History Research on dry deposition stems from attempts in the 1960s to measure worldwide fallout of radioactive debris from weapons testing. Dry deposition on grazing lands was of particular concern because it introduced radioiodine into the food chain. Researchers identified the phenomenon and developed a now widely used system that collects dry and wet deposition separately. The early monitoring efforts resulted in a body of data but also made clear the inadequate understanding of the underlying physics. The results of OHER-supported research into aerosol phenomena was combined in 1973 with other advances in aerosol research and with the emerging electronics technology to produce a new electrical aerosol analyzer for surface-level use. Compared with the preceding electrical analyzer, the prototype achieved an approximate sixfold reduction in size and weight. Recognizing its potential, TSI, Inc., an instrument manufacturer, completed the design and engineered a reliable electronics package for the unit. After its market introduction in 1974, the unit quickly became the standard method for measuring the number and size of submicron-sized particles or drops in aerosols.

Benefits Over 200 units of the electrical aerosol-size analyzer have been sold since its introduction in 1974; nearly one-half of these sales have been to overseas customers. TSI supplied the following approximate domestic sales by category:

Number of units	Applications
50–60	Air pollution monitoring and research
12–15	Diesel combustion research and health effects research
10–12	Military research on smokes, obscurants, and aircraft condensation trail suppression

Other applications include commercial smoke detector development and calibration, research on commercial air filters and demisters, semiconductor clean rooms, and particle-size control of carbon black in tire manufacturing.

A number of health, safety, military, and industrial benefits are associated with the use of electrical aerosol-size analyzers. Air pollution monitoring and research benefits include accuracy in quantifying airborne pollutants, identifying particles small enough to be respirable, and improving the ability to enforce emission regulations for point sources. Benefits arising from diesel combustion and health-effects research include the ability to monitor more precisely the diesel combustion exhaust and to evaluate more effectively the effect of design changes on exhaust products. Research on smokes, obscurants, and aircraft condensation trail suppression enhances the survivability of military personnel and equipment. Industrial benefits include clean-room monitoring, leading to a lower rejection rate of electronic components and assemblies; particle-size control of carbon black used in tire manufacturing, resulting in greater tire treadwear; and miscellaneous applications, such as smoke detector development and calibration, information on the effects of pollutants on plant growth, and development of commercial air-cleaning filters and demisters.

A sound understanding of the complex relationships between pollutant emissions and pollutant concentrations in the environment is essential for promulgating sound environmental policy. In this regard, research on dry deposition and resuspension can benefit society in one of two ways: by providing basic data needed to demonstrate that human and environmental exposures to harmful aerosols are less than currently believed or by demonstrating that the threats are greater than currently believed. In the former case, society can benefit from this information by devoting fewer of its scarce resources to emission controls, and in the latter case, it benefits by taking actions to reduce emissions.

An additional benefit from research on resuspension relates to windblown soil erosion. The physical processes of resuspension and soil erosion are essentially the same. Hence, the results of research on resuspension can be applied directly to the study and prevention of windblown soil erosion.

Identification and Evaluation of Environmental Effects

The concerns resulting from energy production and use have ranged from disturbance of natural systems by mining, deforestation, and drainage to offshore drilling, toxic waste disposal, thermal discharges, and the contamination or pollution of sources of food. Research initiated to gain an understanding of the effects of fallout from weapons tests, potential discharges from weapons production facilities, and pathways radioactive materials and other energy-related materials follow in moving from their source to the size of potential danger has been expanded to encompass pathways of substances through the food chain, underground migration of substances, as well as aspects of radioecology, geology, and many other fields.

Riverine Ecology "Riverine Ecology" is the title given to a group of studies and models developed to understand and describe the environmental impact resulting from industrial heating of river water.

History Beginning in the late 1940s, the environmental impacts of once-through cooling of reactors built for the United States nuclear weapons program at Savannah River and Hanford were the object of research on riverine ecology by the AEC. Later, environmental impacts resulting from once-through cooling of power reactors prompted a major research program at Oak Ridge on riverine ecology. The program focused on power reactors in an effort to anticipate problems the nuclear industry might face in complying