THE ENVIRONMENTAL SPECIMEN BANKING PROJECT OF THE FEDERAL REPUBLIC OF GERMANY

Pilot Phase

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Abstract. Thousands of chemicals are on the market, but only in a few exceptional cases is it known where these chemicals remain in the environment and what effects they are able to exert in correlation to their environmental concentration. In addition to monitoring the actual concentrations of chemicals in the environment, it is necessary to establish an environmental specimen banking program which will, in the future, make possible the retrospective monitoring of chemicals. The feasibility of such a program is being studied in a joint U.S. – German pilot project. The German project is described here, including its organizational structure, technical and scientific considerations, and methods of specimen selection.

1. Conception

At present, some fifty thousand chemicals are traded world-wide. For only a few of these is information available on the production quantity, the purposes for which they are used, their distribution in the environment and their effects on man and the environment. 1000–2000 new chemicals are entering the market world-wide every year in addition to those already in circulation.

Chemicals are produced not only in a great variety, but also in very large quantities. World production in organic substances alone amounts to approx. 300 million tons per year [1]. In the highly industrialized nations, economic activities are controlled to a significant extent by the production and consumption of chemical substances. Thus, 14% of the value of the Federal Republic's total exports can be attributed to chemicals [2].

From all areas of activity of the technosphere, chemical substances continuously escape into the ecosphere in considerable quantities and disperse there according to their physical-chemical properties (cf. Figure 1). In only very few cases is it possible to remove substances which have reached the environment, i.e. which have dispersed in air, water and on land. Rather, the introduction of chemicals into the environment represents, in most cases, an irreversible step.

A key factor from the environmental protection point of view is the fate of the chemicals which have reached the environment. A large number of these substances are chemically transformed, and often degrade completely, through the effects of water, oxygen, sunlight and, most of all, biological systems. A considerable number of chemicals reaching the
Fig. 1. Entry of chemical products into the environment.