

existing fossil station. In general, at the present time, nuclear power is not economically feasible in unit sizes under about 200,000 to 300,000 kilowatts or when the generating unit is operated at a reduced plant factor. In the last 2 years, more and more utilities have chosen nuclear plants over fossil plants in the larger sizes.

In our discussion of the question of pollution, we will discuss two broad areas—the potential pollution aspects of nuclear power and the technology which has been developed to control pollution.

NUCLEAR POWER AND ITS POLLUTION ASPECTS

The rate of nuclear power growth is increasing more rapidly than the most optimistic forecasters had predicted. In 1964 it was estimated that the installed nuclear capacity in the United States in 1980 would be 60,000 to 90,000 electrical megawatts. The recent large number of nuclear power announcements have raised these 1980 power estimates to 80,000 to 110,000 electrical megawatts.

With this expanding industry, one might reasonably ask if this increased nationwide use of nuclear electric power will produce serious environmental pollution problems or, conversely, if the extent of power reactor waste management operations will be of such magnitude as to deter the orderly development of the industry. The control of reactor effluents, to date, has been carried out in a safe and economical manner, and these operations have not resulted in any harmful effects on the public, its environment, or its resources. We believe this excellent environmental pollution control record will be continued.

We will summarize briefly the state of technology and of the research and development being carried out to achieve this objective.

The potential effluent control problem from nuclear power systems may be considered in two parts: (1) the handling, treatment, and disposal of increasing quantities of liquid, solid, and gaseous wastes with very low levels of radioactivity from the normal operation of civilian nuclear power stations, and (2) the processing and disposal of highly radioactive wastes from facilities which process irradiated reactor fuel to recover the unburned fissionable material.

NUCLEAR POWER REACTORS

While the management of radioactive waste at nuclear power stations is not expected to impede the development of large-scale and widespread nuclear power generation, sufficient quantities of low-activity wastes (liquids, solids, and gases) are produced to require effective and economical collection, handling and management systems, and to insure that effluent control does not become the limiting operational factor in the production of power. The scope and magnitude of these operations vary with each type of power reactor. For example, the satisfactory handling and disposal of gaseous effluents is an important design consideration for organic, gas-cooled, and direct-cycle, boiling-water reactors. The low-activity liquid wastes produced by water reactors are either treated before disposal or are reused as reactor feed water. The nature and quantity of low-activity wastes from thermal and fast breeder reactors will be evaluated as development proceeds on these reactor systems.