PERFORMANCE STANDARDS: ESTABLISHING DISCHARGE ZONES

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Summary

Many of the industries produce solids, liquids or gases that must be released to the environment (air, water or land), and they can cause serious environmental impacts. The permits specify both quality and quantity of substances that can be discharged. These permits have many names such as licence, consent, authorization, etc. They also include a description of the discharge receptor that can be inland water, the sea, or the ground.

For release into surface waters, such as rivers or the sea, it is necessary to establish a zone within which discharges must be limited to the set environmental quality standards. As there is a need for limiting pollution discharges to this zone as much as possible, the performance standards of the facility (or facilities) concerned must be correspondingly strict.

After its establishment (by the permitting system or legislation), the zone can be an element of the permit for discharges.

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1. Business environmental performance

Many governments have established permitting and controlling systems to prevent pollution caused by human activities, especially by industrial facilities. It has been established that pollution in industrial areas and regions is caused mainly by the activities of major industries, including all types of businesses and enterprises ranging

from power stations to sewage works. These have potential for significant environmental impact. Legislation in many countries allows their competent authorities to grant permits to businesses in order to control the way in which they conduct their operations. The purpose of this is to confine the health and environmental impacts of such activities within acceptable limits.

In granting permits the authorities usually take into account both costs and benefits. They also balance various relevant factors to ensure that the limits, within which an industry operates, reflect society's priorities.

Many of the industries produce solids, liquids or gases that must be released to the environment (air, water or land), and they may cause serious environmental impacts. Known variously as consents, authorizations, licences, etc., the permits specify both quality and quantity of substances that can be discharged to the environment. Through the permitting process the competent authorities ensure that these substances do not have unacceptable environmental or health impacts. In particular, they must not cause harm to people, plants or animals either immediately or over time.

Determination of the way in which a given contaminated substance (or substances) is to be permitted to be released varies from industry to industry, but it is always based on scientific knowledge and understanding. Unfortunately, in many cases relevant scientific knowledge is either not available or inadequate, thus necessitating the application of the Precautionary Principle. In a nutshell, this principle advocates that when there is any doubt about the effects of a certain release, due caution must be exercised in deciding to go ahead with that release. Releases are monitored, and their quality determined either by automatic instruments or by analysis in a laboratory. When the limits set in the formal document (permit, licence, etc.) are exceeded, or when a release is made without a permit, the offending industry has to face fines, penalties, or any other measures that the competent authorities may impose under the legislation in force.

For controlling industries that have the highest potential for causing significant pollution to the environment, the competent authorities are increasingly using what is known as Integrated Pollution Control (IPC). The IPC requires the authorities to consider whether or not the polluting materials, or a combination of such materials, should be released to air, water or land in order to minimize the overall effect on the environment. Whatever decision is made about the part of the environment into which the substances are released, the materials must be as clean as available technology allows without entailing excessive costs, and must certainly not cause any harm. To improve their environmental performance, facilities are encouraged to use the Best Available Techniques and to develop management practices to reduce or eliminate their polluting releases.

In the European countries Integrated Pollution Control is replaced by regulations implementing the Integrated Pollution Prevention and Control (IPPC) Directive which gives importance to pollution at source. The IPPC covers a wider range of industries than the IPC and takes into account a wider range of issues, including accidents and energy efficiency. Another new set of legal powers covers accidental release of

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chemicals to the environment, since even at the best regulated sites accidents could still occur with serious implications for both population and the environment.

These are the regulations implementing the Control of Major Accident Hazard (COMAH) Directive, which is the second EU Directive brought about as a result of the Seveso incident. Seveso is a town in northern Italy where a chemical process ran out of control leading to an explosion, which released significant quantities of dangerous substances, including dioxins, into the environment, causing severe impacts on both people and the environment.

These regulations make sure that the risk of a serious accident (such as that in Seveso), especially at sites where large quantities of dangerous substances are used or stored, is extremely small so that people and the environment are protected.

2. Discharges to Water

Many industries release their discharges mainly to water. They include both sewage treatment works and other industries which discharge their liquid effluents to rivers and the sea but are not covered by the Integrated Pollution Control provisions.

The EC Urban Waste Water Treatment Directive, which applies to all towns and large villages, specifies standards for sewers and stormwater overflows (safety valves, which allow stormwater to escape into the environment in very wet weather) as well as for the levels of treatment needed before the effluent can be discharged. In addition, major improvements to marine sewage discharges had to be made in order to ensure compliance with the EU Bathing Waters Directive.

Both businesses and individuals are responsible for complying with environmental regulations and for preventing pollution. Many thousands of pollution incidents occur each year, originating from factories, farms, transportation and even homes.

Each incident can be an offence and can result in prosecution as well as environmental damage. However, most are avoidable, given careful planning of operations, responsible waste management and suitable facilities to reduce the risk of spillage, along with simple precautions to deal with any spillage if or when it occurs.

Responsible waste management can ensure compliance with the relevant regulations, while waste minimization can reduce the amount of waste produced, which in turn reduces the risk of environmental damage and the costs of waste disposal.

The guidance notes on IPPC cover either a topic of relevance to many sectors, such as oil storage or the use of pressure washers, or are specific to a particular type of site, such as schools, vehicle-servicing garages or hospitals.

In general, they are cross-referenced to reduce repetition; the guidance on hospitals, for example, refers to the guidance on oil storage and does not repeat it in detail. Therefore, there may be a need for several different guidance notes for any one site or operation.

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Biographical Sketches

Mr. Alexendros Karavanas received his Diploma in Chemical Engineering from the National Technical University of Athens, Greece, in 1977, followed by a degree in Pharmacology from the University of Athens in 1991.

Currently Mr. Karavanas is working for the Ministry of Environment, Physical Planning & Public Works, Athens, where he is responsible for Environmental Permitting. This involves environmental impact study of industries, granting environmental conditions and permits, corresponding EU legislation, as well as European Community's Support Framework for the Environment. His main duties and tasks include environmental impact assessment of industrial facilities (examination, authorization, setting of environmental conditions especially for the food, pharmaceutical and pesticide industries, tanneries, textile industries, chemical industries etc.).

He has represented the Greek Ministry of Environment (1997-2001) on the European Community's Committee on article 19 of Directive 96/61, "Integrated Pollution Prevention and Control (IPPC)", concerning the inventory of the IPPC industries, as well as on the European IPPC Bureau's Technical Working Group for Food and Milk, Seville, Spain. To date he has participated in several projects of the Greek Ministry of Environment concerning emission inventory of industrial sources in Greece, and implementation of the IPPC system and Best Available Techniques for industry. He has addressed several seminars organized by, among others, the National Technical University of Athens and the University of Athens on environmental issues including environmental impact statement, treatment of waste water effluents, air emissions, pollution control equipment, and impacts from the operation of the food, textile, and chemical industries.

Dr. Michael Christolis is a Civil Engineer specializing in environmental science and technology. Currently he is working as a research collaborator at the National Technical University of Athens

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(NTUA), Greece, on the mathematical modeling of environmental problems. He has so far accumulated twenty years of experience in air quality monitoring, pollutant dispersion modeling, assessment of the impacts of industrial accidents, design of emergency systems, and implementation of the Seveso Directive in Greece.

During 1983-1988 he was the Head of the Laboratory for the Air Quality Monitoring Network for the City of Athens. In 1988 he joined the Computational Fluid Dynamics Unit (CFDU) of the Chemical Engineering Department of the NTUA, working on research projects on the computational modeling of various applications focusing on environmental issues and problems.

Professor Nicholas C. Markatos obtained his Diploma in Chemical Engineering from the National Technical University of Athens, Greece, in 1967, followed by M.Sc, DIC and Ph.D degrees from the Imperial College of Science, Technology & Medicine, University of London, UK, during 1970 to 1974.

In 1983 Professor Markatos was appointed Director of the Centre for Mathematical Modeling and Process Analysis at the school of Mathematics and Scientific Computing of the University of Greenwich, London, England. At that time he was also a visiting lecturer to the Computational Fluid Dynamics Unit of Imperial College as well as working for CHAM Ltd, (Concentration Heat and Momentum, Limited), London, England. At CHAM he worked first as leader of the Aerospace Group (1976) and then, from 1977 until 1984, as Manager of the Applications Team working on various Fluid Mechanical, Thermodynamic and Transport problems.

Since 1974 he has served as technical consultant to many Research Centres, state institutions and industries.

In June 1980 he was awarded the "Certificate of Recognition" by the Inventions Council of NASA.

In 1985 Professor Markatos was elected Professor of Chemical Engineering at the National Technical University of Athens, and in 1990 he was elected Head of the Chemical Engineering Department. In 1991 he was elected Rector of that University.

Professor Markatos' main scientific interest is in the mathematical modeling of Transport Phenomena, Fluid Mechanics, Thermodynamics and Physical Processes like Fluid Flow (Laminar and especially Turbulent), Heat and Mass Transfer, Environmental Flows, Combustion, etc.

He is referee of scientific papers, reviewer of new books, as well as member of the Editorial Board of several international Scientific Journals.

He has published over 100 original scientific papers in international journals and participated and organized many international conferences, seminars and meetings all over the world. Author of two books, he has also published many articles in the popular press on Engineering Higher Education.

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