

C. INTRODUCTION

The Environment, Health and Safety section of this report contains discussions of issues in the title categories which relate to more than one of the energy research and development areas in the ERDA organization or which are general to the whole topic of energy research and development from the purview of environmental, health or safety considerations. Environmental and health issues specific to individual technologies or energy resources are discussed in those sections of the report, with cross reference as appropriate to this section.

The issues identified in this section fall into four major topical areas: environmental impacts of alternative technologies; systems aspects of environmental impact assessment; institutional problems relating to environmental, economic and social issues; and health factors relating to energy resource development and applications of energy systems. The principal conclusions derived from this work are briefly summarized in the following paragraphs.

Technology Issues

The ERDA Plan is heavily weighted toward electrification of energy-consuming activities. Implied in this emphasis on electrification is a requirement for extensive additions to the electrical transmission network and a shift to ultra high voltage transmission to reduce transmission losses. While interest and program objectives concerning biological, health and environmental impacts of high voltage transmission technology are stated in the ERDA program, no explicit scheduling or resource information appears in the ERDA documents to relate those programs to the schedules and decision points in the high voltage transmission technology programs (Issue 1).

In resource recovery and mining, only limited attention is being paid to mining and associated ground-water pollution, with inadequate effort devoted to the definition of hydrological baseline data (Issue 2). Potentially irreversible climate

modification on a global scale is a risk of continued efforts to meet increases in energy demand. ERDA has not developed a program to examine the relative heat rejection and atmospheric pollutant emission consequences of new technologies, especially the "inexhaustible" but highly inefficient processes, and their potential impact on global climate balance (Issue 3).

Environmental quality regulations in their present form are designed to protect the environment and the public health by limiting the emission of pollutants from potential sources. The necessary programs to develop new energy technologies and the environmental control technologies associated with them could be severely hampered by inflexible application of the current environmental regulations (Issue 4).

Systems Aspects of Environmental Assessment

It is not clear from the ERDA Plan and Program that critical needs in energy modeling procedures and the associated data requirements are fully recognized and accepted by ERDA (Issue 5). There are serious questions concerning the impact on air quality of the addition of new energy facilities to the existing field of air pollution sources. Simple extension of energy systems modeling to the regional level will not yield a valid assessment of potential environmental impacts (Issue 6).

The ERDA Program document contains an extensive description of proposed activity in environmental, health, social and institutional topics. Almost all of this description occurs in the sections of the report devoted to Environment and Safety and Systems Studies. Discussion of these topics in the sections of the report devoted to technology development generally consisted of one-line statements recognizing the existence of a potential constraint. There was no reference to the environmental or health research programs in the schedules appended to technology-oriented sections. Interviews with ERDA personnel

yielded the strong impression that the stated objective of integrating the environmental control research into the technology development is at present illusory. Given that environmental, health, social and institutional problems are likely to impose serious constraints on implementation of ERDA's programs, much better integration of these concerns into the pursuit of the technology programs themselves is indicated (Issue 7).

Existing regulations concerning air and water quality and some which will become effective in the next few years may impose significant energy costs or environmental impacts in categories which are not encompassed by the regulating agency. There has been no systems evaluation of the interactions between environmental regulations and their total effect. This is a valid and important area of inquiry for ERDA which has not been addressed (Issue 8).

The problems of water availability for coal conversion to liquid or gaseous fuels, shale oil retorting, electrical generation by any means and other energy oriented activities will have to compete with other uses for water in water-short areas (Issue 9). These same activities and associated mining and waste management operations may impact water quality in the same areas, thus potentially affecting agriculture and domestic and municipal water supplies.

Social and Institutional Issues

The entire discussion of interagency activities in the Program document indicates poor coordination between ERDA and other agencies and

equally poor definition of jurisdictional responsibility in critical areas of cooperative effort on potential environmental, social and institutional problems. These problem areas will probably pose the most serious constraints to implementation of ERDA's programs in several technology areas and may jeopardize the achievement of ERDA's goals if not properly addressed in a timely manner (Issues 8, 10, and 11),

Health Effects Issues

At this time, the adequacy of air quality regulations concerning sulfur dioxide is being questioned [Issue 14]. The complex interaction between sulfur oxides and other constituents in the atmosphere, natural and man-induced, is the subject of extensive study by EPA, ERDA and others. The outcome in terms of sulfate standards for protection of public health and environmental quality is unknown, but could have a serious constraining effect on achievement of ERDA's Plan, which relies heavily on coal in the near and intermediate term. The health programs relating to potential new chemical intrusions from coal conversion and oil shale programs, some of which may be potent carcinogens, were also questioned (Issue 13). In the general area of health studies, there is little evidence of a serious effort to define the relative priority between programs. There are also indications that ERDA is involved in programs which do not relate to its energy mission and needs to reassess the usefulness of other programs in terms of the validity of the results these programs will yield (Issue 12).