centuries, indicating a more dynamic environment than previously believed. In 1976 Goldberg's associates showed that radon-226 could be used to help date sediments of biological origin deposited over the past 5000 years.

Scientists (Harley and H. L. Volchok) at the DOE Environmental Measurements Laboratory established the ratio of cesium-137 and strontium-90 in fallout and used this information to determine how quickly artificial radionuclides penetrated and moved in ocean waters and what factors (other than radioactive decay) changed the ratios. Oceanographers at Oregon State University measured Columbia River outflow to the sea by its chromium-51 content. Natural radon measurements were used to study the movement of underground water and the propensity of soil to retain introduced materials to judge the safety of waste disposal; PNL measured the natural interchange of materials between the air and seawater with beryllium-7.

Oceanographers at Hawaii and Livermore used fission products to measure the growth rate of corals. Woods Hole scientists used natural radionuclides to measure the absorption, desorption, and settling, that is, the processes that remove pollutants from the water and place them in the sediments.

Benefits Knowledge of how quickly the air is purged of pollutants, how pollutants are swept out of the ocean and into the sediments, how fast coastal waters flush, and where the materials in rivers are deposited provides important insights into the ability of the environment to accept human wastes. Thus, some basic issues can be addressed: the carrying capacity of nature's major sinks; the rate at which the land, air, and water can accept civilization's wastes; the time until cleansing mechanisms are operating; and the time and manner in which wastes break down into component parts.