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

ENERGY AND MINERALS
DIVISION

DEC 7 1979

B-196852


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The Honorable Charles W. Duncan, Jr.
The Secretary of Energy

Dear Mr. Secretary:

Subject: Planned Contract Award for the Fort Hood Solar Project Should Be Reconsidered (EMD-80-37)

The General Accounting Office is currently reviewing the Department of Energy's (DOE's) management of solar energy research and development (R&D) projects. During our review, we identified a planned contract action that we believe needs to be reconsidered by DOE. The planned action concerns a proposal made by the American Technological University (ATU) which is being prepared for award by DOE's San Francisco Operations Office under the direction of the headquarters solar program office. The proposal is for a prime contract on the reinitiated large-scale total energy project at Fort Hood, Texas. We were told an advance working agreement would be signed in early December 1979 leading to a contract award in February 1980.

Our review has disclosed a prior history of problems on the Fort Hood project, frequent and severe criticism of past ATU performance on the project, and continuing expressions of doubt concerning ATU's future performance. Although we did not assess the merits of the technology being considered for the planned project or independently evaluate ATU's capabilities, we believe the volume and severity of the criticism concerning ATU's performance raises serious questions about the desirability of the planned contract award to ATU. Accordingly, we believe the planned award should be reconsidered. We are continuing our overall review of solar R&D project management, but because of the concerns we have about this pending contract award we are bringing this matter to your immediate attention.

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Letter report

HISTORY OF PROJECT DIFFICULTIES

DOE's solar energy project at Fort Hood has been a project plagued with problems. The project's objectives were to design, construct, and operate a solar total energy system to provide electricity, space heating, air conditioning, and hot water for a military barracks. However, after an investment of more than 4 years and an expenditure of over $5 million, the project made little progress toward achieving these objectives.

The Fort Hood project began in May 1974 under a National Science Foundation grant to ATU. The grant was to study the applicability of solar thermal systems for military installations. In January 1975, the grant was transferred to the newly created Energy Research and Development Adminstration (ERDA). When the grant expired, ERDA continued the project under a $200,000 sole-source contract with ATU commencing in April 1975. That contract's intent was to build upon the information developed under the grant and produce a refinement of a solar conversion system design. Two contract modifications extended the original period of performance by 1 year (from November 1975 to November 1976), and increased the funding level to $680,000. At the end of this period, an acceptable conceptual design was not completed.

That contract was followed immediately in December 1976 by another sole-source contract for a preliminary design. Recognizing that ATU had not developed an acceptable conceptual design during the first contract period, the follow-on contract directed ATU to reconsider or modify that conceptual design before proceeding to the more comprehensive preliminary design. After several months under the new contract, ATU still did not complete a design acceptable to project managers. Project managers then decided that continuing the design effort with ATU would not result in an adequate design. Accordingly, in June 1977 ERDA deleted the design task from ATU's scope of work and selected two other contractors to prepare new conceptual designs.

The two designs were then evaluated by DOE, and the conceptual design submitted by the Westinghouse Corporation was selected as the basis for preparing a preliminary design. The project's technical managers at Sandia Laboratories in Albuquerque, New Mexico told us they assumed that following this selection Westinghouse would be awarded the prime contract for the project's future design phases. Instead, the

DOE 1/ headquarters solar program office directed that a third sole-source prime contract be awarded to ATU in March 1978. Westinghouse agreed to act as ATU's systems engineering design subcontractor.

The ATU/Westinghouse preliminary design was completed in late 1978. A formal technical review, however, identified several deficiencies in the proposed project and design. The reviewers concluded that the proposed design was not cost effective and had little potential for competing with conventionally general power. In addition, one reviewer commented that the project failed even to meet the definition of a total energy system. He also identified as a potential problem the complex interrelationships among the contractors involved with the project and noted an apparent overlap of project management responsibility among ATU, Westinghouse, and DOE's technical project manager. Other reviewers noted that the proposed project would provide little information on the technology being developed that was not already being provided by other DOE projects. Consequently, DOE decided not to pursue the project under the proposed design and allowed the project and the ATU contract to expire on October 31, 1978.

Although DOE allowed the project as originally conceived to expire, DOE's project managers told us that DOE offered to entertain new ATU proposals that would return the project to a conceptual design stage, employing a completely different solar thermal technology. In response, ATU submitted two proposals, one of which is now being considered for the sole-source contract award. The other proposal was withdrawn after DOE's evaluators noted major deficiencies.

SEVERE CRITICISM OF PAST ATU PERFORMANCE

Throughout the project's history, technical managers at both Sandia and DOE identified ATU's poor performance as a major contributor to the serious project problems. On numerous occasions, these managers stated that ATU lacked the technical expertise, organizational experience, and management ability to implement a project as large and complex as the Fort Hood project.

1/ERDA was incorporated into DOE effective October 1, 1977.

The managers identified many specific areas of deficient performance. We noted over 20 letters and memoranda by DOE and Sandia project managers beginning in early 1976 that criticized ATU's performance and questioned its capabilities. Some of the most severe criticism concerned ATU's lack of analytical and engineering depth as demonstrated in its design efforts. On several occasions, project managers cited ATU's continuing inability to prepare a technically sound project design and attributed this failure to ATU's lack of experience and related expertise.

In addition to the design problems, we also noted memoranda and letters that identified ATU's failure to

--complete contractual work scope requirements and

--effectively integrate and utilize the expertise of technical subcontractors in project activities.

For example, in June 1977 the Sandia project manager wrote that a substantial portion of the work described in the first ERDA contract was not completed under the terms of the contract and its modifications. In his memorandum, the manager identified five work plan tasks that were either completed late or not completed at all.

On several other occasions, a Sandia manager and others complained that ATU was not adequately interfacing with the design contractors and subcontractors. The memoranda noted that ATU did not fully use their respective design capabilities, provided inadequate guidance and supporting data, and did not provide sufficient insight into the overall program and project goals.

In view of these observations, as early as February 1976 technical project managers began discussing with headquarters program managers the possibility of replacing ATU as prime contractor. By April 1977, Sandia's technical project managers formalized their position in a recommendation to DOE. Citing their belief that ATU's continued inadequate performance was jeopardizing the success of the project, the officials recommended terminating the ATU contract. A similar position was expressed several months later by the Albuquerque Operations Office project coordinator, who concluded in an August 1977 letter that it is impossible for ATU to assume a competent management role in the project.

QUESTIONS CONCERNING FUTURE ATU PERFORMANCE

In addition to the widespread criticism of ATU's performance on its previous Fort Hood work, there are continuing expressions of doubt over future ATU performance. While the Fort Hood project has been redirected to a completely different technology, technical managers continue to express serious concerns about ATU's capability to successfully perform as the project's prime contractor.

The views of DOE's technical project managers concerning ATU's capabilities have not changed since the project expired in October 1978. In this connection, a representative of Aerospace Corporation, DOE's current technical project manager, 1/ told us that he basically agrees with Sandia's earlier assessments of ATU's capabilities. The representative said ATU has not demonstrated the capability of managing a complex system design project of the type now being considered at Fort Hood. He indicated that ATU has limited engineering expertise and that on technical grounds there would be no reason to make ATU the project's prime contractor. Accordingly, the official told us he recommended against installing ATU as prime contractor.

Even though Sandia was replaced as technical manager, the solar program office sought its advice and comment on the new ATU proposals. Sandia officials stated that it could be difficult to justify a sole-source award to the ATU team in view of the many contractors presently engaged in the technology.

We believe the comments made at a DOE project evaluation in November 1978 also lend support to the concerns about future ATU performance. In assessing various options concerning the project's future, DOE evaluators noted that cancelling the project would avoid "a black eye" for the solar program and put the project "out of its misery." They also observed that restructuring the project around an approach different from the original design would retain the "costly entanglement" with ATU and add to "DOE vulnerability" to criticism over its handling of the project.

1/Sandia ceased activities as project technical manager in October 1977, and was subsequently replaced by the Aerospace Corporation.

DOE AND CONTRACTOR COMMENTS

We obtained informal comments from DOE and ATU on the contents of this letter. Although DOE officials did not disagree with the facts presented in the letter, they believed several additional points should be made. First, officials told us ATU should not be singled out for criticism. They asserted DOE should also share responsibility for the project's previous difficulties. Second, the officials stated the prior project efforts were not completely unsuccessful. They said the project did make a contribution by eliminating one technological avenue from future consideration. Finally, the officials noted that ATU's role in technical and design matters on the proposed project was being reduced. While DOE is planning to issue the prime contract to ATU, they said most design responsibility is to rest with ATU's design subcontractor. ATU's primary responsibility is planned to involve interfacing with the Army and performing site coordination. In this manner, they believed previous ATU deficiencies would be deemphasized.

ATU shared DOE's opinion that problems with DOE management also contributed to the project's difficulties. ATU stated that "irregularities in project direction and confusing directions by DOE and Sandia made it virtually impossible to identify the precise direction and thrust of the project and its objectives." They believed that different conclusions would be reached if data relative to this lack of direction had been captured during our review. ATU further contended that the report did not fairly present its role in the prior project. ATU said it did not contract to provide a conceptual design, nor a preliminary design.

With respect to DOE's and ATU's contention that ATU was not singularly to blame for the project difficulties, we recognize that DOE may at least have been partly to blame. We continue to believe, however, that the magnitude and severity of the criticism raised concerning ATU's prior project performance and capabilities call into question whether proceeding with ATU as the prime contractor for the Fort Hood project would be in the best interest of the solar program.

Concerning ATU's contention relative to its role in the project, we recognize that there may have been some ambiguity under the first contract; such ambiguity, however, was not evident in the second or subsequent contracts and it was clear that ATU was to first come up with a conceptual design and subsequently a preliminary design. As discussed previously, ATU under the first contract was to build upon the

information developed under its prior grant with the National Science Foundation and produce a refinement of a solar conversion system design. The contract, however, made no specific reference to the term "conceptual" design. It did call on ATU to draw on its earlier work with the intent of developing a preliminary design. The implication here is that the earlier work was to be a conceptual design followed by a preliminary design. This point was made much clearer in the second contract which stated that ATU was to:

> "Reconsider or modify as appropriate the conceptual design produced [under ATU's first contract] * * * [and] * * * provide a comprehensive preliminary design of a Solar Total Energy (STE) system for the Military Large Scale Experiment (LSE) to be located at Fort Hood, Texas."

CONCLUSIONS AND RECOMMENDATIONS

We believe current plans to award ATU a contract to manage the Fort Hood project should be reconsidered. Although we did not independently evaluate ATU's technical and management capabilities, we believe the volume and severity of criticism made by technical project managers raises serious questions about the desirability of these plans. Questions concerning past project difficulties, heavy criticism of previous ATU performance, and continuing doubts of ATU's capabilities need to be resolved before awarding the contract.

In addition, indications are that under the proposed redirected Fort Hood project there may be other firms having the capability for managing the project. We believe consideration should be given to seeking such a firm through a competitive solicitation. As we noted in a recently issued report 1/ on DOE's contracting practices, competition is probably the single most effective way to ensure that the Government obtains acceptable services at the lowest possible price. Through a competitive prime contractor procurement, DOE can weigh the relative advantages of various proposals and assure itself that the best possible contractor has been selected. In this way, we believe a truly fresh start can be made on a badly scarred project, and a serious blow to the integrity of the solar program can be avoided.

1/"The Department of Energy's Practices for Awarding and Administering Contracts Need to Be Improved," EMD-80-2, Nov. 2, 1979.

Accordingly, we recommend that

--you thoroughly evaluate whether issuing the Fort Hood project's prime contract to ATU would be in the best interest of the solar program and

--should a decision be made that the contract award to ATU is not in the best interest of the solar program, you give serious consideration to obtaining the project's prime contractor through a competitive solicitation.

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Section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

Copies of this report are being sent to the Director, Office of Management and Budget; the Chairman, House Committees on Appropriations and Government Operations, and Senate Committees on Appropriations and Governmental Affairs; and oversight committees for DOE.

Sincerely yours,

J. Dexter Peach
Director