MASTER

TASK VIII

①
REVIEW EXISTING OS MATERIALS

R & D PROGRAMS

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September 28, 1979

Dr. James Eberhardt
Office of Policy, Planning and Evaluation
Assistant Secretary for Conservation and Solar Applications
U.S. Department of Energy
20 Massachusetts Avenue
Washington, D.C.

Dear Jim:

I am enclosing two (2) copies of: a paper entitled "Management Options for Implementing a Basic and Applied Research Program Responsive to CS Technology Base Needs;" and a 1-page summary of the paper. This work was performed under the quick response portion of task 8 of our contract EM-78-C-01-4249.

Sincerely,

Richard Silberglitt
Senior Associate

RS:fa

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SUMMARY - CS BASIC AND APPLIED RESEARCH OPTIONS

The enclosed paper considers a number of possibilities for setting up a basic and applied research program that would be responsive to CS technology base needs. An earlier analysis of the requirements of the program(attached)concluded that the following elements are essential for program success: 1) CS sign-off authority for project funding, 2) ER input concerning research quality and 3) a mechanism for coordination between researchers and end users.

Three options that satisfy these requirements, but have differing lead responsibility and chain-of-command structures are analyzed. Option 1 retains lead responsibility in ER, with CS personnel exercising sign-off authority and filling the coordination role. (Several sub options are examined.) Option 2 places lead responsibility with CS program office management, and utilizes the existing chain-of-command, but adds a Basic and Applied Research Division to each program office. Option 3 also places lead responsibility with CS, but within a new Office of Basic and Applied Research, which would include a Research Coordinator to manage interactions with ER, and Research Managers for each CS program area.

Option 3 is recommended because it allows substantial input from CS program offices, provides an effective research integration and coordination mechanism, and facilitates interaction with ER, within an overall structure which gives CS lead responsibility for funding and managing the research.

Management Options for Implementing a Basic and
Applied Research Program Responsive to CS
Technology Base Needs

I. Introduction

The purpose of this analysis is to examine the various ways in which a basic and applied research program aimed at satisfying CS technology base needs could be organized and managed. The attached paper describes some of the major considerations relevant to the development of such a program, with emphasis on the area of materials R&D. It notes (See Section V) that the implementation of the program should include the following three elements:

- CS sign-off authority for project funding, to assure the relevance of the research to CS program needs;
- Input from ER concerning the quality of the research projects; and
- Coordination between researchers and end users of the research to ensure significant impact on the research-to-commercialization process.

The coordinating function is analogous to that of the DOE Resource Managers. This suggests the creation of a Research Manager, who would carry out this analogous research coordination function, as well as exercising the sign-off authority and being responsible for obtaining the ER input on quality of research. Candidates for this position would preferably have both management experience and a background in at least one research area related to CS program objectives.

The text below describes and analyzes several organizational arrangements for the implementation of this basic and applied research program. The key functions of the system such as resource allocation, and program coordination and management follow from two fundamental characteristics: assignment of lead responsibility (CS or ER); and nature of the organizational chain-of-command. Thus we categorize the various options in terms of these two characteristics. The presence of Research Managers and their assigned areas of responsibility are specified for each option.

II. Description and Analysis of Options

We will consider three organizational options for a basic and applied research program to satisfy CS technology base needs. The first option gives the Office of Energy Research the lead responsibility for managing the program, with CS in an oversight and coordination role. The second and third options are different chain-of-command possibilities for implementing a program for which CS has the lead responsibility. Each option will be analyzed in terms of its facility for:

- Relating the research program to CS program objectives;
- Coordinating the research projects in different CS program areas;
- Coordinating with ER to ensure that their input is received on the quality of the research; and
- Management overview of the functioning of the system.

Option 1 - ER Lead Responsibility

Description

Under this option, additional funds earmarked for basic and applied research related to CS technology base needs are added to the ER budget. Resource allocation and line management responsibility follow the existing ER structure, but a CS sign-off is required for the expenditure of the special funds. In addition to exercising their sign-off authority, CS personnel must also execute the coordination role described previously, e.g., they must ensure that the end users are involved in the review and (where appropriate) the performance of the research. This could be accomplished three different ways: (a) assignment of coordination and oversight lead to a new staff person in the Office of the Assistant Secretary or to PPE; (b) creation of a new CS Office of Basic and Applied Research (BAR) to fulfill this function; or (c) creation of Research Manager positions in each CS program office (BCS, TP, IP, etc).

Analysis

None of these options provides for a close relationship of the research to CS program needs because CS does not have the lead responsibility. However, option 1 (c) would probably be the best of the three from this point of view. For coordinating the research within the different CS program areas and coordinating with ER options 1 (a) and 1 (b) would be preferable, since a single focus of responsibility at higher than program level is involved.

Management overview will be complicated in all these cases because of the ER lead role, but option 1(b) would seem to be the best of the three in this respect because a new Office Head would be given this as a primary responsibility.

Summary

- Difficult to manage and to relate closely to CS program objectives because of the ER lead responsibility.
- Some differences between the three organizational possibilities - single focus of responsibility (a or b) preferable for coordination with ER and among CS program areas.
- Major positive feature of this scheme is that ER's role in reviewing the research is assured organizationally.

Option 2 - CS Lead Responsibility with Program Office Management

Description

Under this option funding would be added to the CS budget, and the existing chain-of-command would be utilized, with a basic and Applied Research Division added to each program office (See Figure 1). Funds would be allocated by AS/CS to the program offices, and then to the BAR divisions. These divisions would be responsible for funding and managing basic and applied research related to the programs of the office in which they are located. They would also be charged with the responsibilities of coordinating with ER and of ensuring the participation of the end users of the research. Figure 1 shows the Solar Energy Technology programs as a separate CS office. This is of course just one option. If these

Figure 1 - Option 2   Organizational Structure

a single Research Manager responsible for each CS program office. It might prove slightly less effective than Option 2 in this regard because the Research Managers do not report to the program Office Head. However, the improvement in overall coordination and integration that will result from the Research Managers for different program areas all reporting to the same individual should more than outweigh this effect. The difficulty of coordination with ER stemming from the organization of Research Manager responsibility according to end use or technology, as opposed to the disciplinary or research area organization of ER, still exists. However, the Research Coordinator can soften this problem somewhat by providing a central focus for coordinating the interaction with ER. For example, he or she might assign one particular Research Manager who is expert in a specific discipline or research area to be the lead contact with that branch of ER. Management overview should not be significantly different in Options 2 and 3, except that an overall picture of the basic and applied research program should be easier to obtain with a separate Office of Basic and Applied Research.

Summary

- Allows for close relationship of research to CS program objectives by assigning a Research Manager to each CS program area.
- Provides for the coordination of basic and applied research in different CS program areas by organizing all Research Managers within a single office.

- Does not provide for a single focus of responsibility to coordinate CS basic and applied research in different program areas (e.g., to eliminate duplication).

Option 3 - CS Lead Responsibility with a New Office of Basic and Applied Research

Description

Under this option funding would be added to the CS budget, as in Option 2, but a new Office of Basic and Applied Research would be created within CS. This office would include a Research Coordinator, and Research Managers for each program area, as shown in Figure 2. The Research Managers would be responsible for funding and managing the research programs in each program area, coordinating with ER, and ensuring end user participation as were the BAR divisions in Option 2. However, here the Research Managers report to the same BAR Office Head, rather than the heads of the different program offices. The Research Coordinator is responsible for providing an analysis of the basic and applied research programs across CS and for integrating efforts and eliminating duplication where necessary or desirable. He or she will also coordinate the interactions with ER. As in Option 2, ETS is shown as a dotted line. The comments concerning this made in the Option 2 description apply here as well.

Analysis

This organizational structure should provide for a close relationship of the research to CS program needs because there is

programs were distributed to the existing CS offices, then the dotted lines would be eliminated. Similarly, were ETS to remain in ET, the dotted lines would be eliminated and the BAR divisions would have the added responsibility of coordinating with ET.

Analysis

This option ensures the relation to CS program objectives by placing a BAR division within each program office. However, coordination with ER would be difficult because the ER programs are organized according to scientific disciplines or research problem areas, whereas the CS BAR divisions would be organized along end use or technology lines. Moreover, coordination of the research funded by the different program offices would also be difficult, because of the absence of a single focus of responsibility for basic and applied research throughout CS. Management overview would be relatively straightforward because of the utilization of the existing chain-of-command.

Summary

- Maximizes relationship of research program to CS program needs by creating a BAR division within each program office.
- Simplifies management by using the existing chain-of-command.
- Makes coordination with ER difficult because the CS BAR divisions are organized along end use or technology lines.

- Retains the difficulty of coordination with ER that stems from end use or technology organization of Research Managers; however, allows for softening of this problem through use of an overall Research Coordinator.
- Enhances management overview by providing overall perspective on research program through BAR Office Head.

III. Recommendation

Based upon the analysis described above, we recommend Option 3, CS Lead Responsibility with a New Office of Basic and Applied Research, for the implementation of the research program. This option is superior to Option 1 because it provides the necessary lead responsibility to adequately couple the basic and applied research to CS program objectives. It is superior to Option 2 because it allows the integration and coordination of the research in support of different CS programs, via the incorporation of all the Research Managers into a single office. It also allows the flexibility, through the Research Coordinator, to interact with ER on a scientific discipline or research area basis. In summary, Option 3 allows substantial input from CS program offices, provides an effective research integration and coordination mechanism, and facilitates the interaction with ER, within an overall structure that gives CS lead responsibility for funding and managing the research.