Chapter VI

Environmental and Health Issues

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1. Environmental Impacts of High Voltage Transmission Lines

ISSUE

More explicit program planning is needed to relate High Voltage Transmission Line Program objectives and decisions to related research and decisions on biological and environmental impacts.

SUMMARY

While the ERDA Plan states program objectives on the biological, environmental, and health impacts of high-voltage transmission technology, it does not present explicit scheduling or resource information to relate such programs or findings to the schedules on decision processes of its high voltage transmission technology programs.

BUDGET SUMMARY

SUMMARY TABLE

(Dollars in millions)

Budget Category	FY 76 Appropriations	FY 77 Division Request	FY 77 ERDA Request	FY 77 Request to Congress
Environmental Control Technology—Conservation [Budget Outlays)	0.075	(Not Available)		0.300

The above figure is the Environment and Safety Division's budget for electrical transmission work. The budget of the Division of Electrical Energy Systems (EES) in the Office of Conservation is claimed by ERDA to include five health and environmental studies totaling over $1.8 million. It is not possible to extract this information from the more aggregated figures contained in the budget requests for EES. There is some question as to whether two of the programs are in fact primarily environment or health oriented.

COMPARATIVE SUMMARY

A general fault found with the first ERDA Plan and Program (ERDA-48) was that there was no integration of environmental or health-related work into the Technology Development programs. The electrical transmission area in ERDA is an example of at least partial integration of the Environmental and Health programs into the Technology Development Program. Description and budget presentation in the Program and Budget documents are still inadequate, especially when compared with the description of the technology programs. Further evaluation of ERDA internal documents and discussion with ERDA personnel yielded five programs which were claimed to be environment or health oriented. Of these, the available descriptions raise questions of applicability, though not appropriateness, concerning two of these programs. ERDA personnel have admitted that the results of health and environmental research will not be available in time to affect the design or equipment testing programs planned in electric transmission technology R, D&D but claim that the results would certainly affect deployment of the technologies if deleterious effects are identified.

QUESTIONS

1. EPRI is performing environmental assessments of high-voltage transmission lines. Are they also involved in health or biologic studies related to high-voltage problems?

2. What potential effect could the ERDA biological, environmental, and health investigations have on the contracting and implementation milestones shown in ERDA's technology program schedule for high-voltage transmission?

z. Ground and Surface Water Contamination From Surface Mining

ISSUE

Research is inadequate on the potential environmental problems arising from surface mining, particularly in terms of its impacts on ground and surface water quality.

SUMMARY

Large-scale surface mining of fuels to the extent necessary to meet ERDA's energy plans presents the potential for generating large amounts of a variety of pollutants that will be difficult to control by point-source control technology.

Examples of this type of pollution are the leaching into ground and surface waters of sulfates, nitrates, ammonium, acids, and trace metals from strip mines and reclaimed areas.

The type of pollutants generated can vary from area to area depending upon geology, topography, and climate. The development of predictive models to evaluate the types and amounts of potential pollutants will ease the development of the technology needed to control and minimize these discharges.

BUDGET SUMMARY

Funding referring to strip mining operations is contained in the Environmental Studies, Analysis and Assessment, and Environmental Control Technology sections of the ERDA Program.

SUMMARY TABLE

(Dollars in millions)

Budget Category	FY 76 Appropriations	FY 77 Division Request	FY 77 ERDA Request	FY 77 Request to Congress
Environmental Studies				
Coal Extraction (Budget Outlays)	0.6	[Not Available)		1.4
Oil Shale Technology (Budget Outlays)	0.4	(Not Available)		0.6
Analysis & Assessment				
Assessment of Environmental Impacts of Energy Systems (Budget Outlays)	1.6	(Not Available)		1.6
Assessment of Impacts of Energy Production on Local, Regional & National Scales (Budget Outlays)	7,7	(Not Available)		7.8
Environmental Control Technology — Coal (Budget Outlays)	1.2	(Not Available)		1.8

The only area of significant budget increase is in Environmental Studies, Coal Extraction. The increase in the budget of Environmental Control Technology, Coal, appears to be oriented toward coal combustion research, rather than extraction research. The budgets related to surface mining in the Analysis and Assessment Program have decreased in real dollar terms.

COMPARATIVE SUMMARY

ERDA's awareness of the environmental problems related to strip mining is evident in the program descriptions provided in the budget documents, and to a lesser extent in the Program document. There appears to be activity related to water resources and strip mining in several agencies other than ERDA.

There is little indication of how good the level of coordination is between ERDA and other agencies. The potential environmental effects of strip mining or in situ leaching of uranium are barely mentioned. This may be a significant oversight. The schedule on page 587 of the Program for the Coal/Uranium Extraction study indicates that completion of data on the most critical area, the Southwest, will not be completed until the end of 1981, which seems a long lead time. In general, however, ERDA is either doing much more in this area than it was a year ago or is reporting its programs better.

QUESTIONS

1. What is the effect of large-scale surface mining operations in the West on ground and surface water quality in the Missouri and Colorado River Basins?

2, What impacts will changes in ground and surface water from large-scale surface mining operations have on farming and ranching in the West, and on forestry, agriculture, and municipal water supplies in the East?

3. In what geographic areas is it necessary to replace topsoil to insure the productivity of the land, and in what areas will replacement of topsoil be unnecessary?

4. To what extent and in which areas will mining-induced water pollution limit energy development?

5. Which agency should take the leadership role in research relating to environmental impacts of surface mining operations, and what should be its relationship to other Federal and State agencies?

6. Why is there little mention of environmental effects from uranium extraction included in the Biomedical and Environmental Research (BER) or the Fuel Cycle Research and Development Programs?

7. What percent of the research is to be allocated to national laboratories and what percent to the private and university sector?

3. Energy Consumption and Inadvertent Climate Modification

ISSUE

Not enough is known about the potential for detrimental or irreversible climate modification caused by increasing worldwide energy use over the long term.

SUMMARY

Changes in rainfall and temperature associated with increased energy consumption have been observed in specific localized areas. Evaluation of the potential for large scale changes in climate caused by escalating energy use requires a better understanding of the Earth's ultimate capacity to assimilate man-made heat. While the ERDA plan paid some attention to the relation between energy use and local meteorological changes, it does not address the larger question of the ultimately sustainable level of thermal loading.

COMPARATIVE SUMMARY

The issue deals with the multiple aspects of inadvertent climate modifications associated with escalating energy uses of all types. Budget authorizations could not be identified for any of the following areas: 1) climate modifications produced by large nuclear farms; 2) long-term limits on supportable man-made thermal heat loads; 3) long-term impacts of pollutant generation (e.g., $C0_2$, SO_x, NO_x) associated with the use of fossil fuels; 4) identifiable constraints on energy-development scenarios that relate to thermal or pollutant environmental loadings; 5) international cooperation on problem areas of this type; 6) cooperative programs with NOAA, NASA, EPA, The potential long-term temperature change caused by increased atmospheric $C0_2$ concentrations is considered to be an especially critical unresolved problem.

QUESTIONS

1. What is the total requested budget authorization for work on the relation between energy consumption and inadvertent climate modification?
2. How much of this total will be allocated to studies on nuclear farms?
3. What is ERDA's financial contribution to cooperative programs with NOAA, NASA, and EPA?
4. Will the responsibility for early identification of environmental constraints (e. g., unacceptable $C0_2$-loading) in energy development schedules reside with the Assistant Administrator for Environmental Research and Safety, the Assistant Administrator for Systems Analysis and planning, or the manager of the new Overview and Assessment Program?

4. Variance on Environmental Standards During Development

ISSUE

Present environmental regulations on the functioning of environmental control equipment may tend to deter the development of new energy technologies at the pilot plant level.

SUMMARY

Development of necessary environmental control equipment can be as difficult and uncertain as the development of any other technology. The present regulatory climate in the United States does not provide for pilot plant development programs as special cases. Coupling the development of new energy technologies with that of their associated environmental protection technologies, as regulations now require, may seriously hamper ERDA efforts to bring new energy sources to commercial use. This presents a risk of abandoning potentially viable energy technologies because faulty performance of experimental environmental control equipment compromises (the proof-of-process) results obtained in pilot-plant testing of the basic energy technology. ERDA should address the question of the environmental risks and ad hoc mitigating measures which may be appropriate in pilot level development. With the Congress and the regulatory agencies, ERDA should explore the advisability of special regulations for pilot and demonstration facilities.

BUDGET SUMMARY

No section is directly applicable,

COMPARATIVE SUMMARY

ERDA is to be commended for the addition of $5 million in establishing the Analysis of Energy and Environmental Policy Considerations Program. The ERDA Program does not, however, discuss the complex issue of obtaining variances from existing environmental standards for pilot demonstration facilities for new energy-development technologies. It has not been established when environmental assessments or environmental impact statements will be needed.

The overview and analysis role of the Environment and Safety Division relative to the technology branches of ERDA needs to be more carefully defined. The role of EPA in enforcing existing environmental standards for new energy testing facilities needs to be carefully delineated. The problem of possible variances from existing or proposed regulations by State and local government agencies has not been discussed.

QUESTIONS

1. What consideration has ERDA given to prototype development problems which could result from the parallel operation of experimental energy-associated and environmental control equipment?
2. Have the possibilities for flexible environmental regulations and necessary pre - cautions for experimental facilities been explored by ERDA with other agencies such as EPA? Will the treatment of this problem open the door for general standard relaxation?

5. Energy Modeling and Data Bank Requirements

ISSUE

It is not clear from the ERDA Plan and Program that ERDA fully recognizes and accepts critical needs in energy modeling procedures and in the associated data requirements.

SUMMARY

Linear models, such as the Brookhaven Reference Energy System, used for projecting the ERDA scenarios can easily incorporate probabilistic measures of the accuracy of environmental information. Probabilistic calculations would give a more meaningful projection of future demand as well as pinpoint data which are important but highly uncertain.

A large increase in the number of categories of effluents measured and used in environmental impact modeling is also needed. Using the proposed Brookhaven techniques, grouping of compounds results in, for example, the collection of all hydrocarbons in a single category. This procedure facilitates the collection and manipulation of data, but makes conclusions based on such data suspect, because of the substantial variation in environmental effects among the hydrocarbons.

The whole field of energy system modeling is in an early stage of development. ERDA's discussion of modeling recognizes a need for much more sophisticated techniques than those currently at hand. Several energy models are being developed around the country. It would be desirable for ERDA to interface on a continuing basis with these other activities so as to compare the sensitivity of modeling results to alternative techniques and data bases. Consistency of projections from alternative models does not guarantee accuracy. However, in the absence of an existing real basis for calibration, a consensus between independent efforts can increase confidence in the validity of the results obtained.

BUDGET SUMMARY

ERDA's efforts to develop environmentally related data bases and modeling procedures appear to be primarily embodied in the Assessment of Impacts of Energy Production on Local, Regional, and National Scales (AIEP) section of the BER Analysis and Assessment Budget. Other sections of the budget allude to related activities. Although the original division and ERDA requests for AIEP funding are not known, it is assumed that reductions follow the overall Analysis and Assessment funding in a roughly proportional manner.

SUMMARY TABLE

(Dollars in millions)

Budget Category	FY 76 Appropriations	FY 77 Division Request	FY 77 ERDA Request	FY 77 Request to Congress
Analysis and Assessment	11.6	27.8	27.5	19.0
Assessment of Impacts of Energy Production on Local, Regional, and National Scales (Budget Outlays)	7.7	(Not Available)		7.8

COMPARATIVE SUMMARY

The FY 77 ERDA Budget indicates that during the year **ERDA** will develop models to evaluate the impacts of the development and use of prospective energy sources and to analyze and utilize appropriate models developed by other agencies. Moreover, the budgets also indicate that the relevant data bases in standardized form are being expanded and improved. Despite these indications that ERDA has given consideration to the key concerns involved in this issue, the FY 77 budget in this area represents an actual decline in funding in real dollar terms. If it is assumed that the decrease in the funding for this section is roughly proportional to the decrease in analysis and assessment funding overall, it would appear that OMB has failed to support ERDA's interest in this area.

QUESTIONS

1. What are ERDA's plans to incorporate in their modeling efforts information on the levels of uncertainty associated with environmental data?

2. The postulating of alternative scenarios is only one of several methods of treating the uncertainties associated with the development of new technologies. What methods will ERDA use to display the sensitivity of their results to changes in assumptions used and to uncertainties in the environmental data?

3. In view of the number of independent energy system models that are being developed, what plans does ERDA have for making alternative projections?

6. Site and Technology-Specific Nature of Cause-Effect Relationships in Environmental and Health Impacts

ISSUE

Simple extension of energy systems modeling capabilities to the regional discrimination level with expanded emissions categories will not yield a valid impact profile for energy technology decisionmaking.

SUMMARY

Considerable effort has been devoted to determining the rates of emission of various materials from energy conversion devices. These data are by no means complete, but in many cases they are adequate. Much less is known about the actual amounts of environmental degradation resulting from a given emission rate. The prediction of dose is complicated by site specific factors such as population density, climatology and ambient air quality. The further translation from pollutant dose to effect is known only for a very small number of pollutants (SO, ozone, PAN, lead, CO, etc.) and only in terms of their major effects on agricultural products and selected animal species. However, the effects of even these pollutants is not known for low dose levels. Chronic exposure conditions or possible synergistic relationships have seldom been explored. Expanded studies are needed to assess the impact, in quantifiable terms, of the many energy related pollutants at varying emission or release rates. Such studies will improve the effectiveness of modeling approaches and ultimately improve our capability to optimize energy choice/use patterns.

BUDGET SUMMARY

SUMMARY TABLE

(Dollars in millions)

Budget Category	FY 76 Appropriations	FY 77 Division Request	FY 77 ERDA Request	FY 77 Request to Congress
Health Effects of Energy Systems (Budget Outlays)	1,5	(Not Available)		**1.5**
Environmental Impacts of Energy Systems (Budget Outlays)	**1.6**	(Not Available)		**1,6**
Local, Regional and National Impacts (Budget Outlays)	7.7	(Not Available)		7.8
Environmental Data Integration (Budget Outlays)	0.6	(Not Available)		
Total Analysis & Assessment	**11.3**	**17.5**	**17.2**	**11.7**

There was a significant increase in budgetary allocation between FY 75 and FY 76 and an attempt by ERDA to further increase the budget for this work in FY 77. That attempt did not survive the budget review process outside ERDA.

COMPARATIVE SUMMARY

In addition to the work identified in the budget summary in the Analysis and Assessment area, there are significant programs identified elsewhere in the budget document that relate to pollutant emissions from specific technologies, the transport, transformation, and fate of those pollutants and the health and ecological impacts of pollutant concentrations identified in specific study areas. Studies are underway or planned for a number of critical areas. In sum, the various elements add up to a very-well-defined and well-structured program. The urgent need for the information sought in these programs places in question the action of OMB in reducing the budget request.

7. Integration of Environmental, Health, Social, and Institutional Research Into Technology Programs

ISSUE

ERDA's presentation and discussion of environmental, health, social, and institutional research indicates a lack of integration of this research into its R, D&D program.

SUMMARY

To maximize the effectiveness of research on environmental, health, social and institutional constraints, the results of that research should be available before the widespread implementation of the technology, The ERDA implementation schedules do not present environmental and health research timelines in parallel with the technical milestones. Further, the specific plans for environmental and health-related research, tailored to the individual technologies which will be promoted, are not detailed and discussed in the technology program statements provided in volume II.

The failure of volume II to define environmental, health, social and institutional problems which could constrain specific technology programs is a significant oversight. The oversight is emphasized by the established obligation of Federal agencies to consider potential environmental impacts at the earliest time in their planning processes. Explicit priority is given to analysis of environmental and social consequences of energy technology deployment in Section 5 (a] (2) of the Federal Nonnuclear Energy Research and Development Act of 1974. Because of the lack of specificity of the environmental activities defined in ERDA's technology program descriptions, there is no guarantee that the necessary environmental research and assessment will be conducted simultaneously with energy technology development.

BUDGET SUMMARY

SUMMARY TABLE

(Dollars in millions)

Budget Category	FY 76 Appropriations	FY 77 Division Request	FY 77 ERDA Request	FY 77 Request to Congress
Analysis and Assessment	11.6	27,8	27.5	**19.0**

Relatively large increases were requested by the Division and ERDA and approved by OMB for Analysis and Assessment. The percentage increase recommended by OMB is 63.5 percent and is much larger than the specified increase of 4.73 percent for all aspects of Biomedical and Environmental Research. The small increase for all of BER is inadequate, especially in view of a 31.9-percent increase in funding for all of the ERDA activities recommended by OMB.

COMPARATIVE SUMMARY

Initiation of the Overview and Assessment Program within ERDA is a major response to the primary OTA concern in the Environment and Safety area. According to ERDA 76-1 (p. 549), the activities of the Overview and Assessment Program will be defined during FY 77, thus leaving unanswered each of the following critical questions:

QUESTIONS

1. Who is in charge of the Overview and Assessment Program?
2. If its functions are not restricted to advisory and coordinating activities, by what mechanism will program implementation be accomplished?
3. Where and what are the direct budgetary authorizations for operation of the Overview and Assessment Programs?
4. How will this program be coordinated with EPA functions?

8. Energy Impacts of Air and Water Pollution Control Regulations

ISSUE

The interactions between energy, environmental and economic effects of Federal, State, and local air and water quality standards are not sufficiently understood.

SUMMARY

The enactment and enforcement of air and water pollution control regulations can have substantial impacts upon energy consumption requirements and solid waste generation. These potential impacts will become increasingly important in the future with the decreasing availability and increasing cost of fuel supplies and/or disposal sites. These complex interactions are not presently recognized by existing regulations, which tend to treat air pollution, water pollution, and solid wastes as separate problems unrelated to potential energy consumption requirements. Environmental protection and energy consumption optimization trade-offs are needed.

BUDGET SUMMARY

The considerations relevant to this issue appear to be most directly addressed by the Analysis of Energy and Environmental Policy Consideration (AEEPC) section of the Environmental Research and Safety's Analysis and Assessment Budget. However, funds expended in other sections of the Analysis and Assessment Budget also bear on these considerations. Therefore, the table below lists information on both the overall Analysis and Assessment Budget and the subordinate AEEPC section. Although the original division and ERDA requests for AEEPC funding are not known, it is assumed that the reductions follow in a roughly proportional manner the overall Analysis and Assessment funds.

SUMMARY TABLE

(Dollars in millions)

Budget Category	FY 76 Appropriations	FY 77 Division Request	FY 77 ERDA Request	FY 77 Request to Congress
Analysis & Assessment	11.6	27.8	27.5	19.0
Analysis of Energy — & Environmental Policy Considerations (Budget Outlays)	—	(Not Available)		5.0

COMPARATIVE SUMMARY

The addition of a new activity with a rather substantial budget to specifically analyze the relationship among interrelated environmental, health, economic and societal factors would indicate an appreciation of the need for a clearer understanding of the benefits and costs of air and water pollution control regulations. To the extent of the 24-percent reduction in the Analysis and Assessment request, the program desired by the Biomedical and Environmental Research Division would appear to have been reduced in scope. Without more detailed information of how the $5 million will be allocated it is difficult to analyze the effects of the program. Nevertheless, it does appear that ERDA has meaningfully addressed the issue.

QUESTIONS

1. What changes need to be made in existing Federal, State, and local air and water pollution regulations regarding the trade-offs between environmental protection and energy consumption?

z. What are the proper criteria for obtaining optimum balance between environmental protection and energy consumption at specific sites, and by whom should they be explored?

3. What improvements are needed in existing air pollution and water pollution control technologies to minimize potential energy consumption?

9. Competing Demands for Water in Western River Basins

ISSUE

The limited availability of water in areas such as the Colorado and Missouri River basins will force systems evaluation of net benefit from energy and non-energy activities which depend on water.

SUMMARY

Large amounts of water will be required from available ground and surface water supplies in the arid Rocky Mountain States for energy production operations such as coal and oil shale mining, slurry pipeline coal transportation, minemouth electric power generation, coal and oil shale conversion to gaseous and liquid fuels, and environmental management of strip-mined areas and spent shale disposal areas. Extensive implementation of these projected energy production activities may adversely affect water quantity and quality for agricultural use in the same river basins. Development of geothermal energy resources, e.g., in the Imperial Valley, could result in either further water demand and water quality impact or in the production from saline water of a supplementary source of freshwater for agricultural use. Extensive analysis of the total system activity in these river basins will be required to ensure that the proposed energy development activities which are actually implemented will result in a net benefit to the country.

BUDGET SUMMARY

SUMMARY TABLE

(Dollars in millions)

Budget Category	FY 76 Appropriations	FY 77 Division Request	FY 77 ERDA Request	FY 77 Request to Congress
Assessment of Impacts of Energy Production on Local, Regional & National Scales (Budget Outlays)	7.7	(Not Available]		7,8

Issue 9 is just one study of this subprogram; no figures are available for budget allocations for this specific program.

COMPARATIVE SUMMARY

It appears that ERDA's program only partially addresses the problem of water demands in western river basins. It further appears that ERDA's primary concern is for nuclear power complexes and ERDA's own demonstration facilities. The competing water demands between different energy production operations and the competing water demands between energy production and nonenergy production uses (agricultural, recreational, industrial, and municipal) are an all-encompassing problem that has not yet been addressed.

QUESTIONS

1. What is the maximum amount of water which can be made available for energy production in the Missouri and Colorado River basins without jeopardizing agricultural operations and other industrial or public demands for water?
2. What impacts upon water quantity and water quality will occur in the Rocky Mountain States from varying levels of energy production, and what impacts will these have on agricultural production and resultant food prices?
3. What are the relative environmental, energy and economic trade-offs of minemouth processing of coal to electrical energy or synthetic fuels in the arid Rocky Mountain States as compared to alternative transportation to water-abundant areas along the Mississippi River or Gulf of Mexico for subsequent processing?
4. What is your estimate for the potential production of desalinated water from geothermal resources in the Imperial Valley of California by the year 2000?
5. What plans does ERDA have for the construction of integrated regional development plans linking seemingly disparate energy technologies?
6. Which energy production and transportation operations become less attractive (environmentally and economically) with a limited availability of water?
7. What is the budgetary contribution for studies of water demand for nonnuclear operations versus studies oriented toward nuclear power complexes?

10. Need for Social Research in Offshore Energy Programs

ISSUE

Social research is needed on institutional problems arising from the deployment of offshore energy technologies.

SUMMARY

Major problems in new offshore development are presented by the social and institutional constraints to developing offshore oil and gas production, nuclear, and fuels transportation facilities. One current major research need is to examine new institutional mechanisms in order to further understand the problems of government management and public acceptability, This research needs to be conducted on national, regional, and local levels.

BUDGET SUMMARY

No direct budget information is available relative to the specific issue. A new division, Overview and Assessment, has been suggested within AES which will examine: 1) policy analysis, 2) overview management, 3) EIS monitoring and review, and 4) integrated assessment. This new division will inherit the functions of Analysis and Assessment (A&A). The A&A budget shows five categories, three of which mention socioeconomic studies. It is not clear, however, how the five A&A budget categories will relate to the four functions of Overview and Assessment.

SUMMARY TABLE

(Dollars in millions)

Budget Category	FY 76 Appropriations	FY 77 Division Request	FY 77 ERDA Request	FY 77 Request *to Congress*
Analysis & Assessment (socioeconomic) Environmental Impacts of Energy Systems (Budget Outlays)	**1.6**	(Not Available)		**1.6**
Impacts of Energy Production on Local Regional & National Scales (Budget Outlays)	7.7	(Not Available)		7.8

SUMMARY TABLE — Cont.

(Dollars in millions)

Budget Category	FY 76 Appropriations	FY 77 Division Request	FY 77 ERDA Request	FY 77 Request to Congress
Energy and Environmental Policy Considerations (Budget Outlays)	0	(Not Available)		5.0
Analysis & Assessment, Office of Planning and Analysis	11,6	27.8	27.5	**19.0**

The ERDA budget in Analysis and Assessment grew by 65 percent between 1975 and 1976, and the requested figure sent to OMB of $27.5 million would have represented a 136-percent increase over the 1976 appropriation. By comparison the total ERS budget grew by 26 percent between 1975-76 and by 65 percent from 1976 to the 1977 ERDA request. A larger share of funds is going, then, to socioeconomic research.

COMPARATIVE SUMMARY

The social impacts of energy production have been mentioned under Policy Analysis, Environmental Effects, and Analysis and Assessment Programs in BER. However, these need to be more fully addressed for both onshore and offshore energy development, particularly in terms of new communities, quality of life, and employment mobility.

ERDA states that it desires to work with EPA on impacts from oil spills (p. 585). It also says that its Overview Management "assures proper integration and coordination of various programs. "

ERDA thus both recognizes social impacts and understands that it should cooperate in environmental problems related to offshore energy programs with other agencies, However, it does not specifically relate social research and offshore oil development problems.

11. Effect of Public Attitudes on Program Implementation

ISSUE

ERDA's plan for Energy Research, Development and Demonstration does not include research on how public attitudes and values affect implementation of Government energy plans and controls.

SUMMARY

Public attitudes about the proper role of Government, what constitutes qua lit y of life, and what characterizes important threats to the human environment, greatly affect what Government actions people will support as well as the incentives and disincentives to which they will be willing to respond. ERDA's plan does not appear to include study of energy-related attitudes, their formation, intensity, and stability, and the impact of information upon attitude changes.

BUDGET SUMMARY .

No specific budget allocation for this activity has been identified.

COMPARATIVE SUMMARY

The issue of how public attitudes affect program implementation of new energy technologies has not been fully addressed in the ERDA Program and budget. However, a section is devoted to Public Awareness in the ERDA Program (pp. 683-685). The goals are stated as:

"To increase public awareness and understanding of the nation's energy problems and of the resource and technology options which may be applied to their solution so that the public can make an informed choice. " (p. 683). Enhancement of public awareness and understanding is a necessary goal, but it is not the whole issue; the question includes the ways in which the public can or will affect the program, not just how the program affects the public.

The ERDA Program states that "Cooperative programs are being developed with organized groups — civic, labor, and management organizations and environmental, public interest, consumer, and youth groups — to provide and obtain information via the active communication channels such groups have with community cross sections throughout the U. S." (p. 685). Workshops, seminars, exhibits, films, etc., and other educational materials are also being produced or planned. These statements indicate that ERDA has at least committed itself to a good start in establishing a genuine dialogue with the public.

QUESTIONS

1. How will ERDA present the necessary results of research on public attitudes so that agencies and other policy makers can make judgments about what the public will accept in terms of energy development, conservation regulations, and environmental controls?
2. How well do the environmental impacts which ERDA proposes to predict for various technologies reflect the concerns that people actually have about their environment?

12. Program Focus in Fossil Fuel Health Effects Research

ISSUE

The ERDA program of research on the health effects of fossil fuels covers a broad range of biological responses and pollutant exposures. Some research areas do not appear to be relevant to ERDA's missions.

SUMMARY

ERDA's overall program of research into the effects of fossil fuel use on health places great emphasis on basic biological mechanisms of response, Certain important areas, such as biological screening, carcinogenesis and mutagenesis, and epidemiological studies, appear to be inadequately emphasized, while other areas, such as research on recovery, treatment, and development of radio-pharmaceuticals, may well be unnecessary under the primary mission of ERDA's health research program. The program description gives little detail as to which pollutants will be given highest priority, or on how the results of health effects research will be integrated into the decision process as to which alternative energy technologies to develop. To meet these research demands, there is a critical need for the training of additional cell- and tissue-culture experts, toxicologists and epidemiologists.

BUDGET SUMMARY

SUMMARY TABLE

(Dollars in millions)

Budget Category	FY 76 Appropriations	FY 77 Division Request	FY 77 ERDA Request	FY 77 Request to Congress
Health Studies	65.1	83.1	79.7	63.3
Biological Studies	34.0	41.3	40.1	34.0
Education and Training	3.5	7.6	7.0	2.2

The budget history shows an attempt by ERDA to significantly increase both health effects and biological studies. The OMB screening process changed the ERDA budget requests to an effective reduction if inflationary effects are included. The Education and Training budget suffered an absolute decrease of almost 40 percent.

COMPARATIVE SUMMARY

The original issue identified a need for more emphasis on epidemiological studies and the training of cell and tissue culture specialists, toxicologists and epidemiologists. There appears to be no change in this situation. Some epidemiological and toxicological work is defined in the Health Effects budget, but the majority of the effort appears to be expended on delayed carcinogenic effects. The Biological Studies Program of ERDA 76-1 is much more oriented toward cellular and molecular biological studies than was the program description in ERDA 48. The education and training proposal of ERDA\AES, which would have doubled the budget in this area, did not survive OMB review.

QUESTIONS

1. How will ERDA's health research program, which is largely directed toward animal models, evaluate known adverse effects on human health which cannot yet be modeled with animal experiments?
2. What plans does ERDA have for training programs to provide the additional manpower needed for their proposed health effects research programs?
3. If ERDA obtains positive results on screening for detrimental effects of a fossil fuel product, how will the results be validated with respect to human populations?
4. What plans does ERDA have to evaluate the safety of substances in humans, once they have successfully passed through the animal screening system?

13. Inadequate Inventory of Skills and Techniques in Health Effects Research

ISSUE

Means are not available to estimate effects of coal combustion and conversion on human health. A broad-based research effort, in both university and Federal facilities, is critically required to develop improved techniques for evaluation of health impacts from coal combustion and conversion.

SUMMARY

The Health Studies Section of ERDA-48, volume II, emphasizes research in the area of longterm effects of coal-related pollutants. This emphasis on cancer and birth defects is most appropriate, since coal-related pollutants are known carcinogens and mutagens, The program, however, appears to stress traditional long-term animal experimentation. This approach cannot yield relevant data in time for decisions about national energy prerogatives. The program also suggests the use of recent research developments in the field of animal cell genetic assays, These show great promise as relevant bioassay systems and should receive greater emphasis. An intensive broad-based effort should be used in both data acquisition and innovative fundamental research, A significant increase in both the scope of the related ERDA research organization and the university production of trained researchers will be needed to meet the research program requirements,

BUDGET SUMMARY

SUMMARY TABLE

(Dollars in millions)

Budget Category	FY 76 Appropriations	FY 77 Division Request	FY 77 ERDA Request	FY 77 Request to Congress
Education and Training	3.5	7.6	7.0	2.2

COMPARATIVE SUMMARY

Both ERDA and OMB have drastically cut the Education and Training Program. The problem of contributing to an adequate inventory of skilled professionals in the Environment and Safety area, however, has a larger focus than that of providing training grants. At issue here is the long-term evolution of

ERDA funding strategy with respect to the support of a broad-based research effort in the non-Federal sector, and the support of basic research relating to ERDA's long-term goals and objectives.

QUESTIONS

1. What was the FY 76 funding distribution in the Environment and Safety Program retween:
   (a) the in-house laboratories;
   (b) not-for-profit, non-ERDA organizations;
   (c) the private sector;
   (d) educational institutions?

2. What fraction of the total budget will ultimately be allocated to: (a) the in-house laboratories, and (b) other organizations?

3. How does ERDA management view its responsible and proper implementation strategy for assuring that an adequate number of trained professionals are available in the Environment and Safety Program area?

14. Atmospheric Sulfates as a Potential Constraint on ERDA's Fossil Fuel Program

ISSUE

Suspected health hazards of atmospheric sulfates may result in air quality standards which would constrain ERDA's programs based on coal.

SUMMARY

Questions have been raised concerning whether sulfate concentrations (as an index of SO_2 transformation products) throughout the Midwest and Northeast may presently exceed threshold concentrations for adverse health effects. If substantiated, this finding would raise serious questions as to the advisability of introducing any new sources of sulfur oxide emissions into the atmosphere. There are considerable uncertainties about the concentration and chemical nature of atmospheric sulfates which are hazardous to health. Improved information on the relation of toxicity to sulfate concentrations is required to set ambient air quality standards. If the present fears are supported by scientific findings, standards could be set which would severely limit further energy development programs based on coal as a primary fuel, on direct utilization of geothermal resources, and on approaches to reduce automotive emissions. Immediate and concentrated attention to this area would help to resolve the existing uncertainties. Some of the energy

goals set **by ERDA, if pursued in the absence of the necessary health effects information on atmospheric transport and transformation of sulfates, may not represent an achievable objective.**

BUDGET SUMMARY

SUMMARY TABLE

(Dollars in millions)

Budget Category	FY 76 Appropriations	FY 77 Division Request	FY 77 ERDA Request	FY 77 Request to Congress
Characteristics, Transport & Conversion (Budget Outlays)	17,6	(Not Available)		19.5
Fundamental Environmental Processes Related to Energy (Budget Outlays)	9.2	(Not Available)		8.3
Physics & Chemistry of Pollutant Interactions in the Environment (Budget Outlays)	1.0	(Not Available)		**1.6**
Characterization, Measurement & Monitoring (Budget Outlays)	10.5	(Not Available)		11.4

COMPARATIVE ANALYSIS

The question of sulfate air pollution is well addressed by BER in the Health Effects, Environmental Effects and Physical and Technological Studies Programs in the larger context of fossil fuel pollutants. The program is well characterized and will effectively define the magnitude and nature of sulfate problems from stationary sources.

Sulfates are also produced in automotive-engine exhausts as the result of catalytic oxidation of SO_x in emission-control devices. When allowable levels are defined by the EPA for this pollutant (hopefully, at concentration levels that can be monitored reliably), it will be necessary to consider the combined effects of sulfate emissions contributed by the transportation sector and by coal-based technologies.

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