Guest Editorial

Role of environmental (ecological) assessments in the management of chemical pollution

We are old enough to remember the way things were before the environmental revolution, which began in earnest some 30 years ago. Those of us practicing chemistry and chemical engineering then believed that we were responsible citizens concerned about the environment and about any potential dangers to public health that our products and processes might pose. There were a few laws and regulations, but beyond making nuisances of ourselves, we were free to decide for ourselves what were acceptable risks to which to expose both people and the environment. Some companies had a strong conscience and acculturated their people accordingly. Unfortunately, others did not.

But, "that was then, this is now". Over the past 30 years, we have gone through two major waves of expanded environmental regulation and are well along in defining the third. The first was control of high-volume discharges of primary pollutants — sewage, sulfur dioxide, auto exhausts, and the like. The second was control of land disposal of untreated wastes and clean-up of abandoned dumps. The third — the one we are currently embarking on — is control of longterm low-level exposures of both humans and ecological systems to toxicants and irritants.

In this third wave, the regulatory rubric is being extended to consider the entire product life cycle from conception through production, use, and disposal. Effects of interest are acute and chronic effects on human health and on whole ecosystems. It is hard to visualize a more comprehensive concern, and the impacts on product and process development, evaluation criteria, and philosophy of chemistry-related progress, already profound, may well be as revolutionary as any we have undergone before.

This symposium proceedings issue focuses on diffusion of wastes — from product manufacture and from humans and animals using the products — and disposed products on the ecological environment. It reviews the major U.S. legislation governing ecological protection — the Endangered Species Act, the National Environmental Policy Act, the Emergency Planning and Community Right to Know Act, as well as legislation dealing with air, water, and land pollution and preservation of sites of historical interest — with a comparative look at how European regulatory practice is evolving. Authors from the Environmental Protection Agency and the Food and Drug Administration describe both current and pending permitting regulations derived from the legislation, the kinds of information the regulators are requiring, and the best

ways to work with the regulators while preparing the permit applications. Impacts on research planning and practice in the pharmaceutical and animal health industries are described; the need to gather a wide variety of data not heretofore viewed as relevant to new product and process development is emphasized.

A major subtheme is how one identifies the key ecological impacts without drowning in the complexities of ecological systems. EPA's evolving "Framework for Ecological Risk Assessment" provides the basis for identifying exposure pathways, key indicator species in the ecological environment, and criteria for determining the presence or absence of ecotoxicity.

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