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Office of Environmental Engineering and Technology

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# **The Federal Nonnuclear Energy Research and Development Act (Public Law 93-577) Section 11**

## **Environmental Evaluation**

### **Report to the President and Congress**



Public Law 93-577  
93rd Congress, S. 1283  
December 31, 1974

## An Act

To establish a national program for research and development in nonnuclear energy sources.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

### SHORT TITLE

SECTION 1. This Act may be cited as the "Federal Nonnuclear Energy Research and Development Act of 1974".

Federal Non-  
nuclear Energy  
Research and  
Development  
Act of 1974.  
42 USC 5901  
note.  
88 STAT. 1878

### ENVIRONMENTAL EVALUATION

SEC. 11. (a) The Council on Environmental Quality is authorized and directed to carry out a continuing analysis of the effect of application of nonnuclear energy technologies to evaluate—

42 USC 5910.

(1) the adequacy of attention to energy conservation methods; and

(2) the adequacy of attention to environmental protection and the environmental consequences of the application of energy technologies.

(b) The Council on Environmental Quality, in carrying out the provisions of this section, may employ consultants or contractors and may by fund transfer employ the services of other Federal agencies for the conduct of studies and investigations.

(c) The Council on Environmental Quality shall hold annual public hearings on the conduct of energy research and development and the probable environmental consequences of trends in the development and application of energy technologies. The transcript of the hearings shall be published and made available to the public.

Hearings.

Transcript,  
availability.

(d) The Council on Environmental Quality shall make such reports to the President, the Administrator, and the Congress as it deems appropriate concerning the conduct of energy research and development. The President as a part of the annual Environmental Policy Report required by section 201 of the National Environmental Policy Act of 1969 (42 U.S.C. 4341) shall set forth the findings of the Council on Environmental Quality concerning the probable environmental consequences of trends in the development and application of energy technologies.

Report to  
President,  
Administra-  
tor, and  
Congress.

United States  
Environmental Protection  
Agency

Office of  
Research and Development  
Washington D.C. 20460

EPA 600/9-80-008  
January 1980

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Office of Environmental Engineering and Technology

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# **The Federal Nonnuclear Energy Research and Development Act (Public Law 93-577) Section 11**

## **Environmental Evaluation**

## **Report to the President and Congress**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

LETTER OF TRANSMITTAL

THE ADMINISTRATOR

THE PRESIDENT AND CONGRESS OF THE UNITED STATES

I am pleased to submit herewith the Environmental Protection Agency Report to the President and Congress of the United States in accordance with the direction contained in Section 11 of the Federal Nonnuclear Energy Research and Development Act of 1974 (PL 93-577).

The Act calls upon the Agency to analyze the effect of application of nonnuclear energy technologies to evaluate - (a) the adequacy of attention to energy conservation methods; and (b) the adequacy of attention to environmental protection and the environmental consequences of the application of energy technologies.

This report sets forth the Agency's findings concerning the consequences of trends in the development and application of energy technologies. In our report, we have sought to define both the scope and context of these issues. By presenting and considering the comments of other interested parties obtained in public hearings mandated by the Act, the report reflects the full range of opinions available to the Agency during our deliberations.

I trust that the report proves fully satisfactory. If such is not the case, or if there are any additional questions, please contact me.

Sincerely yours,

A handwritten signature in black ink, which appears to read "Douglas M. Costle", is written over the typed name.

Douglas M. Costle

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## **ABBREVIATIONS**

<b>DOE</b>	<b>Department of Energy</b>
<b>DOI</b>	<b>Department of Interior</b>
<b>EAC</b>	<b>Environmental Advisory Committee</b>
<b>EA</b>	<b>Environmental Assessment</b>
<b>ECC</b>	<b>Environmental Coordination Committee</b>
<b>EDP</b>	<b>Environmental Development Plan</b>
<b>EIS</b>	<b>Environmental Impact Statement</b>
<b>EPA</b>	<b>Environmental Protection Agency</b>
<b>ERD</b>	<b>Environmental Readiness Document</b>
<b>ESAAB</b>	<b>Energy Systems Acquisition Advisory Board</b>
<b>MSA</b>	<b>Major System Acquisition</b>
<b>NEPA</b>	<b>National Environmental Policy Act</b>
<b>PEP</b>	<b>Project Environmental Plan</b>
<b>PPBS</b>	<b>Planning Programming and Budgeting System</b>
<b>PPMS</b>	<b>Program and Project Management System</b>
<b>RD&amp;D</b>	<b>Research, Development, and Demonstration</b>



## EXECUTIVE SUMMARY

### Introduction

Under Section 11 of the Federal Nonnuclear Energy Research and Development Act of 1974 (Public Law 93-577), the Environmental Protection Agency (EPA) is now responsible for an annual review of

the adequacy of attention to energy conservation methods and environmental protection...and the environmental consequences of the application of energy technologies...within the Federal Nonnuclear Energy Research and Development Program...

Past Section 11 reviews have revealed that the public is deeply divided on how research resources should be allocated and has little knowledge of how the Department of Energy (DOE) plans and manages research, development, and demonstration (RD&D) for nonnuclear technologies. Consequently, this year's Section 11 program examined DOE's "adequacy of attention" not in terms of the relative share of the RD&D budget given to particular technologies, but rather in terms of how information on "conservation methods and environmental protection" is used in major DOE management decisions controlling technology RD&D.

The 1979 Section 11 review initially focused its attention on the Program and Project Management System (PPMS) which was DOE's basic system for reviewing major technology RD&D projects. During the course of the analysis, however, it became clear that many problems associated with the environmental aspects of technology development were not a function only of PPMS but resulted also from conflicting program and policy priorities. Many of these conflicts extend far beyond the Department's control and reflect the differing views of the American public regarding energy policy. The findings and recommendations presented in this report are not limited to this project review system, but also address certain aspects of the nonnuclear energy RD&D policy process. However, since the scope of this review is limited to environmental and energy conservation concerns, comments on the overall policy process are made from that perspective and may not reflect all the factors which bear on the process.

A number of changes have occurred within DOE since the 1979 Section 11 analysis was completed. These include the following:

- PPMS has been superseded by a new Project Management System. A manual describing this new system is currently in preparation.
- A Planning, Program, and Budgeting System has been developed for the Department that integrates programs, projects, and the budgetary process.
- A Conservation Strategy prepared by the Office of Conservation and Solar Energy is being revised by that Office and Secretary Duncan's staff.
- Two new DOE committees have been established to enhance Federal, State, and local coordination and cooperation.
- A Health Effects Assessments Program has been initiated within DOE's Office of Environment to improve the Office's ability to conduct cross-technology analyses.
- A *Citizen Participation Manual* was published to assist all DOE Offices in designing and implementing public involvement programs.
- The Office of Environment commissioned a study of the Environmental Advisory Committee (EAC) "assessing its first year's operation and identifying areas that needed improvement and suggested actions to enhance the effectiveness of the Committee." The results of the study are to be presented during the mid-January 1980 meeting of the EAC.

It is likely that some of the problems discussed in this report will be alleviated by these changes.

### Organization of the Report

The two major Section 11 activities for this year are detailed in Chapter I. They involved: (1) an analysis of DOE's review and decisionmaking process for nonnuclear RD&D projects, and (2) wide-ranging discussions with the public, structured through workshops and hearings. Appendices A and B summarize the workshops and Hearing.

The mechanism established by DOE in 1978 for setting the pace of federally supported energy technology development and for undertaking the

technical, economic, and environmental review of RD&D projects was the Program and Project Management System. This system is described in Chapter II. The 1979 Section 11 review was based on this project review system and other DOE procedures in operation until the fall of 1979. Chapter II also summarizes recent changes in DOE that are relevant to this report.

Analysis of the findings gained from the Section 11 review resulted in recommendations in six areas. These recommendations have the following overall goals:

- To suggest areas in which DOE's attention to environmental issues in its management and decisionmaking process could be improved.
- To indicate steps DOE can take to improve its credibility with the public and demonstrate that it is giving "adequate attention to energy conservation and environmental protection."

Chapter III discusses in detail the findings and recommendations from the Section 11 program. These recommendations are summarized briefly below.

## **Major Findings and Recommendations**

### **A. Nonnuclear Energy RD&D Priorities**

DOE's priorities do not appear to reflect systematic comparative evaluations of alternative technologies. In particular, environmental attributes are not compared and supply technologies are not evaluated against the potential for reducing demand through energy conservation measures. An approach to such comparisons is to base them on the ultimate "end use" of the energy. *DOE priorities should reflect systematic and explicit comparisons of production and conservation alternatives. The comparisons should establish priorities on the basis of energy efficiency and environmental attributes.*

### **B. Purpose of DOE Nonnuclear RD&D**

The major barrier to commercial use of a technology is, in many cases, a high degree of uncertainty. This includes uncertainty about environmental performance, engineering performance, and process costs. The primary purpose of

energy RD&D is to generate information to reduce this uncertainty and to solve the problems associated with various technologies. *DOE program and project plans should be based on an evaluation of the barriers preventing the development of energy technologies, such as the availability of effective environmental control technologies. Research should be specifically directed toward overcoming these barriers.*

### **C. Project Review Process**

In the past, high-cost, large-scale projects have appeared to receive a disproportionate share of senior DOE management attention through the project management system. Research programs such as those in the area of conservation which involve numerous small projects have not received comparable senior Department-wide review. Further, projects with potentially severe environmental impacts do not appear to be assured of comprehensive review. *DOE's project review process should be modified to provide a more balanced and comprehensive review that includes more evaluation of such programs as energy conservation.*

### **D. Evaluation Criteria for Technology Development**

It is not clear what formal environmental criteria, if any, DOE uses as a basis for project reviews and priority-setting. The development of explicit criteria and consistent, systematic application of them would contribute significantly to DOE's credibility in addressing environmental concerns. *DOE should develop explicit environmental criteria for use in formulating energy policy and evaluating technology development, and submit those criteria for public and peer review. The criteria should facilitate quantitative cross-technology comparisons, where possible, and include explicit examination of health, environmental, and socioeconomic impacts.*

### **E. Resolution of Environmental Issues at the National, Regional, and Local Levels**

The development of an energy technology requires that environmental problems be addressed at three levels: local site-specific (e.g., ground water contamination); regional or cumulative (e.g.,



water resource use); and national (e.g., health effects). DOE's management process does not appear to assure that potential problems at each level are clearly identified and resolved in a timely and effective manner, or that responsibility for analysis of regional and site-specific impacts is clearly defined. *DOE should clearly assign organizational responsibilities, and allocate resources for effectively treating environmental issues at local, regional, and national levels. DOE should involve State and local agencies in the resolution of environmental issues in order to both expedite and improve the process.*

#### **F. Public Participation in Nonnuclear RD&D**

Workshop and Hearing participants felt strongly that DOE does not systematically involve the public in the energy technology development decision process except as required by the National Environmental Policy Act. Since the public has not routinely been offered the opportunity to comment on the environmental documents associated with the project review process, it has been hindered in its participation in early decisions on energy technology development. *DOE should systematically involve the public in a timely and meaningful manner in consideration of the environmental aspects of policy development, program planning, and project management.*

Hearing witnesses claimed that well-funded public interest groups, industry and scientists have been overrepresented in DOE public participation forums, and that members of the general public who are well-educated on energy matters often cannot afford the time and cost of presenting their views. *DOE should actively pursue means by which a broader cross section of the public can be represented in the Department's decisionmaking processes.*

DOE has few effective mechanisms for distributing information to the public, and many of the materials disseminated are difficult for the public to read and understand. *DOE should improve its efforts to provide citizens with the information necessary for them to understand and comment effectively on energy development.*

The DOE Environmental Advisory Committee was established in early 1979 to advise the Secretary on "policies that affect the environment and the safety of the general public." However, the committee's role within the Department is not well understood. *DOE should clarify the role of the Environmental Advisory Committee and link the Committee's functions more directly to Departmental activities.*

## I. OVERVIEW OF 1979 SECTION 11 ACTIVITIES

### The Section 11 Mandate

The Federal Nonnuclear Energy Research and Development Act (Public Law 93-577) was passed in December 1974 as part of the national response to the effects of the 1973 Arab Oil Embargo. The legislation created a comprehensive national research, development, and demonstration (RD&D) program for nonnuclear energy technologies, with total Federal investments of nearly \$20 billion over a 10-year period. Further, it required the development of the

...technological capabilities to support the broadest range of energy policy options through conservation and the use of domestic resources by socially and environmentally acceptable means.

Section 11 of Public Law 93-577 directs an annual review of

...the adequacy of attention to energy conservation methods and environmental protection...and the environmental consequences of the application of energy technologies.

The Office of Environmental Engineering and Technology within the Environmental Protection Agency's (EPA) Office of Research and Development has been assigned responsibility for the review and is charged with conducting annual public hearings and preparing this Report to the President and Congress.

### Focus of Activities

The Section 11 activities in 1978 focused on the allocation of the Department of Energy's (DOE) RD&D budget resources among competing energy technologies. During the public hearings, it became apparent that there were deep differences of opinion on how research dollars should be spent. However, there was one point on which witnesses did agree: outside the Department of Energy there is a general lack of understanding of DOE's decisionmaking processes and the manner in which environmental considerations enter these processes. This lack of understanding appears to have damaged DOE's credibility with the public, generating controversy rather than consensus on how to deal with the Nation's energy problems.

Consequently, the 1979 Section 11 program did not evaluate specific budget allocations. Rather, the planning and management *processes* were examined to ascertain how they address concerns for environmental protection and energy conservation. In other words, this year the "adequacy of attention" was evaluated not in terms of the relative share of the RD&D budget given to particular technologies, but rather in terms of how information on "conservation methods and environmental protection" is used in the major management decisions controlling DOE's technology RD&D.

### Specific Section 11 Activities

The 1979 Section 11 activities had two components: an analysis of how environmental concerns are treated in DOE nonnuclear RD&D, and discussions with the public about the adequacy of DOE's attention to these environmental concerns. Specific activities of the Section 11 program included preparing and distributing background documents, and conducting regional workshops and a National Hearing.

This year's program began with an investigation of the procedures and documents used by DOE to guide the development of energy technologies, focusing on environmental review and its integration with technology development. The investigation resulted in publication of a document describing DOE's major project review system and associated environmental assessments.\* This document also provided a case study of the application of these procedures to geothermal energy RD&D. Five other case studies were prepared to describe how the project review system and associated environmental assessments were related to the development of additional technologies. A range of technologies was selected—from environmentally benign or beneficial, such as cogeneration, to those with the potential for serious environmental effects, such as coal liquefaction.\*\*

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\* The Federal Nonnuclear Research and Development Act (Public Law 93-577), Section 11, Environmental Evaluation, EPA 600/9-79-020, June 1979.

\*\* EPA Issue Paper on Urban Waste and Cogeneration Technologies, July 12, 1979; EPA Issue Paper on Oil Shale Technologies, July 18, 1979; EPA Issue Paper on Coal Liquefaction and Coal Gasification Technologies, July 31, 1979.

These documents were distributed to a wide range of public interest, environmental, government, labor, and industry representatives, along with invitations to one of four workshops where one or two technologies and the project review process would be discussed.

Workshops were held in Atlanta, Denver, San Francisco, and Pittsburgh. At the workshops, technology development and environmental assessment were reviewed, with workshop members participating in an evaluation of these processes. Each workshop focused specifically on technologies under development in that region. A summary of the workshop proceedings is included in Appendix A to this report.

Following the workshops, a document synthesizing participants' comments, questions, and concerns was prepared.\* This document outlined five issues which had emerged as overall themes during the workshops:

- The appropriate level for treating environmental concerns;
- The types of projects receiving major management attention;
- The criteria used in evaluating individual technologies;
- The role of the public in evaluating environmental issues; and
- The integration of environmental factors into technology decisionmaking.

These issues served as focal points for the National Hearing. Although Hearing witnesses were not limited to consideration of these particular issues in their testimony, they were encouraged to examine them and present recommendations. In

preparing testimony, witnesses were asked to consider how their recommendations would affect the adequacy of attention given to environmental concerns within DOE, and how they might be implemented by the Department.

The National Hearing, mandated by Section 11(c) of Public Law 93-577, was held October 3-5, 1979, in Washington, D.C. Thirty-five witnesses, representing the general public, various interest groups, environmental and alternative energy groups, State and local governments, research scientists, and industry, testified during the 3 days. Hearing panel members included the DOE Assistant Secretary for Environment, and representatives from EPA, the Council on Environmental Quality, Congressional Staff, environmental groups, State government, and industry. A transcript of the Hearing will be published separately but a summary of comments and testimony at the Hearing is included in Appendix B.

### **Organization of this Report**

The remainder of this report is organized as follows:

- Chapter II presents a brief description of DOE's major project review system, upon which the workshop and Hearing discussions were based, and outlines recent changes in DOE which are relevant to the 1979 Section 11 review.
- Chapter III discusses the issues raised in the 1979 Section 11 Program, and presents recommendations for resolving these concerns and improving DOE's energy technology decisionmaking.
- Appendices A and B are detailed presentations of the comments made during the regional workshops and National Hearing, respectively.

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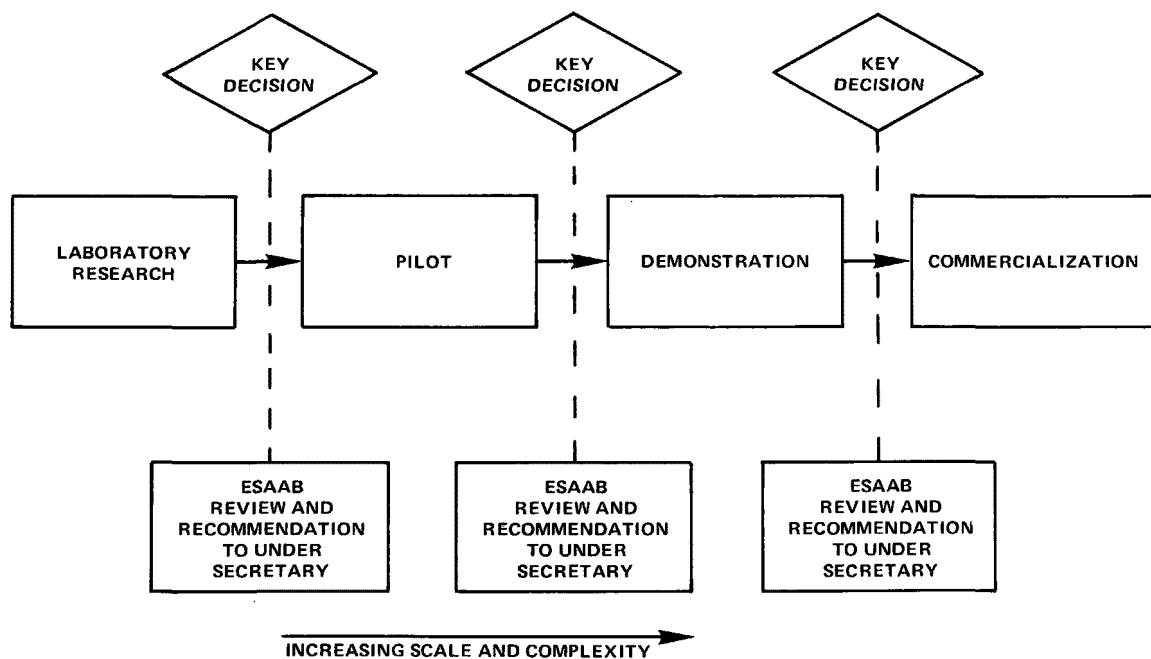
\* Background Document for the National Hearing, EPA 600/9-79-033, September 1979.

## II. DOE TECHNICAL AND ENVIRONMENTAL PROJECT REVIEW PROCESS

### Overview of the RD&D Project Review Process

The Federal Nonnuclear Energy Research and Development Act of 1974 requires DOE to accelerate the development of alternative energy technologies consistent with national energy policy as laid out in the biennial National Energy Plans. As part of its responsibility to implement energy policy, DOE conducts research programs to develop technologies that are technically feasible, economically practical, and environmentally acceptable. Within each program, specific projects are funded to move an emerging technology from basic research to commercial acceptance. The projects progress through several stages of increasing complexity and scale—laboratory, pilot, demonstration, and commercialization. At the end of each stage, a decision must be made whether or not to advance the technology to the next stage.

The 1979 Section 11 Program examined a number of DOE management systems to determine how environmental concerns affect nonnuclear RD&D. The Program and Project Management System (PPMS) was selected for indepth analysis because it was the principal DOE system guiding the review and approval of DOE's major technology development projects. The basic purpose of PPMS was to structure the review of individual projects at the end of each development stage before additional Federal resources were committed. Each project was evaluated at these decision points for technical feasibility, cost, and environmental acceptability—but no comparisons were made between projects. This review was conducted by an Energy Systems Acquisition Advisory Board, consisting of senior DOE officials, including the Assistant Secretary for Environment. As a result of this review, recommendations were made to the DOE Under Secretary who determined whether a project should advance to the next stage of development. Participation in this review was important to the DOE Office of Environment because it provided a direct link to the development, approval, and execution of DOE's major technology projects. A general outline of the process is illustrated below.



ESAAB = Energy System Acquisition Advisory Board

FIGURE 1. MAJOR SYSTEM ACQUISITION REVIEW PROCESS

Only projects designated as "Major System Acquisitions" are consistently reviewed by senior DOE management. DOE uses many factors to determine whether a project will be designated as a Major System Acquisition, however, the principal factor is the level of Federal support.\* Of approximately 300 nuclear and nonnuclear DOE technology RD&D projects now underway, only 25 to 30 are Major System Acquisitions. These account for about 50 percent of the total Departmental budget for energy RD&D.

DOE energy projects not designated Major System Acquisitions are under the management responsibility and direction of the appropriate energy technology Program Office. These projects are reviewed only by the appropriate Assistant Secretary or the Director of Energy Research. For these projects, environmental concerns are addressed by an Environmental Coordination Committee (ECC). The functions of the ECC are to provide a forum for the exchange of viewpoints between the Office of Environment and the technology Program Offices, and to oversee the preparation and implementation of environmental planning documents.

### **Environmental Planning, Review, and Assessment Documents**

For all RD&D projects, both Major System Acquisitions and others, environmental research is planned and assessed in a series of documents:\*\*

#### **A. Planning Documents**

Environmental Development Plans identify environmental concerns and plan research to address those concerns. These plans describe environmental, safety, and health research required at each stage of program development so that decisionmakers will have this information as they consider budgetary allocations for further development of technology projects. Preparation of the Environmental Development Plan for each program is the

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\* For example, development cost criteria stipulate that a project is considered "a major system acquisition" if there is a total estimated Government cost share in excess of \$50 million in the technology development phase or \$200 million over the life of the system or project.

\*\* Many of these documents existed before the PPMS was implemented, and it seems likely they, or some variant of them, will be retained in any new management system.

responsibility of the Environmental Coordination Committee. This Committee functions through subcommittees designated for each technology. Subcommittees include representatives from both the Office of Environment and the appropriate Program Office. The subcommittees prepare Project Environmental Plans, which detail the site-specific environmental research to be conducted for each major project.

#### **B. Review and Assessment Documents**

Three documents—Environmental Readiness Documents, Environmental Assessments, and Environmental Impact Statements—are used to assess the environmental acceptability of energy projects.

Environmental Readiness Documents serve several purposes. As assessments prepared independently by the Office of Environment, they are used by the Assistant Secretary for Environment to advise the Energy Systems Acquisition Advisory Board or a Program Manager as to whether it is suitable for an energy technology to move to the next stage of development. Environmental Readiness Documents present the results of environmental research already carried out, and provide further definition of concerns and research needs for subsequent stages of development. As reference documents, Environmental Readiness Documents are also designed to be useful in "scoping" environmental concerns and supporting Environmental Impact Statement preparation.

The National Environmental Policy Act of 1969 (NEPA) requires Federal agencies to prepare Environmental Impact Statements for major actions that significantly affect the quality of the environment. An Environmental Assessment is a preliminary analysis to determine whether the impact of an action will be significant, and is used to decide if preparation of an Environmental Impact Statement is necessary. At the present time, Environmental Impact Statements provide the major opportunity for public input into DOE decision-making through legislatively required review and comment.

A further description of NEPA and internal DOE environmental documents is given in Figure 2.

DOCUMENT	PURPOSE	CONTENTS	PREPARER	PUBLIC ACCESS	TIMING
1. Environmental Development Plans (EDP)	Define major environmental concerns associated with a particular energy technology and general environmental research requirements for addressing those concerns.	<ul style="list-style-type: none"> <li>Define environmental concerns.</li> <li>Assess status and risk.</li> <li>Identify R&amp;D needs.</li> <li>Describe R&amp;D plan.</li> </ul>	Office of Environment in conjunction with ECC subcommittee for that technology.	Internal document, available by request.	Annual revision of EDPs is formally called for, however, major updates of EDPs will likely coincide with PPMS phases in the future.
2. Energy System Acquisition Project Environmental Plans (PEP)	Plan environmental R&D for a specific project.	<ul style="list-style-type: none"> <li>List research projects (including NEPA requirements).</li> <li>Identify the sponsoring office.</li> <li>Specify funding requirements.</li> <li>Provide a research completion schedule.</li> </ul>	Office of Environment in conjunction with ECC subcommittee for that technology.	Internal document, available by request.	In conjunction with site-specific technology research plan.
3. Environmental Readiness Documents (ERD)	Review environmental status of a particular technology and serve as formal Office of Environment input to DOE technology development decisions.	<ul style="list-style-type: none"> <li>Assess environmental readiness of a technology to move on to the next development stage.</li> <li>Discuss current and potential regulations affecting technology and control technology options.</li> <li>Assess delays and costs associated with adverse environmental findings.</li> </ul>	Office of Environment in conjunction with ECC subcommittee for that technology.	Internal document, available by request.	Prior to PPMS decision gates.
4. Environmental Assessments (EA) and Environmental Impact Statements (EIS)	EAs evaluate if EISs should be prepared in order to meet NEPA requirements. EISs assess environmental impacts of proposed major Federal actions.	<ul style="list-style-type: none"> <li>Describe proposed actions.</li> <li>Describe probable impacts.</li> <li>Describe unavoidable adverse impacts.</li> <li>Describe possible alternatives.</li> </ul>	Technology program manager.	Public review required by NEPA.	Contained in the EDPs and PEPs.

FIGURE 2. DOE ENVIRONMENTAL DOCUMENTS



## Recent Changes in the Department of Energy

Several changes have occurred recently in DOE organization and procedures which are relevant to the issues raised in this report. Some of these changes may alleviate specific problems described in our findings and recommendations. However, timing of the changes has precluded an indepth assessment of their effects, so they have not generally been incorporated into the discussion of issues.

### A. Program Planning and Policymaking

The Department of Energy is in the process of updating several Internal Management Directives and Secretary-level memoranda to improve its policymaking and program planning. A Planning, Program, and Budgeting System (PPBS) is under development within the Department to provide a multiyear system relating budget cycle evaluation and program/project reviews.

A draft Policy, Programming, and Fiscal Guidance Document in support of PPBS is now under review within DOE. This document is an attempt to describe the Department's energy policies and programs/projects and their rationale. It is primarily to be used as guidance for preparation of 5-year DOE program requirements for Fiscal Years (FY) 1982-1986. The FY 1982-86 program development cycle began when the Policy, Programming, and Fiscal Guidance Document was drafted and distributed for internal DOE comment in mid-December, 1979. The PPBS will be the management system used by the Department to establish and maintain the 5-year Energy Program and the Departmental budget.

### B. Project Management

A recently completed DOE *Project Management System Study* reviewed the PPMS and other project-level systems and recommended changes to "tighten and simplify procedures, establish clear lines of responsibility, ensure appropriate delegation of authority, and establish management accountability for project activities."\*

A manual which describes the new Project Management System is under preparation and scheduled to be completed in early 1980. Following is a description of the new system taken from the *Study*.

The DOE Project Management System is intended to be an umbrella system tying together and integrating all Departmental organizations and systems which have roles in project management... The requirements of this management system are mandatory for the Department's Major System Acquisitions and Major Projects; the general principles should be used for other projects as far as practical. Uniform guidelines for application to other projects may be developed, if needed, after additional experience with the system has been gained...\*

### C. Environmental Evaluation

A newly formed Health Effects Assessment Program within DOE's Office of Environment is attempting to develop information on health and ecological effects of energy-related pollutants. Specifically, it is attempting to formulate scientifically defensible, quantitative criteria and data, assessing health risks from energy technology-related pollutants.

### D. Conservation Strategy

In the fall of 1979, Energy Secretary Charles Duncan requested that the DOE Office of Conservation and Solar Energy complete a conservation strategy paper that detailed current government conservation programs and possible new initiatives to cut energy consumption. A draft Conservation Strategy Paper was completed in early November 1979.\*\*The strategy paper was divided into several sections, including an overview of U.S. conservation strategy, "cross-sectoral" programs and initiatives, and conservation in the residential/commercial, the industrial, the transportation, and the utility sectors. In the overview of the paper, it was stated that "greater energy efficiency and reduced petroleum consumption can be achieved without adverse effects on present or future economic well-being," but that "this potential will only be achieved through a concerted effort to overcome a variety of significant barriers."

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\*ibid. p. 2.

\*Department of Energy, *Project Management System Study*, DESM 79-1, *Summary of the Report*, p. 1.

\*\*Draft U.S. Conservation Strategy, DOE Office of Conservation and Solar Energy, November 2, 1979.

During the fall, the document was modified to incorporate more specifically the Department's 1980 conservation objectives. The DOE Office of Conservation and Solar Energy is now preparing a fully documented strategy and program objectives report.

### E. Intergovernmental Coordination

DOE has recently taken two significant steps to enhance intergovernmental coordination and cooperation. On October 1, Secretary Duncan established an Intergovernmental Affairs Council within the Department to promote internal coordination and to facilitate the close cooperation of the Department with State, local, and Indian governments.\* The purposes of the Council include: providing a forum for resolving issues; involving State, local, and Indian governmental leaders in developing energy priorities, policies, and programs; and coordinating DOE resources for intergovernmental initiatives. The membership of the Council consists of 20 officials and delegates from within the Department, representing every principal operating and staff component and including Regional Representatives.

On November 30, Secretary Duncan announced the establishment of a Local Government Energy Policy Advisory Committee which "will focus, first and foremost, on developing procedural mechanisms that will enable local government officials to participate actively in the formulation and implementation of national energy policies."\*\*

The specific purposes of the Committee are to help ensure that energy programs and legislation reflect and respond to the needs of local governments, that components of the Department of Energy are coordinating their activities with local governments, where appropriate, and to enhance intergovernmental communication generally. Thirty-three State, county and city officials nationwide were asked to serve on the Committee.

### F. Public Participation

Over the summer, DOE published a *Citizen Participation Manual* to assist DOE officials in designing and implementing public involvement

programs. In general, the *Manual* presents a positive commitment to the concept of public participation:

The legislation establishing the Department of Energy (DOE) (Public Law 95-91, Title I, Section 102) directs DOE to provide for, encourage, and assist the public to participate in the development and execution of national energy programs.

Public understanding of the complexities of energy issues and public involvement in the decision process addressing these issues are essential steps in achieving an effective national energy policy. Because of time and resource constraints in the past, many of our programs and activities have not been well understood by the general public, resulting in a lack of basic understanding of the nature and objectives of such programs. We must improve our ability to effectively communicate with and respond to the energy concerns of the American people. Only through open and constructive communication can we work together to develop acceptable solutions to the energy problems facing the Nation."

(Cover memorandum from former Deputy Secretary John F. O'Leary.)

The *Manual* indicates that there are four categories of DOE administrative processes which call for public participation: regulation development, policy development, planning, and program operations. It stresses that

public participation must be integrated into the total process so that events are relevant to the decisions and schedules of the administrative process.

### G. Environmental Advisory Committee Study

A study of the operation of the Environmental Advisory Committee was commissioned by the DOE Assistant Secretary for Environment for use at the Committee's January 1980 meeting. The purpose of the study was to "identify areas that needed improvement and suggest actions to enhance the effectiveness of the Committee."\* The study found that, although the Committee contained a good mix of member capabilities and leadership potential, neither DOE nor Committee member expectations had been met during the first year. The study's major recommendations call for DOE and the Committee to clarify their expectations, and to agree upon "a new covenant" to meet them.

\*DOE Intergovernmental Affairs Council Charter, October 7, 1979.

\*\*DOE News Release, "Energy Secretary Establishes Local Government Advisory Group." R-79-510, November 30, 1979.

\**The First Year: An Assessment*, Delphi Research Associates, January 1980, p. 2.

## H. National Environmental Policy Act

On July 18, 1979, DOE announced proposed guidelines for compliance with the Council on Environmental Quality (CEQ) Regulations issued as a result of the National Environmental Policy Act. The DOE guidelines state that the Department will "incorporate into early planning processes a careful consideration of the potential environmental consequences of its proposed actions, and appropriate alternative courses of action."\*

The CEQ Regulations require that environmental analyses concentrate on alternatives and include

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\*Department of Energy: *Compliance with the National Environmental Policy Act, Proposed Guidelines*, Federal Register, Volume 44, No. 139, Wednesday, July 18, 1979.

"scoping, an early and open process for determining the scope of the issue to be addressed." In addition, they require a tiering concept

which provides for focusing on the actual issues ripe for decision and eliminating repetitive discussions of the issues already decided. Accordingly, environmental documents prepared for a policy level decision will provide the foundation for subsequent program and project environmental documents.\*

The proposed DOE guidelines were published on an interim basis pending publication in final form. Written comments were requested by DOE in the Federal Register notice of the proposed guidelines. Final regulations are expected to be published in February 1980.

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\*Council on Environmental Quality. *National Environmental Policy Act — Regulations*, Federal Register, Volume 43, No. 230, Wednesday, November 29, 1978.

### III. FINDINGS AND RECOMMENDATIONS

#### Background

This chapter discusses major concerns regarding nonnuclear RD&D management which were raised during the 1979 Section 11 program. The recommendations have two overall goals:

- To suggest areas in which DOE's attention to conservation and environmental issues in its management and decisionmaking processes can be improved.
- To outline steps DOE can take to improve its credibility with the public and to demonstrate that it gives "adequate attention to environmental protection and energy conservation methods...and the environmental consequences of the application of energy technologies."

There are several Sections within Public Law 93-577 that relate to energy conservation and environmental protection in the Federal Non-nuclear Energy Research and Development Program. These Sections and the recommendations suggested in this chapter are based upon the conviction that disclosure, feedback, and accountability are integral to improving DOE's decision-making in the nonnuclear RD&D program.

Initially, the 1979 Section 11 review focused its attention on the DOE Program and Project Management System (PPMS) to determine how environmental and energy conservation concerns had a *demonstrable* impact on technology RD&D projects. During the course of the analysis, however, it became clear that many concerns associated with the environmental aspects of technology development were not a function only of PPMS, but resulted from other DOE priorities and the conflict of overlapping decisionmaking processes. Many of these conflicts extend far beyond the Department's control and reflect the differing views of the American public regarding energy policy. The concerns and recommendations presented in this chapter are not limited to the PPMS, but also address certain aspects of the non-nuclear energy RD&D policy process. However, since the scope of this review is limited to environmental and energy conservation concerns, comments on the overall policy process are made

from that perspective and may not reflect all the factors which bear on the process. Before presenting these concerns, however, it is useful to discuss lessons which can be learned from DOE's experience with PPMS.

During the time it was in effect, PPMS, with its associated environmental assessments, exhibited several aspects of an effective review and documentation system. Specifically:

- It provided a systematic means of reviewing emerging energy technologies by identifying distinct stages through which every technology must pass, from initial research to full-scale commercialization.
- It provided formal procedures which enabled the Office of Environment to play a role in DOE project decisions through membership on the Energy Systems Acquisition Advisory Board and chairmanship of the various Environmental Coordination Committee's subcommittees.
- It attempted to integrate energy technology development projects and environmental research through timetables and review procedures.

Despite these positive design features, there were problems with the environmental planning and assessment process associated with PPMS. There was an overall concern regarding the extent to which the system actually operated as it was designed. As one hearing witness noted:

It seems clear that the process is systematically structured. What is not clear is whether that process functions or simply exists on paper. It is not clear whether that process suffices to protect environmental concerns. We saw no guarantee that an identified environmental problem must be dealt with, that a mitigation strategy must be adopted, and so forth. It is not clear to us that this process necessarily identifies the needed environmental research related to a given technology or if it does identify it, that it proceeds to accomplish it, or if it accomplishes it, that it integrates the results into actions in future decisions.

(Richard Pratt, Pennsylvania Sierra Club)

In addition to specific issues regarding the design and operation of the project review and assessment process, a major finding of the Section 11 analysis was that the public as represented in the workshops and the Hearing does not appear to understand, and therefore lacks confidence in DOE's systems for treating environmental issues.

The concerns about the adequacy of DOE's "attention to environmental protection and energy conservation" in its RD&D programs which resulted from the 1979 Section 11 program can be grouped into six major areas. These are:

- A. Nonnuclear energy RD&D priorities;
- B. Purpose of nonnuclear RD&D;
- C. Project review process;
- D. Evaluation criteria for technology development;
- E. Resolution of environmental issues at the national, regional, and local levels; and
- F. Public participation in nonnuclear RD&D.

## MAJOR FINDINGS AND RECOMMENDATIONS

### A. Nonnuclear Energy RD&D Priorities

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**FINDING: DOE's priorities for technology development are not based on comparative evaluation of alternative technologies.**

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Past DOE procedures for RD&D decision-making have not led to comprehensive analysis, comparative evaluation, and prioritization of potential alternatives for meeting energy needs. Instead, the knowledge gained from research on engineering performance or environmental problems is used in specific project decisions, with review and comparison focused on narrow selections of engineering alternatives. For example, past procedures only required or fostered comparisons within various program areas (e.g., oil shale processing) rather than assessing the value of several supply alternatives versus reduction of demand through energy conservation measures.

At the Hearing and in all of the workshops there was an overriding consensus that smaller scale appropriate technologies using renewable resources have not been given adequate evaluation and attention when RD&D priorities are set. Criticism of the priority-setting process included opinions that:

the process does not take into consideration alternative small-scale technologies when it evaluates a particular major system technology. In other words, it does not consider other ways to obtain the energy which is proposed for production by the technology under consideration

and:

if technological alternatives are not reviewed, then energy conservation possibilities will not be addressed, nor will appropriate technologies or other alternatives be addressed which might produce more economically the same amount of energy as the large-scale technologies being considered.

(Susan Tachau, National Center for Appropriate Technology)

Participants described in detail their belief in the potential lower costs and environmental advantages of such alternatives as solar energy, recycling and conservation as compared to the technologies DOE is now emphasizing. They felt there is an urgent need to find better methods to balance RD&D efforts and to make that balancing process known to the interested public. Several recent studies contain support for these opinions, emphasizing the crucial importance of conservation and renewable resources to our energy future.\*

If DOE's priority-setting processes are to be widely accepted as giving adequate attention to energy conservation methods and environmental protection, they should be justified in terms of explicit comparisons of a broad range of alternatives. DOE should demonstrate that it has thoroughly considered production and conservation, intensive and appropriate technologies, and both large-scale centralized and small-scale decentralized technologies. Further, it should be clear that research priorities were established on the basis of these comparisons.

There are two specific aspects of DOE's planning and priority-setting in which the adequacy of attention to energy conservation and environmental protection could be improved. The first area concerns the extent to which energy conservation was considered in past energy demand forecasting, and the second concerns an alternative approach for comparing RD&D opportunities, one which is based on energy "end use."

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\* Landsberg, Hans, H. et al., *Energy, the Next Twenty Years*, 1979; Stobaugh, Robert, and Daniel Yergin, *Energy Future*, 1979.

The dynamic nature of energy supply and demand within the past several years has forced a mode of policymaking which may overemphasize the economic consequences of supply shortages. Contributing to this approach have been overestimates of energy demand which have been derived from past economic performance. The forecasting models do not realistically reflect the consumer response to unprecedented disruptions in energy supply or major changes in energy pricing. The econometric models are valuable tools, but they do not have the flexibility necessary to reflect the continuous response of social and economic structures. This is especially relevant in the area of conservation, where recent energy consumption patterns have demonstrated that they can shift dramatically as a result of supply and price changes.

A further problem is the fact that models have not included the potential impact of the capacity of the economy to turn over or replace the capital stock. Newer technologies tend to be more energy efficient than the technologies they replace. By the year 2000, the Nation is likely to replace 35 percent of existing commercial buildings, 60 percent of existing industrial boilers, and virtually all remaining energy-using devices.\*

The usefulness of formal models, derived from historic data, decreases significantly as uncertainty about assumptions and variables increases. Recent questions about the validity of the relationship between energy use and economic activity, and the inability to accurately predict energy prices and resultant consumer behavior, tend to undermine any planning system that relies exclusively on traditional econometric demand predictions.

Formal models can help uncover counter-intuitive results and thus promote deeper understanding...The dilemma of formal models, however, is that the scientific aura surrounding them encourages those who use the results of models to expect much more. And a model incorrectly used can do more harm than good. \*\*

The priority-setting process could be improved if it included a comparison of technologies based on the ultimate "end use" of the energy produced.

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\* Based on Statistics from the Bureau of Economic Analysis, U.S. Department of Commerce, prepared by TRW Energy Systems Group for DOE, Office of Conservation and Solar Energy.

\*\*Stobaugh, Robert & Daniel Yergin, Eds., *Energy Future*, "Appendix: Limits to Models," p. 262.

Under this analytic framework each fuel source and technology would be compared as to its capacity to fulfill a specific energy need in the most efficient and environmentally beneficial manner. As one witness expressed this:

the principle is that the 'end use' for which energy is required should determine, as much as possible, the resource and form of the energy to be employed for that use. The choice should be based on considerations of conservation or, in other words, of energy economy. This means that preference should always be shown for forms of energy that, while remaining compatible with the 'end use' to which they are put, are as direct as possible, involve as little capital-intensive technology as possible, and come, as much as possible, from renewable sources. (Susan Tachau, National Center for Appropriate Technology)

For example, in residential heating, rather than just replacing heating oil with synthetically derived oil, other alternatives such as passive solar heating, wood burning, and increased energy efficiency through the use of insulation and double-glazed windows should be considered.

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**RECOMMENDATIONS: DOE research priorities should reflect systematic and explicit comparisons of production and conservation alternatives.**

**The comparisons should help establish priorities on the basis of energy efficiency and environmental attributes.**

**Methods of analysis, such as energy "end use," should supplement econometric models which tend to underrate the effects of energy conservation.**

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## **B. Purpose of DOE Nonnuclear RD&D**

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**FINDING: The major barrier to commercial use of an energy technology is uncertainty—uncertainty about environmental performance, engineering performance, and process costs.**

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Uncertainty about technical, environmental, and economic feasibility are the principal barriers to the adoption of new energy technologies. The DOE



RD&D program has operated under the assumption that a technology demonstration is the way to reduce this uncertainty, and that a *successfully operating prototype* with wide-scale dissemination of information on its characteristics would lead to commercialization, given appropriate market conditions. Under this assumption, the primary purpose of research and development is the operational demonstration unit. DOE's past RD&D management system seems to have been built on this concept, that technologies can best be developed through an orderly progression of demonstration projects of ever-increasing size.

Another approach to RD&D would be specifically directed toward identifying and solving *problems* associated with technology development. As one witness said:

The most intractable problem with technology development programs is the single-purpose momentum they generate to carry each new technology into full commercial application. Unfortunately, DOE's management system does everything possible to reinforce rather than correct this fault. It is hardware-oriented; it is not geared to problem-solving.  
(Kevin Markey, Friends of the Earth)

Reviewing research programs in terms of the problems they are trying to solve — that is, the barriers they are trying to eliminate — means that research would not be justified solely in terms of proving engineering feasibility, but in terms of providing the solutions to problems impeding the development of the industry. If data on engineering performance are critically lacking, this may indicate a need for demonstration; but the problem-solving approach may anticipate and resolve development issues, such as the generation of carcinogenic wastes, that may not be relevant in the present design stage. The problem-solving approach would make explicit the research required to produce information needed for engineering and environmental protection evaluations.

Many workshop participants and hearing witnesses observed that technical and environmental research should be more closely linked and that DOE efforts in both areas should be designed to provide the greatest amount of data to be used in decisionmaking. One witness stated:

What you need is a system which is a little more balanced between branches that are building things and branches that are considering alternatives, rather than having a

whole agency...whose mission it is to build and secondarily to do the best it can with the consequences... You need a more balanced situation, where you are setting your energy priorities and your environmental priorities at the same time and how can we optimize both of these— rather than looking for the best energy technologies and then later worrying about how to handle the environment.  
(Richard Pratt, Pennsylvania Sierra Club)

Another witness observed:

I think the need has to be stressed for experimental facilities which test not only the technological capability, but also the environmental issues.... There's also a need to emphasize decisionmaking systems which focus on incremental and adaptive decisionmaking to the greatest extent possible, rather than go/no-go decisions, so that we can reflect, as we move through various steps, the findings of environmental research, assessment, or monitoring.  
(Alan Hirsch, Fish and Wildlife Service)

The development of new strategies or technologies to produce or conserve energy involves several major activities: basic technical research; research on environmental, social, legal, or institutional barriers; testing and demonstration of the technology; and finally, commercial operation and marketing of the technology. Government involvement is more appropriate in some of these activities than others given the constraints, incentives, and capabilities within the private sector. Moreover, the private sector is unlikely to conduct research into environmental effects of energy technologies, thus this area is particularly appropriate for government involvement. But DOE's RD&D program seems to be heavily oriented toward rapid commercialization of technologies rather than toward thoroughly testing and examining all aspects of their application, including environmental effects. DOE's research goal should be directed toward providing data on technical readiness, cost, and environmental risks. As stated in a recent study:

The market cannot be expected to provide the right amount or kinds of basic scientific research or information gathering, but can ordinarily move ideas from the lab to the marketplace at about the right rate. We think it is important, therefore, that government policies concentrate on encouraging programs that enhance basic knowledge and provide a wide range of competing technological concepts that can be evaluated and, when warranted, picked up and applied by the private sector.\*

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\* Landsberg, Hans, H. et al., *Energy, the Next Twenty Years*, 1979, p. 50.

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**RECOMMENDATION: DOE program and project plans should be based on an evaluation of the barriers preventing the development of energy technologies such as the availability of effective environmental control technologies. Research should be specifically directed toward overcoming these barriers.**

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### C. Project Review Process

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**FINDING: In the past, high cost, large-scale individual projects appeared to receive a disproportionate share of senior DOE management attention. Substantial research programs such as conservation that involve numerous small projects have not received senior Department-wide review.**

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Many witnesses felt that DOE lacks a project review process that is sufficiently broad-based and systematic, and that this has resulted in a bias toward large technologies. This bias has caused the majority of DOE's smaller, appropriate technologies to *appear to* languish in their development, even though their supporters feel that they may be more cost-effective and their environmental impacts may be less severe.

There are approximately 300 nuclear and non-nuclear DOE-sponsored technology RD&D projects now underway. During their development, all technology RD&D projects progress through various stages including basic research, pilot, demonstration, and commercialization. At each stage, projects are reviewed, and a decision is made to move them forward or to hold back further development because of technical, environmental, or economic problems. The level and type of review a project receives at these key decision points depends on whether it is designated a "Major System Acquisition" (MSA), "major project" or "project."

Several criteria are supposed to be used in designating MSAs. These are: national urgency, dollar value (government investment in excess of \$50 million in the technology development stage or \$200 million over the life of the project), and recommendations by the Assistant Secretaries or

the Director of Energy Research.\* To date, cost has apparently been the major criterion used in determining MSAs. Criteria for designation of a "major project" include total estimated cost, importance to program objectives, size and complexity, visibility, degree of DOE control required, clarity/stability, and recommendations by one of the DOE Assistant Secretaries or Director of Energy Research.\*\* All others are classified as "projects."

In the past, the process that guided DOE project-level review (the PPMS) was directed primarily toward Major System Acquisitions. MSAs were formally reviewed at key decision points in their development by DOE senior management including the Under Secretary and Assistant Secretaries (the Energy Systems Acquisition Advisory Board) and considerable documentation was required.

Major projects and other projects were reviewed by the Program Office and the responsible Assistant Secretary or Director of Energy Research. Specific requirements for these projects were not clear within PPMS; with the newly proposed Project Management System, management review requirements covering MSAs are to be expanded to include all major projects.

Focusing senior management attention on a few large projects has several implications. Since periodic consideration of MSAs has been required of senior DOE officials, many participants in workshops and hearings felt that large technologies seem to acquire considerable support and momentum as they proceed through the various development stages and it appears that few are held back, even those with adverse environmental impacts. Participants felt that if top DOE management reviewed a wider range of technologies during the various development stages, small, environmentally benign technologies would receive more DOE emphasis. One witness contended that:

The complex procedures which were established by DOE to guide technology expenditures, the PPMS, appear to fail to provide for adequate evaluation of alternative actions on programs....By the time that DOE staff has committed large amounts of time and financial resources to the particular project...it is almost too late to adequately address alternatives in an EIS.  
(Marilyn Reeves, League of Women Voters of Maryland)

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\* Department of Energy, Major System Acquisitions. (Order 5700.1). September 11, 1978.

\*\* Department of Energy, *Project Management Study* (DESM 79-1).

Another implication of the DOE project review system's focus on Major System Acquisitions is that *not all* projects with potentially severe environmental impacts receive comprehensive senior management review. The cost of a project does not necessarily reflect severity of its potential environmental impacts. For instance, under PPMS, no oil shale projects were designated as MSAs, however, some oil shale technologies were specifically noted in the Environmental Readiness Document as having a high likelihood of severe environmental impacts.

The purpose of management review is to assure the quality of projects and programs through examination of technical capabilities, project engineering and environmental plans, cost estimates, and other factors. With the emphasis that has been placed on a few individual projects by past DOE management systems, senior management attention has been diverted from broader reviews, which could include these major *projects* and those *programs* which are composed of many small projects such as energy conservation. Major projects which involve significant costs must, of course, receive substantial scrutiny. However, alternative management systems can be used to assure that all major expenditures receive appropriate review—whether they are associated with a single facility or with program areas. If the review process is expanded to include both major projects and major programs, it could generate the information needed for cross-technology comparisons.

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**RECOMMENDATIONS: DOE should develop a balanced and comprehensive management review process that includes such programs as energy conservation.**

**The potential severity of environmental impact should be included as a factor in selecting projects for senior management review.**

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#### **D. Evaluation Criteria for Technology Development**

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**FINDING: It is unclear what formal environmental criteria, if any, DOE uses as a basis for its policy and project management decisions.**

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To date, DOE appears to have used three specific criteria in evaluating environmental concerns:

- Comparisons of pollutant emissions per unit of energy produced;
- Estimation of the dollar cost of meeting present environmental standards per unit of energy produced; and
- Estimation of the probability that adverse environmental impacts will ultimately rule out commercialization of an energy technology.

These criteria are generally included in a number of DOE documents that assess potential environmental effects of specific technologies. However, it is not clear if these criteria are used consistently or how these factors have affected DOE decisions.

Workshop participants and Hearing witnesses suspected that environmental criteria, even though they may exist, are not given sufficient weight in decisionmaking. As one Hearing witness commented:

Absence of explicit criteria gives the appearance, if not the reality, that decisions are arbitrary.  
(Mark McClellan, Pennsylvania Citizen's Advisory Council)

Another stated that:

The process of evaluating competitive technologies requires explicit criteria which should include risk evaluation, potential for environmental degradation, aesthetics and social concerns, and one aspect so often overlooked—the worldwide consequences of developing a technology. The obvious criteria include impacts on air, land, water and the biosphere. The changes brought about in these resources must then be evaluated in terms of how they affect man. In this analysis, it is not only direct health effects that are of importance, but also the impact on those values that are often impossible to quantify, but are so important, such as the aesthetic impacts of changes and the recreational values of the environment.

(Gordon MacDonald, The MITRE Corporation)

The use of explicit criteria, applied consistently to different technologies, would ensure that the environmental problems associated with individual projects could be evaluated on a common basis. However, under PPMS, the project review system was designed to provide a framework *only* for approval or disapproval of individual projects; it did not permit environmental criteria to be used to *advocate* those technologies which are most environmentally preferable.

Some of the hearing witnesses commented on the scientific uncertainty in environmental impact assessment. These scientists pointed out that there are important limitations in the present capability of state-of-the-art methodologies to precisely define the environmental or public health impacts of proposed technologies. Nevertheless, they concluded that consistent and systematic comparisons can be made that will demonstrate the relative environmental advantages of energy technology alternatives. Just as importantly, these methods can indicate where judgments cannot be made regarding the environmental differences between technologies.

Witnesses agreed that environmental evaluations are needed for a number of impacts—a “single figure of merit” for environmental or public health concerns is inappropriate. Although it is very difficult to develop quantitative measures for each area of environmental or health impact, it is *possible* to develop assessment methodologies that allow some technology comparisons. In the area of public or environmental health, for example, emissions of classes of pollutants can be compared. In addition, cancer risk assessments can be made from the results of chemical analysis or biological testing.

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**RECOMMENDATIONS: DOE should develop explicit environmental criteria for use in formulating energy policy and evaluating technology development, and submit those criteria for public and peer review.**

The criteria should be quantitative whenever possible in order to facilitate cross-technology comparisons. To support this quantification, standard assessment procedures (protocols) should be prescribed to ensure uniform results. The criteria should include the following areas:

- Impacts on public and occupational health and safety;
- Impacts on ecosystems;
- Resources (land and water) required for technology production;
- Socioeconomic impacts (e.g., the social and economic dislocations caused when a “boom town” grows up near a plant site in a previously rural area);

- Global impacts (e.g., carbon dioxide buildup in the atmosphere causing a “greenhouse effect,” acid rain); and
- Net energy analysis (e.g., comparisons made between energy produced by burning or decomposing urban waste and the amount of energy required to produce new products such as paper which are lost to recycling when used to produce energy).

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## **E. Resolution of Environmental Issues at the National, Regional, and Local Levels**

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***FINDING-Resolution of Environmental Issues: DOE does not designate responsibility for resolving various levels of environmental concerns associated with energy technology development.***

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The types of environmental concerns associated with a technology range from site-specific impacts of particular projects to national and global concerns such as basic health effects of pollutants or carbon dioxide build-up in the atmosphere. Decisions on the environmental acceptability of a technology require environmental research and analysis covering the whole range of impacts.

The development of an energy technology from its early research stage through its commercialization stage usually requires that associated environmental concerns be addressed at three levels:

- Site-specific concerns — Including environmental questions associated with the construction of an energy facility, such as site-specific pollution impacts (e.g., ground water contamination), resource requirements (e.g., water or land), and socio-economic impacts (e.g., boom town effects).
- Regional or cumulative concerns — Including site-specific pollution or resource requirements affecting areas beyond the immediate vicinity of a facility, such as water rights questions. Problems may also result from cumulative effects of several facilities located in a given region.
- National concerns — Including health effects, global effects of widespread implementation of a technology, and the development of appropriate environmental control technologies.

For the environmental concerns associated with a technology to be addressed adequately, potential environmental problems at all three levels should be clearly identified and treated in a timely manner.

At present, the DOE management process does not ensure that regional and local concerns are identified or that responsibility for analysis of regional and site-specific effects is clearly defined. This means, for example, that a national research program designed to develop generic information on water requirements of synthetic fuels may appear totally unresponsive to local concerns for stream flow depletion by water use at individually proposed pilot plants. As one witness said:

DOE has spent millions studying the Geysers. We're practically an annuity for the National Labs. But our local government still doesn't have the basic environmental and economic information we need in the form we can use. We tend to think it might be because no one ever came to us and asked us.

(Mary Jadiker, Lake County, California, Planning Commission)

Further, although extensive environmental impact statements may be prepared for specific projects, their formal role in the project review process has not been clarified.

Unless DOE recognizes the importance of dealing separately with interests at the local, regional, and national level, it will continue to appear unresponsive. Although an environmental issue may cut across all levels, its resolution may best be undertaken by the level that is affected. DOE's credibility would be significantly enhanced if the local level is actively involved in identifying and dealing with these issues.

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**RECOMMENDATIONS: DOE should clearly assign organizational research responsibility for resolving issues at local, regional, and national levels. Further, DOE should provide management attention to ensure progress in resolving issues at each level.**

**DOE's management should allocate resources for research on local, regional, and national environmental problems and encourage effective information exchange.**

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***FINDING-Resolution of Environmental Issues: DOE does not have a mechanism for systematically coordinating plans for RD&D projects with appropriate State and local agencies.***

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The role of State and local agencies in DOE decisions concerning RD&D projects has not been clearly defined. Although these agencies have responsibility for permitting and enforcing various regulations, DOE has not institutionalized a procedure for involving them in early project decisions, such as siting. This can lead to serious conflicts and delays later in the process. The views of many local officials were summarized as follows by one Hearing witness:

We're the ones who see, hear, smell, pay for, or benefit from your 'go' decisions. Obviously, we feel those ultimate decisions must be made at the local level.

(Mary Jadiker, Lake County, California, Planning Commission)

Failure to resolve local concerns can create enormous barriers to RD&D projects. For example, DOE is planning to construct a \$140 million 50 Mw geothermal demonstration plant in the Valles Caldera of New Mexico. This is the largest geothermal demonstration plant DOE has under contract. Only 50 percent of the funds for the plant are, however, federally sponsored, with the balance coming from the Union Oil Corporation and the Public Service Company of New Mexico. DOE had expected to start construction of the plant in the spring of 1980 on a small section of privately owned land called the Baca Ranch and to start, in 1982, a 3-year demonstration of the plant. However, plans for construction of the plant are being delayed because of several factors, including the unacceptability of the draft Environmental Impact Statement. Specifically, the draft EIS has been criticized by local Indian tribes because of its lack of analyses of both the adverse effects on Indian religious practices and mitigating measures to offset these effects. For the final EIS, DOE has prepared a specific section on Indian issues. That section has been circulated for comment to affected tribes.

In contrast to this experience, by providing a process which coordinates activities of all relevant agencies, the time and resources of all those concerned can be concentrated on generating the data needed to make the necessary critical environmental decisions. For example, in an effort to involve and coordinate participation of agencies in a cooperative scheduling procedure, the State of Colorado has established a "Joint Review Process."\*

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\* State of Colorado, Department of Natural Resources, Project Status Report on the Joint Review Process. November 1979.

Developed by the Department of Natural Resources with support from DOE, it is designed to streamline the process of review and approval of projects and the granting of permits. It provides a "one-window" coordination forum regarding regulations, evaluation criteria, and public involvement. One agency at each governmental level is designated as the lead agency for its level, and represents the interests of its sister Federal, State, or local agencies at project review sessions.

The Joint Review process was designated to bring an organized and rational approach to the review and decisionmaking procedures necessary for development of major energy resources. This voluntary intergovernmental review procedure coordinates local, State, and Federal regulatory reviews and provides the public with additional opportunities to become involved in all phases of project planning and review.

According to the State of Colorado, the advantages of this are two-fold: first, the decisionmaking timeframe can be cut by 40 percent by timely and precise scheduling of all permitting and regulatory procedures. Second, public involvement begins early in the process with public information and outreach followed by opportunities for expression of concerns, discussions of issues, and incorporation of responsible criticism. This allows for meaningful public participation 2 years ahead of mandated public hearings. As stated by its supporters, the process "provides adversaries with the same data, and keeps them talking" while promoting government "by cooperation and compromise."

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**RECOMMENDATION: DOE should encourage the involvement of State and local agencies in the resolution of environmental issues associated with projects affecting their jurisdictions. Joint review processes can both expedite and improve environmental review.**

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#### **F. Public Participation in Nonnuclear RD&D**

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***FINDING-Public Participation: DOE does not provide effective opportunities for public participation in decisions regarding non-nuclear RD&D.***

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DOE, particularly the Assistant Secretary for Environment, has taken measures to increase the attention paid to public participation. In spite of these recent steps, one of the major themes to emerge from the workshops and National Hearing was that public involvement in DOE's management and decisionmaking systems has been woefully inadequate. Participants expressed a deep sense of frustration based on their perception that DOE officials do not feel accountable to the public for their decisions.

DOE procedures do not *systematically* involve the public, except as mandated by the National Environmental Policy Act (NEPA) process. The public is not given an opportunity to review or comment on the documents associated with DOE's internal environmental assessments. Since the NEPA process is not initiated until a later stage of technology development, these internal documents provide the only environmental information for early decisions. As a result, the public is hindered in its participation in these decisions. Participants in the workshops and Hearing noted that this often results in delays when the construction of facilities is proposed. They emphasized that inviting public involvement earlier in the process would facilitate identification of issues and the resolution of conflicts, thus expediting the process. As one participant summarized this problem:

The purpose of effective citizen action is not to subvert [Government's] responsibilities, but to make sure they are honored. Government and industry have experts, but citizen organizations often have their own expertise to contribute to environmental decisionmaking. Moreover, although environmental decisionmaking must be based on the best available scientific and technological information, value judgments and social decisions are ultimately required. And these social decisions must reflect the public will, for the environment belongs to the public, not just to the experts in a particular decision. When risks must be measured against benefits, or when economic and environmental values must be weighed and balanced, the public has the right and the obligation to make its views known. Mediating differences between citizens and Government early in the planning process can prevent confrontation at a later date, and can also prevent subsequent distrust of the Government on the part of the citizenry.  
(Edith Chase, League of Women Voters)

Participants stressed the need for an "advocate" within DOE to increase opportunities for meaningful public participation at appropriate points in the nonnuclear RD&D decisionmaking process. They felt that most DOE officials concentrate on the scientific aspects of projects and do not view public



participation as a high priority. Establishment of an advocate for public participation within the Department would demonstrate a commitment to institutionalizing a program of public participation. One witness outlined the role of a Public Participation Advisor, based on a similar position in the State of California, that could serve as a model. This advisor:

- “initiates and monitors aggressive outreach programs;
  - ensures opportunities for full and adequate participation by all interested groups and the public at large;
  - advises groups and the public as to effective ways of participating in the Department’s processes; and
  - reviews, monitors, and assists in implementing public participation plans and activities in all DOE offices.”
- (Michael Paparian, California Sierra Club)

In DOE, this Advisor should report directly to the Secretary, as do the public affairs and Congressional liaison advisors, and would be responsible for ensuring adequate public participation opportunities. In general, the position would differ from existing organizational entities in its access to the Secretary and in its role as advocate of public participation in decisionmaking.

Another mechanism that could be used to ensure that public participation opportunities are institutionalized within DOE is the recently published *Citizen Participation Manual*. This document provides guidance on planning, implementing, and assessing public awareness and participation programs. DOE senior officials should strongly support implementation of the *Manual*, and the Public Participation Advisor, if appointed, should be charged with monitoring its application.

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**RECOMMENDATIONS:** DOE should systematically involve the public in a timely and meaningful manner in consideration of the environmental aspects of policy development, program planning, and project management.

**Senior management attention should be committed to institutionalizing public participation activities.**

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***FINDING-Public Participation:* Existing public participation mechanisms do not ensure balanced representation of views, or representation of a broad spectrum of individuals and organizations.**

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The Federal Advisory Committee Act (Public Law 92-463) states that legislation to establish an advisory committee shall “require the membership of the committee to be fairly balanced in terms of points of view represented” (Section 5[b][2]). Many members of the public believed that this philosophy should also apply to other public involvement activities, and that DOE should encourage participation by as many interested groups and individuals as is feasible in workshops, Hearings, and other events. NEPA requirements for public involvement (Section 1506.6) also support the concept of participation by all interested parties.

Some participants stated that DOE does not design its public participation activities to encourage broad representation of diverse views. Some believed that well-funded public-interest organizations, industry, and recognized professionals in scientific fields tend to be over-represented. A recent study by Common Cause investigated the membership balance of 14 DOE Advisory Committees that existed during 1977 and 1978. The study found that

industry was represented on DOE Advisory Committees 6 times as often as public, intergovernmental, or education representatives. If the Consumer Affairs and Energy Extension Service Advisory Committees...are not included, the ratio of industry to public representatives on the other twelve is 15:1.\*

Further, workshop participants asserted that DOE review panel membership was too narrowly composed. Many members of the public are well acquainted with the technical and environmental aspects of proposed projects, and participants felt that representatives of this informed public should be included on review panels in addition to professional scientists to ensure that environmental concerns have been identified and adequately addressed.

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\* *Open for Business Only?*, A Common Cause Study of the Department of Energy, February 1979, page 18.

There are often complaints from Federal officials that there are opportunities for public participation but that interest and attendance are poor. DOE should have an independent third party review of the extent to which interested groups attended DOE-sponsored events, and the reasons for nonattendance.

In order to assure that groups which are not well funded do not have difficulty participating in the public programs offered, DOE should make funding available. When necessary, there should be reimbursement for travel and per diem expenses to enable witnesses to testify at hearings, participants to attend workshops and conferences, and local project-related commissions and boards to sponsor forums and disseminate information.

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**RECOMMENDATION: DOE should actively support efforts to assure a broader representation of public views in its nonnuclear RD&D decisionmaking processes.**

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***FINDING-Public Participation: The amount and quality of information DOE makes available to the public is inadequate.***

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Information is crucial to responsible, meaningful public participation. Workshop participants and hearing witnesses cited a number of shortcomings in DOE's public information activities. Participants alleged that important internal documents such as Environmental Development Plans and Environmental Readiness Documents are not systematically disseminated, and that documents that are supposed to be available upon request are difficult, if not impossible, to obtain. They said the materials that are distributed are frequently highly technical and laden with bureaucratic jargon. What is needed are summaries of all major decision documents, written clearly, concisely, and in language that can be understood by the 'lay' public.

Another summary document requested by several participants was an annual review of all DOE-supported technologies, explaining briefly each technology and its development status, its potential for meeting energy needs, its energy efficiency and economy, and any possible drawbacks and constraints to its use.

Finally, much frustration was expressed throughout the Hearing and workshops about the fact that it is extremely difficult to locate the appropriate source or the individual who can provide information because the data are scattered throughout DOE offices. By establishing a toll-free telephone number with a good information back-up system, DOE could provide an easily accessible central source through which the public could request and obtain materials, and "get answers to questions."

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**RECOMMENDATION: DOE should improve its efforts to provide the public with the information necessary to understand and effectively comment on environmental issues related to energy development.**

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***FINDING-Public Participation: The Environmental Advisory Committee (EAC) has not been integrated into DOE decision-making.***

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The EAC was established to provide advice and recommendations to the Secretary, through the Assistant Secretary for the Environment, on policies that affect the environment and the safety of the general public. However, after four quarterly meetings, the EAC has not yet developed a clear vision of its role. Neither the Department nor the Committee has well-defined expectations of the other.

There is a strong feeling among EAC members that they are "information receivers" rather than "advice givers." Effective, regular methods for the EAC to communicate its views to the Secretary or other senior department officials have not been developed; the EAC rarely finds itself talking directly to policymakers, but talks primarily to support staff. Consequently, its members believe that the EAC has little impact on policy.

An active, assertive role and structure for a DOE advisory group can be seen in the functioning of the DOE Energy Research Advisory Board (ERAB). The purpose of the Board is to provide DOE top management with long term guidance on overall research and development, and to serve as a link between the technical community and DOE. The

seemingly successful integration and implementation of ERAB's recommendations are based on:

- the structure of the advisory process — a contract-like procedure for becoming involved in an issue through the use of agreed-upon "terms of reference" entered into with the requesting program office;
- the commitment of top DOE management to respond to their findings;
- the nature and stature of its membership — primarily top business, industry, and research-oriented university officials who historically have had an "ear" at DOE.

In order to strengthen the EAC, it is necessary to tie its functions more directly to decisionmaking. This can be done by establishing a number of issue- and program-oriented task forces (supplemented by nonmember talent) to study and provide

recommendations on specific environmental concerns. Regular meetings of the EAC should be set up with the Secretary, the Assistant Secretary for Environment, and other policy officials in attendance, to provide the forum EAC needs for its recommendations.

The Office of Environment has recognized the problems experienced by the EAC and commissioned a study of the Committee's first year of operation. This is an indication of the Office of Environment's interest in enhancing the effectiveness of this Committee, and may lead to improvements in many of the areas discussed above.

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**RECOMMENDATION: DOE should clarify the role of the Environmental Advisory Committee and link its functions more directly to Departmental decisionmaking activities.**

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## **APPENDICES**

## APPENDIX A REGIONAL WORKSHOP SUMMARIES

### Background

The regional workshops—held in Atlanta, Denver, San Francisco and Pittsburgh, during July 1979—were intended to give EPA initial feedback on participants' perceptions of DOE's RD&D decisionmaking process, and to encourage participants to begin preparing testimony for the October National Hearing. Specifically, the goals of the workshops were to:

- Present an overview of the research, development, and demonstration (RD&D) process.
- Obtain from participants their opinions about "the adequacy of attention" this process gives to environmental issues, and opportunities for public participation in the process.
- Present a report on the decisionmaking process as applied to one or two specific technologies.
- Discuss with participants their views of the future development of these technologies and their recommendations for public participation in the process.

To accomplish these goals, a one-day workshop was designed which included both presentations of information and opportunities for discussion. The morning session focused on the formal DOE non-nuclear RD&D planning and review process for Major System Acquisitions (especially the Program and Project Management System),\* and the afternoon session was devoted to discussion of the DOE process as applied to specific technologies. Materials describing the process and its application to the specific technologies were mailed to participants prior to the workshop.\*\*

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\* This System is described in Chapter II of this report.

\*\* Environmental Protection Agency, The Federal Nonnuclear Research and Development Act (Public Law 93-577), Section 11, Environmental Evaluation, EPA 600/9-79-020, June 1979.

Environmental Protection Agency, Issue Paper on Urban Waste and Cogeneration Technologies, July 12, 1979.

Environmental Protection Agency, Issue Paper on Oil Shale Technologies, July 18, 1979.

Environmental Protection Agency, Issue Paper on Coal Liquefaction (Solvent Refined Coal) Coal Gasification (Gasifiers in Industry) Technologies, July 31, 1979.

Each session began with a brief presentation of highlights of these materials. Participants were then divided into small, heterogeneous work groups which were given a list of questions to guide, but not limit, their discussion. The morning session focused on the following issues:

- What specific environmental factors should be considered prior to DOE decisions?
- Is the DOE process sufficient for addressing the environmental problems of individual energy technologies?
- What role should the public play in the process?

In the afternoon, work groups considered the following questions for the technologies under consideration:

- What are the environmental concerns about the impact of the development of the technologies? Have DOE processes successfully identified and dealt with these concerns?
- Has DOE disseminated information about the technologies widely enough? What has been the involvement of the public and State and local governments in the development of this technology?

The groups were not expected to reach a consensus, although there was a surprising agreement on many questions.

Each work group chose a spokesperson to present its comments to the entire workshop. The participants and EPA staff then had an opportunity to discuss the questions, concerns, and recommendations developed by the work groups.

The workshop concluded with a brief discussion of the October National Hearing and an open discussion of other issues or unanswered questions.

Approximately 200 people attended the four workshops. They represented a wide range of organizations and interests, including industry, labor, environmental and public interest groups, universities and research organizations, and State and local governments.

## **ATLANTA WORKSHOP SUMMARY**

The first regional Section 11 workshop was held in Atlanta, Georgia, on July 12, 1979, at the Peachtree Plaza Hotel. This workshop focused on the DOE nonnuclear RD&D planning and assessment process and on two specific technologies, urban waste utilization and cogeneration.

Invitations to participate in the workshop were sent to 250 individuals, and fifty-five active participants and several Government and other observers attended the workshop. The group was composed of representatives of industry (29%), environmental groups (21%), State and local governments (16%), public interest groups (11%), offices of U.S. Representatives and Senators (9%), universities (7%), and other groups (7%).

### **The DOE Environmental Planning and Assessment Process**

During the morning session's discussion of the Program and Project Management System, skepticism was expressed about the extent to which the actual decisionmaking process follows the formal design. Some participants felt that if the system does in fact adhere closely to its design, it was unnecessarily complex and costly, and that its extensive documentation did not necessarily ensure that a comprehensive management review did occur and that environmental concerns would be considered at appropriate points. In particular, separation of technology development and environmental research into two "tracks" covered by separate plans (Technology Program Plan and Environmental Development Plan) and managed by separate offices (Program Office and Office of the Environment) was viewed as having both positive and negative aspects from the environmental perspective.

On the positive side, participation by the Office of Environment should ensure that environmental concerns will not get lost or ignored in the interest of development. In fact, some participants felt that Office of Environment responsibility should be expanded to include not only review but also preparation of NEPA documentation (Environmental Assessments and Environmental Impact Statements) which is now performed by the Program Office. On the other hand, separation of responsibility into two Offices could lead to extra

cost, poor coordination of environmental and technology research efforts, and, ultimately, a lack of attention to environmental issues in planning and at key decision points.

Participants questioned whether the Energy Systems Acquisition Advisory Board had specific criteria governing its deliberations, review of documents, and recommendations about the readiness of a technology to move forward to a further phase of development. There was a general agreement that such criteria should exist, particularly for evaluation of the Environmental Readiness Document, and should be made public. Among the environmental criteria suggested were traditional environmental concerns (effects on water, air, land, wildlife, vegetation) and the broader economic, human, and social effects of a technology.

Timing of environmental research was viewed as important by several work groups. They felt that relevant environmental research should be performed as early as is feasible in the process, before major capital investments have been made in a technology. Several participants questioned whether there is a point beyond which it is virtually impossible to halt the development of a technology, regardless of the findings of environmental research.

Finally, several participants expressed the view that this process reflects DOE's overemphasis on large high-cost, high-technology projects. These participants felt strongly that DOE tended to overlook lower-cost, decentralized, appropriate technology systems in their RD&D programs. Thus, potentially cost-effective technological approaches might be lost early in their developmental process. In particular, several participants expressed dissatisfaction that solar technologies had not been emphasized more by DOE and in these workshops.

### **Public Participation in the Process**

Work group reports indicated general consensus that public involvement in the Program and Project Management System was inadequate. Representatives of environmental groups, public interest groups, and industry stated that they did not have adequate information or channels of access for systematic involvement. Many participants felt that the public should be brought into the process earlier — by the time the public has an opportunity



to participate, primarily through review of Environmental Assessments and Environmental Impact Statements, it is too late for their opinions to affect many important decisions.

Two factors were presented as crucial for achieving effective public participation in the process: better dissemination of information and some level of funding support. In citing the need for more information, participants said that the public frequently does not know that decisions are being made, the nature of the decisions, and the options available. Two reasons for this were suggested: first, most relevant documents are not made available for public review, and second, materials made available do not clearly outline the nature and effect of decisions to be made. There is need for "translation" of documents, decisions, and procedures so that interested members of the public can understand them. Summaries of materials, with a minimum of bureaucratic and technical jargon, would be helpful in this process.

One group praised the efforts of DOE's Office of Consumer Affairs in responding to requests for information.

The second requirement for sustained public participation cited by several work groups was funding to support such efforts. It was agreed that this funding should not be confined to any one group or interest, but a method for apportioning money among interested groups and individuals was not presented.

Several specific mechanisms for involving the public in the process were suggested. First, several work groups recommended public involvement with the Energy Systems Acquisition Advisory Board. Some suggested that the public should be represented on the Board; others felt that an outside public review board should be established. This public review board should actually meet and discuss issues, not just review written materials and submit written comments. No method for electing public representatives for the ESAAB or an outside board was suggested.

It was generally agreed that the EPA Section 11 regional workshops are a good idea and should be continued. Some participants felt that local workshops would be helpful as well, although they recognized that the cost would be prohibitive.

Many participants noted that one potential effect of public participation was to slow down the process. This could be a distinct drawback, since many beneficial projects could be delayed. On the other hand, early public involvement could enable DOE to anticipate and deal with issues as research progresses, thus avoiding lengthy delays later on.

Finally, the groups discussed who should be included in public participation activities. The major question they considered was whether the general public should be involved, or whether systematic involvement should focus on the "informed" public. Although broad participation was felt by many to be ideal, several groups concluded that major efforts to involve the general public might be too costly and the return too small. While no one should be excluded from public meetings, it was most important to involve the "informed" public.

#### **Environmental Concerns in Urban Waste Utilization and Cogeneration Technologies**

The workshop in Atlanta focused on these two technologies for several reasons. These technologies have the potential to contribute significantly to energy conservation programs in the United States and were 2 of 16 technologies selected by the DOE Commercialization Task Force for development and promotion. Further, a number of privately developed and DOE-supported facilities are operating in this region.

A major theme in the discussion of these technologies was a need for DOE to adopt a less rigid stance, and to allow for more diversity. Many participants felt that the present system is focused only on a few high-cost, high-technology programs, and that smaller scale, appropriate technology projects were not adequately encouraged. In the same vein, some participants felt that DOE should put more effort into promoting conservation in addition to supporting energy production.

In the area of urban waste utilization, one group felt that DOE should concentrate on recycling and bioconversion rather than combustion technologies. Combustion was viewed as a short term solution only; it was felt that the other two offer more long term benefits. Most of the groups mentioned recycling as an important program. Participants emphasized that successful recycling efforts

could not depend on volunteers. In almost all volunteer projects, initial interest and enthusiasm eventually wanes, and the project fails. Funding must be made available for continued operation, or recycling should become a regular municipal function.

Participants felt that if urban waste utilization technologies are to be developed, source separation should be encouraged. Most felt that people would be willing to cooperate with these efforts.

Many participants felt that in assessing these and other technologies, DOE should examine carefully the total impact of the technology, including its by-products and associated expenses. This comprehensive and systematic analysis should encompass primary and secondary effects on the traditional environmental areas (water, air, land, vegetation, wildlife) and an assessment of human and social effects, total costs and benefits, and net energy loss or gain. Participants felt that DOE should be assisted in this analysis by local community groups, public interest groups, environmental groups and industry. Some felt regional citizens' advisory committees should be established and meet regularly to discuss issues affecting their area.

#### **Public Participation in Urban Waste and Cogeneration RD&D**

Participation was viewed as a two-way process that would benefit both the government and the public. Both the public and DOE have responsibilities for making participation successful. For the two technologies studied as well as the whole project review process, participants felt that the public should be more specifically informed in order to fully participate.

#### **DENVER WORKSHOP SUMMARY**

The second regional Section 11 workshop was held in Denver, Colorado on July 18, 1979, at the Environmental Protection Agency Region VIII Office. This workshop focused on the DOE nonnuclear RD&D planning and assessment process and on DOE's involvement in oil shale research and demonstration.

Forty-six people attended the workshop, representing universities and research organizations

(24%), environmental groups (17%), public interest groups (13%), State and local government (13%), industry (6%), and other groups (26%).

#### **The DOE Environmental Planning and Assessment Process**

During the morning session, participants discussed shortcomings in the way this system handles environmental research. Most participants felt that "environmental" factors were defined too narrowly and that, in addition to the traditional concern with air, water, wildlife, and vegetation, environmental effects research should include health and safety issues, social and economic effects, and net energy questions. They also felt that cumulative and synergistic effects of several projects in an area should be examined in a regional or community Environmental Impact Statement. They expressed frustration with the existing fragmented approach to environmental research and felt that a more comprehensive view was needed. They were particularly interested in seeing a greater sensitivity to State and local concerns and felt strongly that State and local officials should be included much earlier in the planning process.

As in the Atlanta workshop, timing was an important issue in this discussion. Many participants felt that environmental factors should be considered earlier in the process, so that major environmental issues would be identified prior to the first major decision. After that, environmental and technological research should go hand-in-hand. Participants also felt that monitoring and updating of environmental research was crucial, particularly in terms of social and economic impacts.

Finally, participants were concerned about the relative emphasis given to environmental research. Some felt that the process was too "driven" by the Program Office. They felt that more interaction was needed between environmental and technological research before people take sides and conflicts occur. Some felt that it would be more appropriate for Environmental Assessments and Environmental Impact Statements to be prepared by the Office of Environment rather than by the Program Office.

In a more general discussion of the Program and Project Management System, participants said that

a formal system incorporating a uniform accountability was needed for smaller projects as well as major systems. Several groups also suggested that the process should allow for more comparison of technologies as they are being developed including conservation and solar technologies. Several participants recommended better coordination between DOE and EPA to avoid duplication of effort whenever possible. Finally, several groups felt that criteria and data bases used in the decision process should be standardized and made public.

### **Public Participation in the Process**

There was general agreement among the work groups that public participation in the process was inadequate. One of the major recommendations formulated by the groups was earlier, more meaningful involvement of State and local governments, industry, and interested organizations. Participants felt that these groups should be included in planning for projects as soon as siting decisions are made and that the role of these groups should include shaping project development and preparing criteria, not just reaction or review. Active involvement in a steering role of those who could be affected by a project would encourage a community's sense of ownership of a project and the building of cooperative working relationships.

Participants also noted that improvements were needed in DOE's information dissemination procedures. They felt that internal environmental documents should be more readily available and that there should be a system for public comment on all documents, not just the NEPA materials. Further, if public participation is to be effective and meaningful, some participants felt that better public education and a central information source are also needed. It is difficult for the public to keep track of the many small decisions made by various agencies and to be aware of when, where, and how to attempt to have an impact.

The work groups agreed that the process should be more open and suggested several means for achieving this. In addition to making documents more available, these included publishing the recommendations of the Energy System Acquisition Advisory Board, holding regional conferences to discuss policy questions, and establishing regular community boards for site-specific questions. Participants stressed that effective public

participation requires a sustained effort and some funding support. One group suggested that a set proportion of each project's budget be set aside to support public participation activities. Another participant recommended that U.S. Senators and Representatives should sponsor attendance of people from their districts or States at meetings such as the October National Hearing.

Finally, participants noted the potentially negative aspects of public participation. They warned against any system that would create more bureaucracy or that would slow the process down too much. No specific suggestions were made about how these pitfalls could be avoided.

### **Environmental Concerns in Oil Shale RD&D**

In the afternoon, participants focused specifically on oil shale, and discussed how the DOE process had worked for this technology. Oil shale was selected as the major technology for discussion at this workshop, because a large percentage of the country's highest quality oil shale resources are located in this region. One major area of uncertainty was the effect that President Carter's energy initiatives would have on oil shale research and development and on the associated environmental research.

Participants reiterated several themes from the morning session. They stressed the need for a holistic view of "environmental" impacts including the human as well as the natural environment. Thus, in addition to traditional concerns, they said that oil shale environmental research should include long term health effects; impacts on water rights, particularly secondary impacts caused by increases in population due to the projects; and positive and negative social and economic effects resulting from new jobs and increases in population, such as increased cost of living, crime, etc. They also mentioned a need for cost-benefit studies on control technologies to be included under environmental research.

The participants said that they did not have enough information to judge whether DOE's environmental research process had identified all these concerns and dealt with them. Several believed that the concerns had probably been identified but that solutions had not been developed for all of them, particularly the social and economic problems. Some felt that this research should be subjected to a greater degree of outside peer review.

Finally, participants repeated their recommendation that environmental concerns be addressed earlier in the process and that technology research and environmental research be more closely coordinated.

### **Public Participation in the Oil Shale RD&D Process**

There was almost unanimous agreement among participants that DOE's information dissemination procedures had been inadequate in oil shale development. Several participants reported that they had not been able to obtain documents through regular channels. One participant said that in order to obtain a specific Environmental Readiness Document, it had to be "leaked" to him.

Another widespread complaint was that materials were virtually incomprehensible. They requested that summaries of environmental documents be prepared and that these summaries contain a minimum of technical and bureaucratic jargon.

As in the morning session, participants stressed the importance of involving appropriate State and local officials and organizations in the planning phases of oil shale projects. They felt that it was particularly important that this kind of involvement be incorporated into any new groups and processes developed in response to President Carter's July energy message. Participants were concerned that the President's emphasis on oil shale development could have highly detrimental effects if environmental issues were not examined comprehensively and with sensitivity to local concerns.

### **SAN FRANCISCO WORKSHOP SUMMARY**

The third regional Section 11 workshop was held in San Francisco, California, on July 24, 1979 at the Environmental Protection Agency Region IX Office. This workshop focused on the DOE non-nuclear RD&D planning and assessment process and on research and development of geothermal technologies.

Invitations to participate in the workshop were sent out by the EPA Regional Office to individuals

and organizations that had been actively involved in discussion of geothermal projects. Thirty-seven participants attended the workshop, representing State and local government agencies (35%), relevant Federal agencies such as the Bureau of Land Management and U.S. Geological Survey (16%), research laboratories and universities (13.5%), environmental groups (8%), and other organizations and areas of expertise (14%).

### **The DOE Environmental Planning and Assessment Process**

The initial reaction of most participants to the Program and Project Management System during the morning session was that it is irrelevant to their experience, since it applies only to projects that receive very substantial DOE support. Their experience with geothermal development and other DOE projects had not brought them in contact with the system. Many felt that this emphasis on large projects was too limited and that criteria other than funding levels should be used in assigning technologies to the process. These criteria could include breadth of applicability, nationwide potential, and value to a specific site or location. These criteria should also be applied to initial decisions about projects and in setting priorities. Many participants felt that the system reflected a DOE philosophy that is too hardware-oriented, and that more attention should be given to smaller scale technologies and projects.

In their discussion of how this process deals with environmental concerns, the work groups had two general recommendations: "environmental impacts" should be defined broadly and assessment should occur very early in the process. Participants suggested that there should be an initial assessment for each geographical area in which a project is being considered to establish baseline data and to determine what environmental factors might be affected. Several participants stressed the importance of gathering baseline data before a project is initiated, then regularly monitoring project effects against this information.

There was general agreement that a broad range of potential impacts should be considered, including traditional elements, social and economic costs and benefits, land use compatibility, qualitative changes in the resource brought about

by development or occurring naturally, conservation of the resource, aesthetics, specific needs and concerns of the local community, and cumulative effects of more than one project in an area or one project over time. These environmental issues can be broken down into those generic to the technology and those which are site-specific.

Participants felt that the process described in the Program and Project Management System might be adequate for making generic technology decisions, but that it needed major additions to be appropriate for making site-specific decisions. These additions would focus on early involvement of local officials and community groups in planning and research so that local concerns could be brought into the decisionmaking process as soon as siting decisions are made, and local expertise could be tapped in conducting research. In this way, a balance between national goals and local effects could be achieved. It would also enable DOE to put its efforts into areas that are of major concern to those affected by a project. One participant summed up this discussion by saying that "DOE answers questions no one asks and then does not have information on issues of considerable local concern."

Many participants criticized the timing of environmental research. They felt that research to develop the technology proceeds ahead of environmental research. They felt that these two areas should be more closely coordinated and that DOE should be supporting more research and demonstration of control technologies.

### **Public Participation in the Process**

As indicated above, there was general agreement that public participation in the process needed improvement. Several specific suggestions were made by the work groups, most of which focused on better dissemination of information.

Most of the groups echoed other workshops' conclusions that better information dissemination was needed and documents should be made more readily available for public review. A number of participants had attempted to obtain internal DOE environmental documents in the past without success. Public review would require that the public be informed of the existence of the documents, the nature of the documents, and how to obtain them

and submit comments. One group recommended that DOE establish a Public Advisors Office which would have responsibility for disseminating information and answering questions. This office should undertake an aggressive outreach effort to a wide audience, including industry, State and local government, environmentalists, and technical experts. The group suggested that this program be based in the regional offices and be coordinated with State and local energy and environmental boards or commissions. Crucial to the success of such a program in several groups' opinion, was access to a real person who could answer questions. It was suggested that a toll-free telephone number would be helpful.

Other mechanisms were suggested to improve the public's ability to use available information. These included a system to make people aware of past and present research projects, and a newsletter or computer access system containing updated information on the status of projects. Other participants said that an understandable document summarizing technologies and projects would be very useful. These suggestions grew out of a need expressed by several participants for DOE not merely to release the current internal documents to the public, but also to make an effort to assist readers in understanding these materials.

### **Environmental Concerns in Geothermal RD&D**

The workshop in San Francisco focused its afternoon technology discussion on geothermal energy because California's hydrothermal resources account for over 70 percent of the electrical energy potentially recoverable from such reservoirs in the U.S. The largest geothermal power plant in the world is located at The Geysers in California, and electricity will soon be produced commercially from liquid-dominated reservoirs in Southern California's Imperial Valley. Many of the workshop participants had been actively involved in The Geysers project, through industry, local government, or citizens' action groups. They had discussed many of the environmental issues surrounding geothermal development in the past, and many conflicts had, over time, been resolved. One participant from industry and one community representative presented a brief overview of their experience with this project and perspectives on it.

The major conclusions from the work groups were that environmental research should begin earlier in such projects, that more baseline data are needed before development begins, and that a whole-system, coordinated approach to environmental research is needed. They questioned how much environmental research should actually be conducted before a demonstration begins. Finally, they said that there was a need for both generic planning and study, and site-specific planning and study.

### **Public Participation in Geothermal RD&D**

The experience of the participants with geothermal projects led them to conclude that—although DOE has not been totally unresponsive, and in some instances, DOE staff have been very helpful—there was a lack of systematic public involvement and information dissemination. This major problem is exacerbated by the fact that summaries of information do not exist.

A major issue raised by many participants was that DOE does not ask local officials and the community what they want. There is no systematic method for involving local officials and citizens after siting decisions are made. They felt that there should be much more careful coordination of Federal, regional, State and local activities and clarification of the roles and responsibilities of each level. During this discussion, participants wrestled with difficult questions concerning the appropriate role and scope of responsibility for DOE. They recognized contradictions in some of their recommendations—asking DOE to take more responsibility for follow-up on environmental research and long term monitoring while also asking for greater local autonomy and decentralization of responsibility.

DOE's role as an R&D agency was discussed in relation to other needs such as long-range planning and long term support of environmental research. Questions were raised about DOE's responsibility for environmental study in the case of private development, as opposed to publicly-supported projects; and about the extent of DOE's responsibility for site-specific studies in addition to generic research on a technology's environmental effects.

## **PITTSBURGH WORKSHOP SUMMARY**

The fourth regional Section 11 workshop was held in Pittsburgh, Pa., on July 31, 1979, at the Pittsburgh Hilton Hotel. This final workshop focused on the DOE nonnuclear RD&D planning and assessment process and on two specific technologies—coal liquefaction and coal gasification.

Invitations to participate in the workshop were sent to 125 individuals; forty-five people attended the workshop; representing industry (24%), environmental groups (18%), public interest groups (16%), State and local government (11%), universities and research organizations (11%), and labor (4%). Also participating in the workshop were several private citizens who have been actively involved in the local debates over the Morgantown, West Virginia project, and a class of students from California State College in California, Pennsylvania.

### **The DOE Environmental Planning and Assessment Process**

An initial question many participants asked during the morning session was whether this process actually worked as it was designed. They suggested that it should be audited to see if, in fact, the process is having an impact on decisions or if the information contained in the various documents is actually ignored. They also wondered if the process was now irrelevant because of President Carter's proposed energy initiatives for "fast tracking" synthetic fuels.

A major issue raised by the work groups was how decisions about overall energy planning and management are made. Where in the process are technologies compared and environmental trade-offs resolved, and how are priorities set among renewable and nonrenewable technologies? They also questioned how energy conservation fits in and whether it is a factor in this process. Some participants expressed concern that, in their view, DOE's philosophy tends toward the view that "the only solutions to energy problems are technological."

Another overall criticism expressed by some participants was that the process deals only with very large projects. They were critical that the Office of Environment does not have the same formal input

for smaller projects with possible serious environmental effects as for larger projects although similar documentation is produced.

Several work groups said they felt that specific criteria were needed for Energy Systems Acquisition Advisory Board recommendations and for the decisions made by the Under Secretary on whether to move a technology to a further phase of development. They suggested that environmental factors be used to form a "threshold," or minimum standard particularly in decisions on whether to pursue a technology at all. If a project or technology did not reach the environmental threshold, conditions should be placed on approval to move it to the next phase. These conditions would require that environmental issues be resolved before development was continued. Participants also felt that efficiency should form a similar threshold, and that there should be serious consideration of how society would get the greatest benefit from dollars spent, both short and long term.

In discussing specific environmental factors that should be considered in the process, participants listed those associated with construction (noise, water, air, and social and economic effects) and with operation (air, wastewater quality and quantity, equipment and signal noise, climatic effects, social and economic costs, and effects on property values). They agreed that the conventional technical environmental factors have generally been identified but not necessarily dealt with and resolved. They felt, however, that it was crucial to look beyond these elements and consider the site-specific effects of any project. A number of participants felt that these site-specific issues were not receiving adequate attention or satisfactory resolution. Several groups felt that Environmental Impact Statement preparation should be the responsibility of the Office of Environment instead of the Program Office.

A final area that needs improvement, according to many participants, is coordination and communication among various levels of government.

### **Public Participation in the Process**

One work group summed up the feelings of many participants in the statement that "public input seems to get lost in the maze of a vast

bureaucracy. It seems to go into a black box, and there is no accountability to the public."

There was general agreement that better dissemination of information was of critical importance to effective public participation. Participants said that active outreach was needed and made several specific suggestions to improve public access to information. These include summaries of reports that use less jargon and interpret what the data mean to the public; putting copies of relevant documents in libraries; distribution of minutes or synopses of meetings to interested parties; compilation of extensive mailing lists from public meetings and inquiries for dissemination purposes; and establishing a toll-free telephone number to a person who can answer questions.

Participants felt that the timing of public input is important and that review of Environmental Impact Statements is too late. They felt that earlier discussion of issues in public forums was needed to encourage communication, rather than presentation of testimony for or against an issue. It was suggested that this discussion be national in scope in the initial planning phases, and that local committees should then be formed for siting decisions and to operate throughout the rest of the process. Some funding support would be needed but the participants did not agree about the level of this support. One work group also recommended evening meetings to facilitate participation by working people.

Several groups requested that the public be given an opportunity to review Environmental Development Plans and Project Environmental Plans, to ensure that all appropriate environmental concerns are included, and to review the Environmental Readiness Document, to ensure that some responses have been developed for each concern. They also felt that the public should be able to review Energy System Acquisition Advisory Board recommendations and the process and rationale for their decisions.

### **Environmental Concerns in Coal Liquefaction and Coal Gasification RD&D**

During the afternoon session, the discussion focused on two specific technologies, coal liquefaction and coal gasification. These two technologies were chosen for discussion by this group because of



the potential development of a coal synthetic industry in the region. Within DOE, a Commercialization Task Force Study recommended coal liquefaction and gasification as candidate commercialization technologies, and three gasification projects and two liquefaction projects were designated "major systems" within the Program and Project Management System. President Carter's energy messages have given further impetus to the development of these technologies.

Participants were skeptical of the capacity of a new process (the Program and Project Management Process) to govern an ongoing program. This may be a particularly acute problem in the case of synthetic fuels because of the political pressures generated by Presidential and Congressional support for the program. Participants noted that many decisions appear to have been made without any regard for the formal process. One participant voiced a fear that "DOE has created a monster which it now cannot control."

Some participants felt strongly that technology development had progressed far beyond environmental research. They felt that this was a clear indication that the process was not working. They said that most technical environmental factors have been identified, but that not all had been dealt with satisfactorily. In particular, they felt that site-specific issues required more attention. Some participants thought that DOE simply had too much confidence that it knows the answers to environmental questions and that it should be more tentative.

Specifically, some participants questioned whether research on a pilot or demonstration scale truly represents the environmental effects of a commercial operation. The potential carcinogenic effects of synthetic fuel production was cited as a major concern, along with water and air quality, waste disposal, noise, climatic effects, social and economic impacts, and effects on property values. Participants also noted the effect on land use and asked what criteria are used in making siting decisions. Other criteria that participants felt should be considered in examination of coal synthetic fuels

were net energy and net cost, including opportunity costs. They urged that DOE compare technologies and determine where the most benefit can be derived from its investment.

Participants expressed concern over the effects that the President's proposed "fast tracking" will have on synthetic fuels research. They worried that environmental research may be cut short, and that opportunities for public participation in the process would have little chance of expanding as they have recommended.

### **Public Participation in Coal Liquefaction and Gasification RD&D**

There was general agreement among participants that mechanisms for public participation and information dissemination in these areas has been inadequate. Desire for a more open process was expressed by many groups, but a basic question was raised: does DOE really want public participation? Some participants expressed skepticism about this and said that if information dissemination and public participation do not appear in DOE's budget, then DOE does not perceive them as a priority.

Participants noted that the role of State and local government in the process was not clear. Participants felt that State and local governments should be more actively involved in gathering and interpreting information. Many also felt that State and local governments should be involved in decisions as to whether a project should occur, in addition to where and how.

Participants repeated several of the concerns expressed in the morning session: that documents should be readily available locally and in a form that the public can understand, and that active outreach is needed. They also questioned how decisionmakers can be held accountable when the public knows so little about their deliberations and decisions. They felt that publishing decisions would be an initial step in increasing accountability.



## APPENDIX B NATIONAL HEARING SUMMARY

The Section 11 National Hearing was held in Washington, D.C., on October 3, 4, and 5, 1979. The Hearing panels included the Department of Energy Assistant Secretary for Environment, representatives from the Environmental Protection Agency and the Council on Environmental Quality, and members of congressional staff, environmental groups, State governments, and industry. Thirty-five people presented testimony, and an additional participant subsequently submitted written testimony. Participants represented a broad spectrum of interests, including industry, environmental organizations, public interest groups, universities and research laboratories, State and local government, and the general public. Many of the participants had attended one or more of the regional workshops held earlier this year.

Prior to the Hearing, witnesses were sent materials discussing the focus of this year's Section 11 activities and the major issues that emerged from the workshops.\* Most of the witnesses addressed one or more of these issues in their testimony. This appendix summarizes comments from the National Hearing on seven key issues and on other topics of interest to particular witnesses. A full transcript of the Hearing has also been published.

### 1. Nonnuclear Research Priorities

Many Hearing witnesses were concerned that DOE's current nonnuclear RD&D policy appears to favor large-scale, centralized technologies based on nonrenewable resources. They felt that smaller-scale, decentralized, appropriate technologies are not given the attention or support they merit. Several participants described in detail the potential lower cost and environmental advantages of alternatives such as solar energy, recycling, and conservation when these approaches are compared with the large projects DOE now emphasizes. Many witnesses felt that there is an urgent need for DOE to balance its RD&D efforts better if the nation's energy requirements are to be met, in both the immediate and the long-range future.

It did not appear to witnesses that, in setting policy and RD&D priorities, DOE planners systematically evaluate and compare all proposed and available technologies to determine which ones offer the greatest potential for meeting our energy needs most economically and with the least environmental risk. Instead, DOE

is hardware-oriented; it is not geared to problem solving. There is no meaningful competition among technologies within each resource category. There is no real competition among resources in developing national energy plans or determining budgetary priorities. (Kevin Markey, Friends of the Earth)

Witnesses felt that such comparisons of both production and conservation options are essential to the development of a rational, comprehensive energy policy.

In discussing the importance of performing such assessments, one witness stressed that

in evaluating technologies from an environmental standpoint, it is crucial to compare the new technology with that which it replaces or augments, as well as with other new competing technologies. (Gordon MacDonald, The MITRE Corporation)

### 2. Objectives of DOE Research, Development, and Demonstration

In one workshop, considerable time was spent discussing the role of DOE as an RD&D agency, and this question was examined further by several Hearing witnesses. Witnesses said that DOE's research goals were not clearly articulated. The RD&D program seems to be heavily oriented toward rapid commercialization of technologies rather than toward thoroughly testing and examining all aspects of their application. One witness outlined how this aspect of RD&D could be improved:

What you need is a system which is a little more balanced between branches that are building things and branches that are considering alternatives, rather than having a whole agency...whose mission it is to build and secondarily to do the best it can with the consequences.... You need a more balanced situation, where you are setting your energy priorities and your environmental priorities at the same time and then you look at those on the same footings and try to ask, how can we optimize both of these—rather than looking for the best energy technologies and then later worrying about how to handle the environment. (Richard Pratt, Pennsylvania Sierra Club)

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\* Environmental Protection Agency, Background Document for National Hearings. EPA 600/9-79-033. September 1979.

Both this witness and other participants felt that technical and environmental research should be more closely linked and that DOE efforts in both areas should be designed to provide the greatest amount of data to be used in decisionmaking. Another witness reinforced this idea:

I think the need has to be stressed for experimental facilities which test not only the technological capability, but also the environmental issues....There's also a need to emphasize decisionmaking systems which focus on incremental and adaptive decisionmaking to the greatest extent possible, rather than go/no-go decisions, so that we can reflect, as we move through various steps, the findings of environmental research, assessment, or monitoring.

(Allan Hirsch, U.S. Fish and Wildlife Service)

### 3. Project Management and Review

Witnesses felt that DOE's project management system, which requires top-level review only of projects involving major Federal investment, was also a problem. Projects that do not require large outlays of capital are managed at lower levels and therefore may never have their potential benefits seriously considered by DOE policymakers. Witnesses believed that this lack of attention to smaller projects reinforces a bias toward high-technology solutions to energy problems. Therefore, although witnesses recognized that not all projects could be monitored regularly by top officials, they felt that cost should not be the primary criterion for selecting projects for senior management review.

The uniqueness of environmental or health considerations, and potentiality of a system should also be examined.

(Chester Richmond, Oak Ridge National Laboratory)

Further, witnesses felt that this top management review should not be limited to determining whether a technology is technically feasible, the cost is acceptable, and the environmental effects are manageable; it should also include comparison with alternative technology options, i.e., it should review *all* feasible options. Criticism of the review process included the opinion that

the PPMS review process does not take into consideration alternative small-scale technologies when it evaluates a particular major system technology. In other words, it does not consider other ways to obtain the energy which is proposed for production by the technology under consideration.

(Susan Tachau, National Center for Appropriate Technology)

The witness added the consideration that

if technological alternatives are not reviewed, then energy conservation possibilities will not be addressed, nor will appropriate technologies or other alternatives be addressed which might produce the same amount of energy more economically than the large-scale technologies being considered.

(Susan Tachau, National Center for Appropriate Technology)

Another witness contended that

The complex procedures which were established by DOE to guide technology expenditures, the PPMS, appear to fail to provide for adequate evaluation of alternative actions on programs...By the time the DOE staff has committed large amounts of time and financial resources to a particular project... it is almost too late to address alternatives adequately in an EIS.

(Merilyn Reeves, League of Women Voters of Maryland)

To ensure that alternatives are adequately considered in policymaking and project management, several Hearing witnesses suggested that technologies be compared according to the efficiency of their "end use"—that each fuel source and technology be compared with others that can be used to meet a given energy need or "end use," such as residential heating or transportation. As described by one hearing witness,

The principle is that the "end use" for which energy is required should determine, as much as possible, the source and form of the energy to be employed for that use. The choice should be based on consideration of conservation or, in other words, of energy economy. This means that preference should always be shown for forms of energy that, while remaining compatible with the "end use" to which they are put, are as direct as possible, involve as little capital-intensive technology as possible, and come, as much as possible, from renewable sources.

(Susan Tachau, National Center for Appropriate Technology)

Another witness cited a recent report by the Carnegie-Mellon Institute of Research, "The Least Cost Energy Strategy," which discusses a new way of looking at interfuel competition—an approach called "energy services"

The premise is that an "energy service" is what people require: people want a warm house; they, in effect, are neutral as to whether this comes from gas heat, electricity, and so forth.

(Benjamin Schlesinger, American Gas Association)

#### 4. Criteria for Assessing Technologies

Several Hearing witnesses expressed concern that environmental criteria do not appear to have significant influence in DOE technology development decisions. Others felt that once the decision is made to invest in a technology, it is virtually impossible to halt or even slow its progress, even if serious environmental questions remain unanswered. Therefore, many witnesses supported the development and establishment of explicit environmental criteria which would be applied consistently to all technology projects at key decision points. Further, they felt that these criteria should be explained to the public and that the results of the application of the criteria to each decision should be disclosed. As one Hearing witness commented

Absence of explicit criteria gives the appearance, if not the reality, that decisions are arbitrary.  
(Mark McClellan, Pennsylvania Citizens Advisory Council)

Witnesses felt that in addition to cost and net energy analysis, the criteria should address a broad range of environmental issues; should apply to the potential local, regional, and global effects of a technology project; and should include consideration of the entire fuel cycle. Ideally these criteria should be measurable and observable. In discussing the broad range of applicable criteria, one scientist stated that

The process of evaluating competitive technologies requires explicit criteria, which should include risk evaluation, potential for environmental degradation, aesthetics and social concerns, and the aspect so often overlooked—the worldwide consequences of developing a technology....The obvious criteria include impacts on air, land, water, and the biosphere. The changes brought about in these resources must then be evaluated in terms of how they affect man. In this analysis, it is not only direct health effects that are of importance, but also the impact on those values that are often impossible to quantify, but are so important, such as the aesthetic impacts of changes in the recreational values of the environment.  
(Gordon MacDonald, The MITRE Corporation)

Another scientist noted that in evaluating energy technologies,

environmental and health considerations cover a span from site-specific to those that are truly global in nature. One might look to the acid rain problem as an indication of growing interest in regional concerns...We must also include the internal environment of an energy-generating facility, which brings us into the important area of worker protection, health, and safety.  
(Chester Richmond, Oak Ridge National Laboratory)

Regarding this last concern, a representative from the National Institute on Occupational Safety and Health said that

the issue of occupational safety and health has generally been given relatively low priority and visibility in the development of new energy technologies.  
(Kenneth Bridbord, National Institute for Occupational Safety and Health)

He felt that these concerns should be among the earliest issues to be discussed, studied, and resolved before large-scale commitment to a technology is made,

because occupational safety and health issues are largely independent of siting, occupational safety and health assessments should really precede overall environmental assessment.  
(Kenneth Bridbord, National Institute for Occupational Safety and Health)

Several witnesses discussed potential approaches to the application of environmental criteria. One described two models that could be used to integrate environmental factors into technology decisionmaking.

The first model is to have a periodic review to identify and avoid potential 'show stoppers'...things that would stop the technology dead and which unless overcome would make continuation unwise. It is my impression that this is the motivating element of the current DOE process. But a second model is to have an interactive process in which environmental and energy conservation factors are influential in steering the technology development along one path as opposed to another path.  
(Larry Moss, National Coal Policy Project)

Another witness had a slightly different perspective on the role of environmental criteria in the review process.

The review process is only useful and accomplishing its objectives if it can result in a negative decision. This does not appear to be the case within the Department of Energy today. Once a project enters the funding pipeline for basic research, it appears to be a foregone conclusion that it will proceed unmolested through the key decision points in the PPMS to commercialization.  
(Mark McClellan, Pennsylvania Citizens Advisory Council)

The process should be modified to include thresholds or

environmental conditions which must be met during each development phase. Any deficiencies or unacceptable environmental problems should be a condition for temporarily halting and in severe cases canceling a project. In the case of the project that does not meet the

threshold, the DOE Under Secretary should have the discretion to allow the project to proceed...but only to the next phase, and under conditional approval which would stipulate that specified environmental concerns must be resolved in a specified time period, or the project will be placed on permanent hold at that phase. No technology should ever be approved for commercialization unless all thresholds are satisfactorily met.

(Mark McClellan, Pennsylvania Citizens Advisory Council)

Environmental issues are currently examined in Environmental Readiness Documents (ERDs). One witness discussed shortcomings, primarily a lack of thoroughness, in the way the ERD deals with these issues.

ERDs should address five areas: the current state of knowledge about the health, safety, and environmental impacts that would be created by deployment of the technology; available control technologies; the current and proposed regulations which will affect commercialization; the areas of environmental concern for which information is inadequate and further research is required; and the likelihood of significant delay in attaining program objectives because of environmental concerns. The ERDs tend to present data unsystematically and to emphasize qualitative rather than quantitative analysis. Most ERDs treat the current state of knowledge about environmental concerns insufficiently. They omit definitions of the origin and size of the environmental concerns ....ERDs now merely list a potpourri of research needs and their dollar value. They should make some effort to prioritize these needs.... Environmental issues are now identified haphazardly. A more logical approach, used in many of the analyses at Brookhaven, would go through the entire fuel cycles of each of the technologies and identify possible environmental conflicts.

(Samuel Morris for Leonard Hamilton, Brookhaven National Laboratory)

Finally, a witness discussed the importance of developing and applying environmental criteria early in the process

prior to siting decisions. Today these considerations usually enter after individual sites have been selected and are being evaluated and after the battle lines have been drawn. If we use these criteria early in the process of identifying candidate sites for demonstration projects or for full-scale projects, we could ease—if not avoid—many last-minute confrontations.

(Allan Hirsch, U.S. Fish and Wildlife Service)

## **5. Appropriate Levels for Treating Environmental Issues**

A concern expressed in each workshop and repeated at the National Hearing was that agencies at the State and local levels, whose residents

lived near planned projects, were not given a clear role in the DOE decisionmaking process.

Most of the assessment of the environmental impact is...done on the national level. Most of the serious environmental effects of the new large-scale technologies will be felt most severely at the regional and local levels where the energy facilities are actually located. These effects must be examined closely.

(Susan Tachau, National Center for Appropriate Technology)

Participants felt that more responsibility for environmental assessment should be delegated to these local levels to increase the likelihood that local concerns, as well as generic technology concerns, would be dealt with at appropriate times. Local, State, or regional officials have a familiarity with their own environment that results in a deeper understanding of the potential range and severity of impacts a project may cause. This information must be considered along with generic technical data in making technology project decisions. In discussing the importance of continued research at all levels, another witness recommended that

DOE...should coordinate its funding sources so that both site-specific...and generic work can be pursued... Answers to the regional and global concerns most probably will arise from the generic research conducted as part of the core programs at various laboratories.

Further,

non-Federal levels of government will become the foci of decisions on environmental tradeoffs among energy policy alternatives. Harmony between energy development and regional concerns will be largely defined at the regional level, with the Federal government defining the boundaries of acceptability, offering incentives for actions and decisions that are in the national interest, and helping resolve conflicts that arise between States and regions whose actions and decisions affect one another.

Therefore,

DOE should make special efforts to keep State and especially local officials involved, as projects proceed through the environmental evaluation process, primarily through improved information dissemination, assistance to outside groups in preparing EISs, and establishing local planning and review groups.

(Chester Richmond, Oak Ridge National Laboratory)

And one witness complained of a present situation.

DOE has spent millions studying the Geysers. We're practically an annuity for the National Labs. But our local government still doesn't have the basic environmental and economic information it needs in a form it can use. We tend to think it might be because no one

ever came to us and asked us. Local government is too often treated as the object of some anthropological field trip. Our geographic jurisdiction seems to be considered as some underdeveloped colonial possession, just right for exploitation.

(Mary Jadiker, Lake County, California, Planning Commission)

Many participants stressed that the role of local and State agencies should not be limited to reviewing documents or decisions. Instead, these organizations should be involved in a steering capacity before final siting decisions are made and then throughout the life of a project. As one witness stated,

We're the ones who see, hear, smell, pay for, or benefit from our 'go' decisions. Obviously, we feel those ultimate decisions must be made at the local level.

(Mary Jadiker, Lake County, California, Planning Commission)

## 6. Public Participation

The clearest theme to emerge from the workshops and the National Hearing was that public involvement in DOE's management and decision-making systems has been woefully inadequate. Hearing witnesses expressed a deep sense of frustration in their efforts to participate in DOE's decisionmaking process. Through their comments, they reinforced the four overall criticisms of DOE's interactions with the public that were made at the workshops, and they offered some specific recommendations.

First, the amount and quality of information available to the public is inadequate. Important internal documents are not systematically disseminated, and documents that are supposed to be available upon request are difficult, if not impossible to obtain. Materials distributed are frequently highly technical and laden with bureaucratic jargon.

Second, opportunities for effective public participation in the decisionmaking process are inadequate. DOE technology management processes do not systematically involve the public until mandated by NEPA requirements. At this point in the process, many critical decisions have already been made. The public is never given an opportunity to affect the choices DOE makes among alternative technology options. According to one witness,

We can see that DOE is not involving a wider public in the decisionmaking process, and it is our view that they

should be doing so and doing so very early. Early participation outside the agency, we believe, is necessary for the effective management of any program which is ultimately going to impact the public. Now...the public has its say (only later) and often that is inefficient and leads to many delays which could have been prevented if this much broader public impact had begun early.

(Richard Pratt, Pennsylvania Sierra Club)

Little attempt is made to inform the public when decisions are going to be made and what the options are. Thus, citizens cannot actively seek involvement at appropriate times. This situation is exacerbated by the seemingly constant crisis atmosphere and organizational flux that surrounds DOE decisionmaking, which makes it very difficult for outsiders to discern how and when to attempt to influence the process. To improve communication with the public on decisions, one witness suggested that

we need to put more emphasis not so much on the formal system of preparing and circulating documents, but providing opportunities for various segments of the public who are concerned with these projects—like government agencies, the industry, environmental community—to meet in forums where... questions can be...(asked) and mutual respect can be generated.

(William Rogers, Gulf Mineral Resources Company)

As an example, one witness cited the National Coal Policy Project, which aimed to reconcile the views of energy developers and those of environmentalists. The approach to reconciliation used in the project was the "Rule of Reason," an alternative to adversary-type processes, in which the primary aim of the parties was to find an accommodative solution which did not seriously transgress the values of either party. This witness suggested that DOE could use this process to help resolve important long term issues, such as those involved in the development of synthetic fuels.

The third overall criticism of existing participation mechanisms was that they appear to favor certain interests. Advisory committees seem to be dominated by industry groups, and research review panels are composed of narrow groups of professionals with vested interests in pursuing traditional technology projects. Groups that are not well-funded have difficulty being involved in the public programs offered.

Finally, participants felt that the general attitude of DOE officials is not favorable toward public participation. Although certain officials in DOE have a strong personal commitment to public involvement, overall there seems to be too little value

attached to effective citizen input. Even when lip service is given to citizen activities, little time is devoted to adequate exchange between top officials and representatives of public groups. Many DOE representatives seem to consider members of public groups as naive amateurs with little of substance to contribute. One witness countered this attitude:

No management system will work without meaningful public involvement. It must be clear to the public also how DOE responds to public... participation. Credibility of public involvement efforts demands a responsive Department.

(Kevin Markey, Friends of the Earth)

Witnesses stressed that the implementation of meaningful measures to encourage public participation would, in fact, result in a number of benefits to DOE: issues would be identified earlier, conflicts would be resolved more easily, greater public support would be fostered, and the process would be expedited. Finally, it would meet the public's demand and legislative mandates for greater participation in governmental decision-making. As one participant summarized,

Public participation should not be viewed as an end unto itself, rather as a means of achieving goals, and it should always be clear that it is providing an opportunity... to participate in the decisionmaking...first you decide what decisions have to be made, then you decide when you are going to make those decisions, and then you decide how it is best to bring in the public to provide advice at those key points in the decisionmaking process.

(Edith Chase, League of Women Voters)

## **7. Discussions of Specific Technologies**

A number of witnesses discussed the merits or drawbacks of specific technologies. Individual witnesses discussed the pros and cons of geothermal development and synthetic fuels from coal and oil

shale. Others discussed the benefits that would result from an increased DOE emphasis on recycling, improved waste management methods, gasohol, and the increased efficiency of electrical appliances and equipment.

Most witnesses who discussed specific approaches focused on conservation, renewable resources, and appropriate technologies. One witness stated, regarding conservation, that it

must be an inherent part of our national energy policy and must be viewed as complementary to energy research and development and not as an alternative to it.

(Patricia Pelkofer, Group Against Smog and Pollution)

Another pointed out the necessity of conservation.

Conservation has been our only source of new supplies in the recent past and will be our only source in the near term. Conservation, along with the use of renewable sources, should be our major source in the long term.

(Lore Keffer, Group for Recycling in Pennsylvania)

Finally, in discussing the urgency of the need to place more emphasis on renewable sources of energy, one witness stressed that the national energy program must soon see

the beginning of a transition in economic and political advantage from the fossil and nuclear programs to the more benign renewable fuel forms. The purpose of this Hearing is to establish a document for congressional and executive review. I think it has to be established here that the people have gone on record as being concerned about a future that is dominated by dead ends and disappointments. A self-sustaining renewable fuel should be priced below the use of our rapidly depleting reserves by policy. To give the petroleum or synthetic fuels programs artificial supports and financial benefits is to work counter to basic principle, and it is to succumb to political irrelevance and cowardice, to oppose the inevitable, to delay the day until we must face our cold and hungry children in the darkness of our own selfish short-sightedness because we waited too long.

(Scott Crytser, Pennsylvania Gasohol Commission)

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