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Report to the Chair, Subcommittee on
Government Activities and
Transportation, Committee on
Government Operations, House of
Representatives

April 1992

SHUTTLE ROCKET MOTOR PROGRAM

NASA Should Delay Awarding Some Construction Contracts



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**National Security and
International Affairs Division**

B-248285

April 27, 1992

The Honorable Barbara Boxer
Chair, Subcommittee on Government
Activities and Transportation
Committee on Government Operations
House of Representatives

Dear Madam Chair:

In January 1992, the President proposed termination of the National Aeronautics and Space Administration's (NASA) Advanced Solid Rocket Motor (ASRM) program. However, he left open the possibility that the program could be reinstated during congressional budget deliberations for fiscal year 1993. According to NASA, if the program is continued, maintaining the current program schedule is critical so that the advanced motors will be available to transport the Space Station Freedom's laboratory module in February 1997. As a result, NASA is pursuing the facility construction program for fiscal year 1992 as originally planned. The purpose of this letter is to identify construction activities that could be delayed pending a decision on the future of this program and still not adversely affect the scheduled ASRM launch date. As you requested, we are continuing our broader review of the ASRM program.

Background

In the 1988 NASA authorization act, the Congress required NASA to issue a request for proposals to acquire the ASRM on a competitive basis and stated that the ASRM would increase shuttle performance and enhance flight safety. The program, being managed by the Marshall Space Flight Center, involves constructing and equipping a government-owned contractor-operated manufacturing facility at the Tennessee Valley Authority's former Yellow Creek nuclear plant site near Iuka, Mississippi. It also includes constructing test facilities at the Stennis Space Center and modifying or expanding other facilities at Stennis, the Michoud Assembly Facility, and the Kennedy Space Center.

For fiscal year 1992, the Congress appropriated \$465 million for the program, which was \$115 million more than the President had requested. According to NASA, the additional funds were needed to keep the program on schedule for an August 1996 first launch date. Even with the added funds, however, NASA had to delay the scheduled launch date to February 1997 because of a design change in the building where motor propellant

will be loaded. As a result, NASA revised the launch schedule so that the space station laboratory would be launched on the first ASRM flight rather than the second flight as previously planned.

In the budget request for fiscal year 1993, the President proposed terminating the ASRM program. According to the accompanying budget message, much of the program's justification had eroded, and alternatives were available to offset the loss of the ASRM capability. To support the termination decision, the budget message cited the safety and reliability of the existing motors, a reduced shuttle flight rate, and cost increases and schedule slippage that had already occurred on the ASRM program. However, the message included a suggestion that the executive branch would consider continuing the ASRM program if the Congress increased NASA's budget allocation for fiscal year 1993. According to NASA's Associate Administrator for Aeronautics, Exploration, and Technology, \$520 million would be needed in fiscal year 1993 to keep the ASRM program on its current schedule.

The budget message noted that ASRM's total estimated cost has increased from about \$1.9 billion, to about \$3.4 billion, and the first scheduled shuttle launch using the ASRM has slipped by more than 2-1/2 years. According to NASA's ASRM Program Director, maintaining the February 1997 launch date is important because that is when the ASRM is needed to transport the Space Station Freedom's laboratory module. NASA estimates that it will need two shuttle flights to transport space station laboratory elements to orbit if the ASRM is not available. Moreover, using two flights will increase the complexity of on-orbit assembly and will also limit the amount of system-level ground testing of the laboratory, according to the ASRM Program Director.

Results in Brief

Even though the executive branch has proposed terminating the ASRM program, NASA is proceeding with all construction activity planned for fiscal year 1992 to avoid schedule slippage if the program is reinstated by Congress. However, NASA could delay some construction activities for at least a few months without affecting the current launch date schedule. For example, NASA could delay Yellow Creek's motor storage and dock projects, Stennis's dock project, and Kennedy's rotation processing and surge facility and dock projects.

Starting all construction activities as originally planned could result in unnecessarily incurring additional costs and termination liability if the

funding for fiscal year 1993 is not provided. If Congress decides to continue the program, construction could still be completed in time to avoid schedule slippage.

Some Construction Contracts Could Be Delayed

If the ASRM program is not continued beyond fiscal year 1992, NASA will incur significant termination settlement costs. The program office's preliminary estimates to terminate range from about \$200 million to \$325 million in new obligational authority, depending on the time all contractor efforts cease. The longer contractor activities continue and the more contracts that are awarded, the greater the termination liability will be.

While it makes sense for NASA to limit its liability in the event the program is terminated, it is still possible that the program will continue. If it continues, delaying activities necessary to meet the current ASRM flight schedule would decrease the ASRM's usefulness to the space station program and could also increase ASRM program costs, according to the Program Director.

In fiscal year 1992, NASA plans to obligate about \$200 million for ASRM construction. Much of this construction must be completed on time if the current launch date is to be met. However, there are many other activities that are scheduled to be completed earlier than necessary. In some cases, construction schedules show that NASA could delay starting activities without jeopardizing the ASRM launch schedule. For example, under the current schedule, NASA will complete construction on a motor storage facility and a barge dock at Yellow Creek, a dock at Stennis, and a motor processing facility and dock at Kennedy at least several months before the first test article is scheduled to be processed. These activities alone are estimated to cost about \$26.3 million (see table 1).

Table 1: Construction Projects That Could Be Delayed

Dollars in millions	
Project	Cost
Yellow Creek's Motor Storage	\$5.0
Yellow Creek's Dock	4.1
Stennis's Dock	3.0
Kennedy's Rotation Processing and Surge Facility	11.2
Kennedy's Dock	3.0

NASA's delaying of these and possibly other planned construction activities by at least a few months would allow time for congressional deliberation regarding the program's continuation or termination without unnecessary expenditures in the interim.

Yellow Creek Motor Storage Building and Dock

NASA plans to build a motor storage facility to perform motor processing and operations at Yellow Creek. The new facility will include a crane and serve as a staging area for motors to be shipped by barge. Construction is scheduled to begin in August 1992 and be completed in April 1993, or about 4 months before it is needed to maintain the overall program schedule.

NASA plans to award a construction contract for the barge dock in August 1992. The actual construction activity is expected to be completed by March 1993, but, according to a NASA facilities management official, the dock will not be needed until November 1993.

Stennis Space Center Dock

NASA currently plans to award a contract to build a shipping dock at Stennis around July 1992, as part of a larger construction package. The entire package is scheduled to be completed by July 1993, or about 10 months before the dock will be needed for test hardware delivery.

Kennedy Space Center Rotation Processing and Surge Facility and Dock

NASA plans to build a rotation processing and surge facility at Kennedy. This facility is to be used to inspect and prepare loaded motor segments before transporting them to the Vehicle Assembly Building. Under its current schedule, NASA plans to award a construction contract in June 1992 and complete construction and facility activation in August 1994, or about 4 months before the first test motor is to be processed through the facility.

NASA currently plans to begin construction on a dock at Kennedy in June 1992 and complete construction in November 1993. The schedule then provides about 11 months for activation and checkout, which, according to a facilities manager, is more than is needed. In addition, NASA recently considered postponing the dock contract award until fiscal year 1993, or at least 4 months later than currently planned.

Other Possible Construction Delays

NASA is also planning to begin other construction efforts between June and August 1992, including the construction of a test stand at the Stennis Space Center and a nozzle manufacturing building at the Michoud Assembly Facility. The estimated cost of these two activities alone is about \$21 million. According to facilities management officials, these activities cannot be delayed significantly without negatively affecting the overall schedule. However, the risk of incurring unnecessary cost and added termination liability makes it important that NASA determine whether some delay in awarding these contracts is possible.

Recommendation

We recommend that the NASA Administrator undertake a thorough review of all ASRM construction contracts scheduled to be awarded in the remainder of fiscal year 1992 to determine the extent to which some efforts can be delayed pending a decision on the future of the program. We further recommend that the Administrator delay awarding any construction contracts currently planned through fiscal year 1992 when such delays would not jeopardize the February 1997 launch date.

Scope and Methodology

To determine whether some construction activities could be delayed pending a final decision on the continuation of the ASRM program, we reviewed obligation plans, construction plans, budgetary documentation, legislative provisions, termination cost estimates, and program schedules. We verified the information to the extent possible but relied on NASA officials' estimates of termination costs and the criticality of certain construction activities.

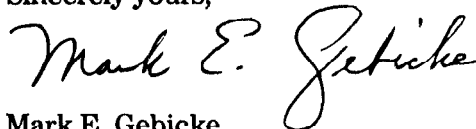
We visited NASA Headquarters, Marshall Space Flight Center, Alabama, and the ASRM Yellow Creek site near Iuka, Mississippi. In addition, we reviewed records and discussed construction planning with officials at the Stennis Space Center, Mississippi; the Michoud Assembly Facility, Louisiana; and the Kennedy Space Center, Florida.

We conducted this assessment from February through April 1992 in accordance with generally accepted government auditing standards. As requested, we did not obtain agency comments on a draft of this report. However, we discussed its contents with program officials from NASA Headquarters and Marshall Space Flight Center and have incorporated their comments where appropriate.

As arranged with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 14 days from the date of this letter. We will then provide copies to appropriate congressional committees, the Administrator of NASA, and other interested parties upon request.

Please contact me at (202) 275-5140 if you or your staff have any questions concerning this report. Other major contributors to this report are listed in appendix I.

Sincerely yours,



Mark E. Gebicke
Director, NASA Issues

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