes as effluent, and then treated and disposed. Moreover, water bodies are used for navigation, fishery, industry, agriculture, recreation etc.

Hence, in reality the water industry is a set of industries, mutually connected in the sense that they are all related to the water cycle, but separate in their objectives. Control of pollutants is only one of the functions in the water industry which is dominated by water supply and sewage disposal. In the past, the operational and regulatory roles were often played by the same organization.

It has become well understood that the organization structure of the operational end of the industry (water supply and sewage) is required to be separated from the regulatory function of the appropriate agency. With the gradual introduction of Integrated Pollution Prevention and Control, the regulatory power seems to remain concentrated in the hands of regulatory authorities in the context of pollution control.

Water supply and sewage disposal will remain in the hands of local authorities, regional authorities or private companies depending on the local situations. Integrated water management is not thought to be the right answer for regulating populations.

The basic three legal techniques, common to the regulation of pollutants in other media, also apply in case of regulation of water pollutants. These are: licensing, listing and standard-setting.

In the context of water pollution, a licensing regime acts to prohibit discharge of pollutants to water bodies unless a permit has been issued by the proper authorities. However, discharge of pollutants is prohibited for some kind of substances and discharges of other pollutants are permitted by a special permit which specifies certain conditions.

This reality, therefore, requires the technique of listing to become extremely widespread in laws to protect water from pollution by different sources. Such lists may be found in Annex I and II of the London Convention for the Prevention of Marine Pollution, 1972, EEC Directive on Pollution caused by Certain Dangerous Substances Discharged into the Aquatic Environment of the Community, 1976 etc. Individual national regulations also identify such pollutants and specifically aim at prohibition and reduction of discharge of such substances, and if allowed, require a permit to be issued by a competent authority under certain conditions after careful consideration of certain factors. The legislation in this context is usually flexible so as to enlist further substances (as knowledge widens) without undue difficulty. The third technique frequently used is standard-setting. Four types of standards are used, including quality standards, emission standards, process standards and product standards.

Quality standards for water fix the maximum permissible concentration of pollutants in water, e.g. the permissible concentration of mercury in river water. As has been said before, permissible concentration levels of pollutants may vary according to the purpose for which the water is used. The EC Directive on Bathing Water, for example, lay down 19 bacteriological parameters to be monitored.

However, the EC Directive on Drinking Water lays down 62 parameters relating to the quality of all water provided for human consumption or for purposes of food manufacturing except for mineral waters. Such parameters, otherwise expressed either as Imperative (I) Values, which must be kept or Guide (G) Values, which Member States must try to achieve within a definite time frame. These values are not constant, and may be modified from time to time in the light of new knowledge.

Emission standards refer back to the technique of listing substances. For example, the above-mentioned EC Directive 76/464 lays down two lists of substances, the black list and the gray list. The directive seeks to eliminate pollution of water by black list substances and hence, requires that any discharge of such substances must be authorized by a competent national authority in each Member State and such authorization must comply with the emission standard which does not exceed the approximate EC limit value, or the emission standard is set so that the EC quality standard for receiving water is kept to at all times.

The EC has not yet been able to issue all daughter directives related to 129 potential black list substances published in 1982. The substances for which daughter directives are not agreed are treated as gray list substances. The Directive's aim related to substance in the gray list is that pollution by such substances should be reduced. The standards or permissible maximum concentration are set at national level. The Member States must also introduce a reduction program for gray list substances and must control discharges by setting standards in discharge consents for achieving the water quality objectives.

Process standards establish certain specification applicable to fixed installations In contrast to emission standards process standards establish the means of production and

do not leave the polluter with a choice of methods to reduce emissions. Often these norms require the installation of purification or filtration system.

Product standards fix the physical or chemical composition of items such as detergents or fertilizers and others. Such standards may specify and limit the composition of certain elements or forbid use of certain substances, for example presence of mercury in pesticide or phosphate in detergent.

Another legal instrument against water pollution is perhaps the most important milestone for future water quality. That is legislative requirement on urban waste water treatment (domestic sewage and industrial waste waters). The EC Directive 91/271 on Urban Waste Treatment lays down minimum standards for the treatment of urban waste water and requires all Member States to cease dumping sewage sludge in the sea by the end of 1998. It obliges them to reduce toxic, persistent or bioaccumulatable materials in sludge.

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Biographical Sketch

After graduating from Calcutta University (India) in 1967, **Dr. Prabir Ganguly** worked for four years in Indian coal mines in various capacities, rising to the position of Manager of a large coal mine. In 1971 he went to what was then Czechoslovakia to do his PhD, which he completed in 1975. He worked in the coal industry in India until 1980 as a senior planning engineer. In 1980 he took up an assignment to work at the University of Liberia in West Africa. He completed this assignment in 1986, following which he joined the Faculty of the Technical University of Ostrava in the Czech Republic. During his tenure at that university he became head of the Institute of Environmental Engineering and "Phare Project Management Cell" of the university. Currently he is the Director of the Centre for European Studies of that university.

Dr. Ganguly has been responsible for organising and participating in several international postgraduate teaching and training programmes sponsored by the Commission of the European Communities, as well as a number of international conferences and seminars.

Dr. Ganguly has published widely, mainly on sustainable development, environmental protection and related issues. He is on the Editorial Board of the journal, *Environment, Development and Sustainability* published by the Kluwer Academic Publishers of Dordrecht, the Netherlands.