



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

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RESOURCES, COMMUNITY,  
AND ECONOMIC DEVELOPMENT  
DIVISION

SEPTEMBER 7, 1984

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The Honorable William V. Roth, Jr.  
Chairman, Committee on Governmental Affairs  
United States Senate



The Honorable Christopher J. Dodd  
United States Senate

Subject: Information on the Purchase of a Gas Generator  
Engine for a U.S. Coast Guard Cutter  
(GAO/RCED-84-115)

This is in further response to your letters of April 4 and 18, 1984, concerning the Coast Guard's procurement of a rebuilt gas generator engine. In our May 30, 1984, letter to you we stated that our audit staff would review the procurement action and report to you on the results of that review. This report responds to that matter.

In January 1983, the contractor, Energy Maintenance Corporation (EMC), delivered a rebuilt gas generator engine to the Coast Guard's District Office in Seattle, Washington for use in the Cutter Boutwell at a cost of \$388,000. Although EMC's offer was considered responsive, the Coast Guard subsequently decided the engine was unusable because it contained disks<sup>1</sup> which had been previously used in aircraft engines. The agency made this decision because the original engine manufacturer strongly recommended that disks previously used in aircraft engines not be used in marine engines because the disks could fail and cause an explosion or fire resulting in serious damage to the ship and injury to its crew.

According to the Coast Guard's General Counsel, the agency had no recourse with EMC because the purchase specifications did not prohibit the use of disks previously operated in aircraft engines. Coast Guard officials told us that organizational changes in its procurement process resulted in the issuance of inadequate specifications to purchase the engine. These officials told us that the agency has subsequently developed standard specifications to repair its gas generator engines rather than purchase rebuilt ones. These specifications preclude the use of disks previously used in aircraft engines, and according to the

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<sup>1</sup>High-speed rotating elements within the engine to which are attached air compressor blades.

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Coast Guard, should prevent the recurrence of the reported problem.

As of July 1984, the Coast Guard had not made a decision on what to do with the rebuilt engine which is in storage at the Coast Guard Yard, Curtis Bay, Maryland.

#### OBJECTIVES, SCOPE, AND METHODOLOGY

In developing information on the procurement of a gas generator engine for the Cutter Boutwell, we reviewed Coast Guard regulations, policies, and procedures. Our work was performed at the Coast Guard headquarters, Washington, D.C., and at the Coast Guard Yard, Curtis Bay, Maryland. We reviewed the procurement records and spoke with the procurement and contracting officers involved with the gas generator engine purchase to discuss the specific events surrounding the contract award. We met with Coast Guard engineers to discuss problems with the engine.

We contacted the Manager of Technical Services for Turbo Power and Marine Services, Inc. (T.P.M.), the original engine manufacturer, to discuss the matter of using disks in marine engines that were previously used in aircraft engines. We also contacted EMC to obtain its views on this matter.

Because the data in this report are primarily informational, we did not request agency comments in writing. However, we discussed the material in this report with the Section Chief, High Endurance Section of the Cutter Maintenance Branch, U.S. Coast Guard headquarters, and his comments were considered in preparing the final report. The work was performed during the period May 1984 through July 1984 and, except as noted above, was performed in accordance with generally accepted government auditing standards.

#### BACKGROUND

The Ships Inventory Control Point (SICP) located at the Coast Guard Yard, Curtis Bay, Maryland, is responsible for the purchase, repair, and issuance of all ship engines including gas generator engines. Prior to 1982, each district was responsible for repairing its own engines and sending them to the SICP to be added to its engine inventory.

In December 1982, the Coast Guard's District Office located in Seattle, Washington, requested a gas generator engine for the Cutter Boutwell, to be delivered by January 17, 1983, in order to meet the Boutwell's scheduled sailing date. SICP did not have any spare engines in working order and did not have time to have the Boutwell's engine repaired. Consequently, SICP purchased a replacement engine. In January 1983, the Coast Guard awarded the contract to EMC, in the amount of \$388,000 for a rebuilt gas generator engine.

At the time of the award, one of the four bid respondents submitted a bid protest to us alleging that the contractor intended to use disks in the rebuilt engine which were previously used in an aircraft engine.<sup>2</sup> The protestor pointed out that the use of disks in a marine engine that had previously been used in an aircraft engine was in violation of the original engine manufacturer's recommendation. According to the original engine manufacturer, disks used in the two engines have different operating characteristics and are subjected to different amounts of stress. Although the original manufacturer stated that no empirical data exist comparing disks used in aircraft and marine engines, he said that aircraft disks are subjected to greater stress and more rapidly reach the end of their useful life. The manufacturer stated that the probability of a rebuilt marine engine's failing or exploding is increased when it contains disks previously used in aircraft. However, the manufacturer stated that he had no record of any such failure.

COAST GUARD DETERMINES ENGINE  
UNACCEPTABLE FOR MARINE USE

The Coast Guard acknowledged that EMC's January 1983, offer was responsive to the specifications in the solicitation. The Coast Guard Commandant, however, decided that on the basis of the original engine manufacturer's position, the gas generator engine was unacceptable for marine use. Officials at the Curtis Bay Yard said the December 1982, solicitation did not include a restriction on the use of aircraft disks because it was SICP's first procurement after they acquired the centralized repair responsibility for the Coast Guard and they had little prior experience working with gas generator engines. They also stated that they corrected the problem by developing more stringent specifications.

The Coast Guard requirements for a gas generator as spelled out in its December 1982, solicitation were as follows:

"A. Must be fully maritized.

B. Must be available for delivery to Seattle, Washington not later than 17 January 1983.

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<sup>2</sup>This was the first of two bid protests regarding the Coast Guard award. We responded on May 25, 1983, that this protest was submitted after the official deadline for protesting procurement specifications and that the bidder's allegations were a matter of contract administration that did not affect the validity of the award. In March 1984, the individual mentioned in the enclosure to your letter also submitted a bid protest to us requesting that we reconsider our May 1983 decision. In April 1984, we upheld our first decision.

- C. Must have less than 15,000 hours total operating time.
- D. Must have 0 hours operating time since last overhaul which must have been performed in a Pratt and Whitney authorized service facility.
- E. Must contain only certified Pratt and Whitney parts.
- F. Must carry not less than 6 months warranty."

The Coast Guard was aware that the original manufacturer had cautioned against shipboard use of disks previously used in flight operations, but it assumed the requirement that the gas generator be "fully marinized" would assure that the engine was acceptable for marine use. The Coast Guard's General Counsel, however, ruled that "marinization" has no bearing on the subject of disks.

The Coast Guard contacted T.P.M., the original engine manufacturer, in February 1983 to verify that T.P.M. sold the disks to clients who planned to use them in aircraft engines. T.P.M. informed the Coast Guard that it did not know if the disks were actually used in aircraft engines or kept as surplus stock but that most of the disks were sold to clients for use in aircraft. In September 1983, the Coast Guard contacted EMC, which verified that all disks used in its engines were previously used in aircraft engines. The president of EMC told us that although he was aware of the manufacturer's recommendation, on the basis of its experience, there has never been a marine engine failure attributable to disks which were previously used in aircraft engines. Therefore, he considered the engine to be safe.

In December 1983, upon completion of the Coast Guard's investigation, the Commanding Officer of the Curtis Bay Yard asked the Office of Chief Counsel for a legal review to determine if the Coast Guard had any legal justification to require EMC to replace the disks in the EMC gas generator engine. In December 1983, the Office of General Counsel determined that the Coast Guard did not have any legal justification to require EMC to replace the disks in the purchased engine, since the solicitation did not specify that disks which were previously operated in aircraft engines could not be used.

During the same month, the Commandant determined that the generator engine was unacceptable for use in Coast Guard cutters in its present configuration, because the manufacturer stated that disks previously used in aircraft engines could fail and potentially cause extensive damage to the ship and injury to its crew.

SICP officials informed us in May 1984, that they have corrected the problem that led to the procurement of an unusable gas generator engine. Coast Guard headquarters and SICP officials jointly developed standard specifications to be used for the

repair of its gas generator engines. SICP plans to use those standard specifications to contract any needed repair work in its gas generator engines. The specifications contain a provision which prohibits replacing any disk with ones which have been previously used in aircraft engines.

COAST GUARD HAS NOT  
MADE ENGINE USABLE

As of July 1984, the Coast Guard had not made a decision on what to do with the gas generator engine purchased from EMC. In May 1984, SICP officials recommended that the Coast Guard order replacement disks from the Federal Supply System to make the engine usable. This would cost approximately \$100,000, including labor costs for installation which would be done under contract. As of July 1984, SICP was awaiting a decision from Coast Guard headquarters as to its recommendation. In the event that headquarters does not accept the SICP recommendation, SICP officials said they could salvage the usable engine parts, which they estimated to be worth approximately \$200,000.

OTHER CONCERNS

In addition to the concerns about the procurement of the gas generator engine, the enclosure to your letter also raises questions about the delivery and operation of the purchased engine. For example, the engine was alleged to have been received in 2 feet of water in a supposedly sealed container, and the generator was alleged to have been shipped without the fuel control and with incorrect fuel nozzles.

Regarding the water in the shipping container, the Coast Guard SICP representatives told us that the generator was received at the Coast Guard's District Office in Seattle, Washington with a broken seal leaving an opening in the shipping container. Upon delivery, it was placed in outside storage, and as a result of severe storms, water seeped into the container opening. However, there was no known damage to the engine.

The SICP representatives also informed us that the contractor shipped and installed the fuel control separately and replaced the incorrect fuel nozzles. The SICP representatives stated that the contractor corrected all the noted deficiencies and subsequently in March 1984 delivered the gas generator engine in working order to the Curtis Bay Yard in Maryland.

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As arranged with your offices, we are sending copies of the report to the Secretary of Transportation and the Commandant of the Coast Guard. We will make copies available to others upon request.



J. Dexter Peach  
Director