

environment in low-level aqueous wastes. Future plants, if situated less remotely, may be restricted in the quantity they can release to their immediate environs.

The costs of high-activity waste treatment and ultimate storage in the nuclear power future have been estimated between 0.02–0.03 mill per kilowatt-hour of nuclear electricity produced. This represents about 1–2 percent of the total fuel cycle cost and substantially less than 1 percent of the cost of nuclear power in a 4-mill-per-kilowatt-hour economy. On the basis of laboratory and engineering process data, and on an expected successful field demonstration and testing program with high-activity waste, it is believed that waste management costs will not deter the development of safe and economical nuclear power.

NUCLEAR TECHNOLOGY IN POLLUTION CONTROL

While waste management technology has been and is being developed which we believe will continue to provide satisfactory environmental pollution control systems for the expanding nuclear power industry, there are also other facets of the AEC program which are making significant contributions to the Nation's overall pollution abatement efforts. These programs deal with the development of instrumentation and monitoring equipment for the measurement and control of nonradioactive contaminants in our geohydrologic and atmospheric environments.

RADIOTRACER RESEARCH AND DEVELOPMENT

Pollution of the environment generally involves the presence of chemical substances in low concentrations. To control pollution, one must be able to measure it. Here the use of radiotracers is a particularly useful tool for quantitatively analyzing the problem, because of the extreme sensitivity of radioisotope measurements. An example of an early use of tracers was their employment in 1958 in a study of sewage flow rates near El Segundo, Calif.

In the past few years, the development and refinement of ultra-sensitive analytical techniques (such as neutron activation analysis) and of sealed sources of radioisotopes have enabled scientists to apply modern methods and portable equipment for determining more accurately and conveniently the concentration of a wide variety of environmental pollutants. Activation analysis, for example, permits the use in some cases of inert tracers to follow the course of a particular contaminant without having to add radioactivity to the biosphere. Reliable and intense sources of alpha, beta, and gamma activity are incorporated in field instruments wherein the degree of attenuation, scattering, or emission of radiation is a measure of the properties of the medium.

An instrument for continuously monitoring the concentration of sulfur dioxide and ozone in air has been developed in the AEC isotopes development program for air pollution control and is under evaluation by a commercial company. This device uses a newly available radiochemical (krypton clathrate) to measure parts per million levels of sulfur dioxide and parts per billion levels of ozone. Air containing the contaminants is passed through an organic compound in which the radioisotope krypton 85 is trapped. Reaction of the contaminants with