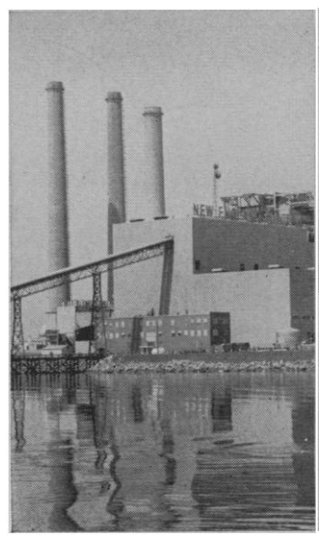
Power Generation and Environmental Change

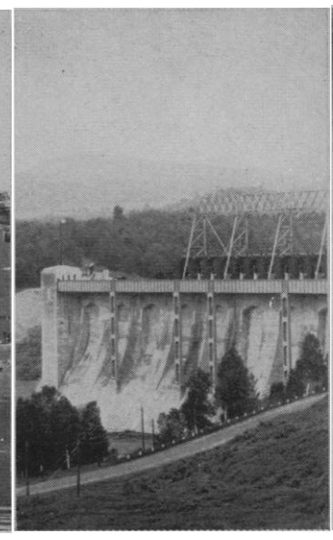
AAAS Symposium

28 December 1969

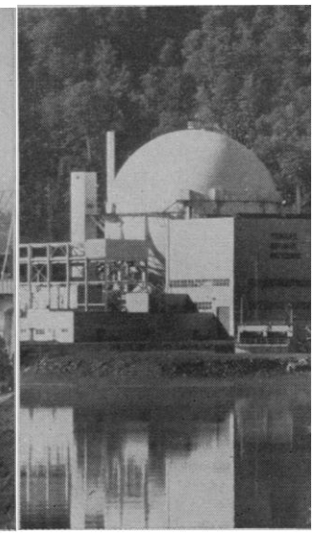
Boston



New England Power Co.
Somerset, Mass.



New England Power Co.
East Barnett, Vermont



Yankee Atomic Electric Co.
Rowe, Mass.

Power generation on the earth is a large-scale engineering enterprise with complex environmental effects. In the future development of the power resource, the challenge to man's ingenuity will be to develop means for minimizing adverse effects and preserving environmental quality. The societal pressure for more power will not decrease; a societal value for environmental quality must be encouraged and the technological means must be sought for reconciling the desires of man with the needs of his environment.

This symposium will consider the three primary means of generating power: nuclear, hydroelectric, and fuel combustion. What are the environmental effects of each, and what can be done to suppress or control them? Nuclear generating plants and nuclear fuel processing plants release radionuclides to the environment in a variety of gaseous, liquid, and solid chemical forms. Hydroelectric dams change the landscape and produce direct change in the ecology of life systems in the newly formed lakes behind the dams, in the rivers in front of them, and in the larger bodies of water into which they drain. Fuel combustion pollutes the air with sulfur and nitrogen oxides and with smoke and changes the balance of carbon dioxide in the atmosphere. In addition, the process of coal mining frequently scars the land and pollutes rivers with the mine drainage. In the process of generating power, the nuclear and fuel combustion plants waste heat which is delivered primarily to the waters near the plants. Most of the usable power generated ultimately reaches the environment in the form of heat as well. In another few decades, the amount of power generated by man will perturb the heat balance of the earth.

The purpose of this symposium is to introduce the ways of generating power, to consider their various effects from an environmental point of view, and to review the technological means available for controlling certain of the environmental interactions. A balanced program for control does not exist; appropriate research and development projects are frequently incomplete and inadequately supported. The field of power generation is split into many separate disciplines, which complicates the processes of analysis and planning. It becomes a single multidisciplinary field, however, through recognition of the importance of the large-scale environmental consequences. We hope that this symposium will initiate a continuing dialogue among all those who share an interest in power generation and environmental change, and will contribute to the definition of a power strategy for the years ahead.

The major portion of the symposium is devoted to papers and short reports. The chairman is James A. Fay (M.I.T.). Merrill Eisenbud (Environmental Protection Administrator of the City of New York) will speak about nuclear reactors and radiation environment. Arthur Tamplin (Lawrence Radiation Laboratory) will discuss the effects of man-made radiation in the biosphere. Floyd Culler (Oak Ridge National Laboratory) will describe means for controlling radionuclides.

The environmental changes that accompany construction of dams in redevelopment regions will be described by Karl F. Lagler (University of Michigan).

There is great concern at the moment about the fate of SO_2 in the atmosphere. Eric Ericcson (University of Stockholm) will speak about the work in Sweden on SO_2 and about nitrogen oxides as well. In discussion, Meyer Steinberg (Brookhaven National Laboratory) will describe SO_2 tracer studies at the national laboratory. Arthur M. Squires (City University of New York) will describe means for controlling the SO_2. Three other related aspects of fuel combustion for power generation will be discussed in short reports, as follows. Wallace B. Behnke, Jr. (Commonwealth Edison) will discuss future needs for power from coal. Gordon A. MacDonald (University of California, Santa Barbara) will discuss CO_2 in the atmosphere. Harry Perry (Department of the Interior) will discuss environmental aspects of coal mining.

The final portion of the symposium will be a panel discussion on waste heat and thermal pollution. The panel chairman will be Lamont C. Cole (Cornell University). The panel members include: William H. Steigelman (Franklin Institute Research Laboratories); Fred E. Smith (Harvard University); Robert T. Jaske (Battelle Northwest); S. Fred Singer (Deputy Assistant Secretary of the Interior for Scientific Programs); Clarence A. Carlson, Jr. (Cornell University); and Walter Belter (A.E.C.).

The symposium has been arranged by Arthur M. Squires, (member of the Committee on Environmental Alteration) and David A. Berkowitz (The MITRE Corporation), who is the executive secretary. The chairman of the Committee is Jack P. Ruina (M.I.T.).

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