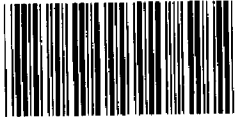


109830

~~10,686~~

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548



109830

For Release on Delivery
Expected at 1:30 p.m.
Tuesday, June 26, 1979

STATEMENT OF
J. DEXTER PEACH, DIRECTOR, ENERGY AND MINERALS DIVISION
BEFORE THE
HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEES ON NATURAL RESOURCES AND THE ENVIRONMENT
AND SCIENCE, RESEARCH AND TECHNOLOGY
ON IMPLEMENTATION OF A NATIONAL MATERIALS R&D POLICY

He 03513
He 03506

At the outset, I would like to express our appreciation for this opportunity to testify on H.R. 2743, a bill to provide for a national policy for materials science and technology and to strengthen the materials research and development capability and performance of the United States. With me this afternoon are Mr. John R. Hadd who is Assistant Director of EMD for Materials, and Mr. David Gandrud of the Materials Branch.

Mr. Chairman, we welcome the Committee's expression of concern about this important national issue. It is a matter of deep interest and concern to the Comptroller General, and he has personally testified on this subject several times in the past. We recently issued a report that calls for the development of both a national materials policy and an ongoing planning and policy process which focuses upon

Testimony
005808

evolving materials problems. If I may quote Mr. Staats' letter transmitting that report to the President of the Senate and the Speaker of the House of Representatives:

"The pursuit of our most important national goals dictates that we be concerned about materials, and that we make an effort to develop an enlightened materials policy. Materials availability and prices will affect our success in trying to reach a full-employment economy. They are essential to our goal of balanced economic growth. They can aid in our effort to reduce inflation. They affect our balance of trade. They will be crucial to our relations with emerging nations all over the world, and they have profound impacts on our environment. Ultimately, they will determine our success in attaining sustainable levels of production and consumption."

We view materials R&D as a key linkage between efforts to address current problems and planning to meet longer-range national goals. The underlying concern of these hearings is whether we are doing either of these tasks very well.

This Committee has repeatedly demonstrated its awareness--yesterday's symposium is a case in point--that research on improved exploration, extraction and processing techniques, new materials, possible substitutes, methods of recycling as well as new uses, can all help to solve a variety of problems. The Committee has expressed its concern over the management of the Federal materials research program and raised the question of how well that

program relates to efforts in the private sector. Specifically, the Committee asked GAO to examine (1) institutional options for implementing a national materials' R&D policy; (2) management of materials R&D information; and (3) the means by which industry could derive maximum utility from the results of Government research. Our purpose today is to share some of the final results of that work with you, to discuss its relation to H.R. 2743, and to comment on pertinent information developed in certain of our other materials studies.

We think our recent work strongly confirms the need for a Federal materials R&D policy, and for direct and sustained involvement by the Office of Science and Technology Policy (OSTP) in developing and coordinating such a policy.

In testifying last year before this Committee, on related legislation, OSTP stated:

"It would be difficult to find an area more important than materials to our economy, national security, foreign relations, environment, and recovery and use of resources, or where science and technology can play a larger role. The Director of OSTP therefore considers all aspects of materials policy to be well within his field of interest and also to be among this most important area of concern. We have therefore set for ourselves the task over the next two to three years to conduct a thorough review of materials policy issues and the government's materials R&D programs."

This last point refers to a specific commitment by OSTP, made during those same hearings, to undertake a full "cross-cut" review of Federal materials R&D for FY 1981, that is, for the forthcoming budget year.

To do that, OSTP needs a comprehensive materials R&D information base. This was the subject of our first report to this Committee in response to its aforementioned request. In that report, we called attention to the ways in which we perceived the current R&D information base to be inadequate for sound policy formulation purposes. We stated then, and we reiterate now, that more comprehensive, complete, and current R&D information is needed. Once collected, that information must be categorized so that it can be related to, and directed toward, national materials problems and issues. In our view, these principles are consistent with the goals of H.R. 2743.

Regarding the "cross-cut" analysis promised by OSTP, we believe it is extremely doubtful that information sufficient for such an endeavor will be available unless OMB issues an Executive Order, such as we have previously recommended, that requires Federal agencies to report all of their current and ongoing materials research to the Smithsonian Science

Information Exchange. The findings of at least 15 studies conducted over the last 18 years have soundly established the utility of the Exchange for this purpose, and the value of mandatory reporting. However, in a letter dated March 20, 1978, the Director of OMB told us:

"We have noted your finding that many agencies have not regularly reported materials related information to the Smithsonian Science Information Exchange. We will look into the question of mandatory agency reporting on materials research and development as part of our more general concern of reorganizing Federal science and technology activities."

OSTP itself favors comprehensive, mandatory reporting.

Regrettably, OMB has yet to issue the needed order.

In our view, the history of inadequate reporting of materials R&D dates back decades and we believe it will continue until appropriate action is taken. We urge the Committee to press the OMB for issuance of the Executive Order needed to make national materials R&D planning possible.

In introducing H.R. 2743, Chairman Fuqua stated that the essence of the bill is to require the Administration to establish a program, and the means, to coordinate and set long term goals for Federal materials R&D. We believe OSTP is the best existing institution to perform this function. With the exception of OMB, it is the only agency of Government with responsibilities broad enough to monitor and direct

Federal R&D in accordance with national materials goals. OSTP has a statutory mandate to "evaluate the scale, quality, and effectiveness of the Federal effort in science and technology and advise on appropriate actions." As such, OSTP has an obligation to help the President by providing general leadership and coordination of all Federal R&D programs. Materials R&D is a part of that mission, and H.R. 2743 is therefore an appropriate means of calling attention to the need for greater involvement by OSTP in materials R&D issues.

I would like to turn now to some examples from three GAO reports, to be issued in the near future, which provide evidence to the need for--among other things--an effective institutional overseer of materials R&D. The focus of the first of these reports is on current research, being conducted independently by the Department of Energy and the Bureau of Mines, into alternative ways of making aluminum. Aluminum manufacturing is one of the most energy-intensive industries in the United States, and the Department of Energy's concern is with directing research into new energy-conserving technologies for making aluminum.

Current technology requires that aluminum be made from bauxite ore. The U.S. is currently about 90 percent import dependent for this key raw material. However, aluminum can

be made from other nonbauxitic ores--such as kaolin clays-- which are abundant in the United States. Although the focus of Bureau of Mines' research has been on developing alternative technologies to make aluminum from these domestic ores, we believe their research is based on a misreading of the aluminum situation and is therefore fundamentally misdirected. The possible threat to future U.S. aluminum supplies is not so much cartel-like actions from bauxite exporting countries--a concern that helped generate the existing Bureau of Mines' research effort--as it is domestic energy availability and costs, and the existence of cheaper energy sources close to future bauxite suppliers in Brazil and Australia.

The Department of Energy is sponsoring research that addresses this precise problem--that is, developing more energy-efficient technologies to make aluminum. A happy coincidence is that these new technologies could perhaps make use of domestically-abundant, nonbauxitic alumina clays. We believe that a very useful purpose could be served by having the Office of Science and Technology Policy evaluate these related research efforts against perceived national needs, and coordinate this work to assure that it is making effective use of scarce national R&D dollars.

We are just finishing another report that we believe shows the need for greater involvement by OSTP in Federal materials R&D. In 1978, nonindustrial organizations spent approximately \$10 million on phosphate research. The Tennessee Valley Authority (TVA) and Bureau of Mines spent approximately \$3 million each, with such organizations as the Florida Phosphate Research Institute and the International Fertilizer Development Center accounting for the remainder. This research focused on the mining, processing, and environmental problems associated with phosphates. During our work, industry officials criticized this research because they said it lacks a unified direction and because they didn't think there has been a very effective exchange of information between Government and private industry on their respective efforts.

More important, however, the Government's research program has not focused on what we perceive to be the key issue with domestic phosphates--that is, their long-term availability, given a growing number of environmental constraints. As members of this Committee are probably aware, phosphates are an essential, presently non-substitutable, plant nutrient, absolutely vital to sustaining

America's agricultural output. In fact, the steadily increasing productivity of American agriculture in recent years can be largely attributed to the increased use of fertilizers containing phosphates.

The United States is a leading producer of phosphates and approximately three-fourths of our current supplies come from central Florida. At current levels of use, these supplies may be depleted within 20 years. While the United States does have large undeveloped phosphate resources, there is cause for considerable concern over their future production because of competing uses of nearby land and water resources and the current desire to minimize further damage to the environment. Of the world's two other major producers, the Soviet Union has determined that domestic needs will surpass domestic supplies by the mid-1980s, and Morocco exhibited signs of cartel-like behavior when they took advantage of the 1973-1974 shortages to impose a fourfold increase in the price of their phosphate exports.

In view of the fact that it currently takes a typical phosphate company roughly 7 years after acquisition to put a phosphate mine into production, and perhaps much longer in the future because of the land, water, and environmental concerns, we feel there is an urgent need to undertake a full

review of the entire phosphate supply situation. We also feel that OSTP should play a major role in this review, given the significance of this issue for long-term research and development.

Unfortunately, OSTP, in commenting on a draft of our forthcoming report, has initially declined this opportunity to become involved in fostering an effective, national R&D strategy for phosphates.

I mentioned earlier that we have three reports, nearing completion, that we feel show the need for greater involvement by OSTP in materials R&D. The third report, on materials R&D management, completes the work previously requested by this Committee.

Our work on this report, and the work of the National Commission on Supplies and Shortages, point to the need for a single, coherent materials R&D program. This will require that OSTP obtain continuing, accurate, comprehensive, and timely information regarding the nature and magnitude of ongoing materials' R&D in Government and industry. The Committee on Materials (formerly an official component of OSTP which now functions on a de facto basis) has made progress toward that end in its collection of information from both the Government and private sector. OSTP will need to continue to build upon this base.

Second, OSTP must determine national materials R&D needs and objectives and render some assessment about the extent to which they are being met by activities in the private sector. We believe this will require a more effective interface between Government and industry.

In fact, this was one of the Committee's major concerns when it asked us to review the management of Federal R&D.

Industry spends \$4.3 billion or about four times more on materials R&D than does the Federal Government. Although industry's basic motivation for research is to maintain a competitive position and to expand markets, we believe industry research could, through better coordination, be more useful than in the past in meeting national materials R&D objectives.

In preparing our most recent report on materials R&D management, we sent a questionnaire to over 600 R&D performing companies. The purpose of our questionnaire was to (1) solicit industry preferences on coordinating mechanisms for Government and industry R&D, and (2) identify industry users of Government materials R&D. Results of our survey indicate that industry wants the Government to coordinate the now fragmented Federal materials research program, and to be more aware of industry needs. Specifically, some of the recurrent themes running through their responses were that Government is not sufficiently

aware of industry's needs, that most Government R&D is not relevant to commercial use, and that, consequently, more discussion and interaction is needed between Government and industry.

Our work led us to conclude that there is a need for better technology transfer programs between Government and potential users of its research. There is, specifically, a need to address the barriers to such technology transfer that arise from Federal patent policies. Only limited use is made of Government-sponsored materials research and we feel this can be attributed to disparate agency technology transfer programs, insufficient emphasis, and inadequate feedback procedures. Also, most agencies give little thought to potential users of the technology.

The absence of proprietary rights (represented by patents), has discouraged industry from using Government-developed technology in its own operations. The Administration will soon issue new guidance on patent policy, which may have significance for materials R&D.

Conclusions

Mr. Chairman, we support the objectives of H.R. 2743. It is an effective expression of actions that OSTP could be taking and should be taking, under its present charter, to formulate a viable materials R&D policy.

What should be clear is that OSTP is uniquely poised to define the Nation's materials research needs, collect information from Government and industry to determine whether those needs are being met, and take appropriate action --including budgetary recommendations to OMB--to redress any perceived deficiencies. While H.R. 2743 would provide some important new functions for OSTP --such as the requirement for long-range materials assessments and corresponding reports to the Congress--we believe that OSTP is presently in a position to take many of these actions. We believe they are needed, and urge OSTP to undertake them.

That concludes my formal statement, and I shall be pleased to answer any questions the Committee may have.