



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

3155  
127271

RESOURCES, COMMUNITY  
AND ECONOMIC DEVELOPMENT  
DIVISION

JUNE 25, 1985

B-215872

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

Dear Mr. Chairman:

Subject: The Status of a Gas Generator Engine for the  
Coast Guard Cutter Boutwell (GAO/RCED-85-125)

In a November 27, 1984, letter, you requested that we review the Coast Guard procurement process. Subsequently, your office asked for additional information on the status of a rebuilt gas generator engine purchased by the Coast Guard for one of its cutters,<sup>1</sup> including the applicability of the warranty. This letter responds to your request for information on the engine; it also provides information on the changes the Coast Guard has made to ensure that the Coast Guard does not experience a recurrence of the problem it had with that engine. We will report separately on our review of the Coast Guard's procurement process.

In January 1983, the Coast Guard took delivery of a rebuilt gas generator engine for its cutter, the Boutwell. Although the engine met the Coast Guard's specifications, it contained disks<sup>2</sup> that had been previously used in an aircraft engine, and the Coast Guard subsequently decided not to use it in the cutter for safety reasons.

The engine was stored at Curtis Bay, Maryland, until November 1984, when the Coast Guard moved it to the Coast Guard engineering school in Yorktown, Virginia, where the engine will be used as a training aid. Before being used for training purposes, the Coast Guard plans to remove some of the high-priced

---

<sup>1</sup>Information on the Purchase of a Gas Generator Engine for a U.S. Coast Guard Cutter (GAO/RCED-84-115, Sept. 7, 1984).

<sup>2</sup>High-speed rotating elements within the engine to which air compressor blades are attached.



127271

032421

(344406)

engine parts and replace them with older parts. The removed parts will be used in the overhaul and repair of other gas generator engines, thus recovering about \$190,000, or about 50 percent, of the engine's original costs, according to a Coast Guard official. The Coast Guard has also revised its specifications for the overhaul and repair of gas generator engines to prohibit the use of disks previously used in aircraft engines.

#### OBJECTIVES, SCOPE, AND METHODOLOGY

Our objectives in developing additional information on the engine purchased for the cutter Boutwell were (1) to determine the current status of the engine and (2) to identify any actions needed to prevent a recurrence of the problems experienced with the engine. To achieve our objectives, we contacted Coast Guard officials responsible for purchasing, repairing, and issuing engines both at Coast Guard Headquarters and at the Ship Inventory Control Point (SICP), located at Curtis Bay, Maryland. The officials contacted are responsible for decisions regarding the rebuilt gas generator engine and the specifications for the overhaul and repair of Coast Guard gas generator engines. We reviewed documentation relating to the relocation of the engine and the removal of parts and visited the Coast Guard's Training Center, Yorktown, Virginia, where the engine is currently located. We talked with Training Center officials concerning the planned use of the engine and the removal of parts. We also reviewed the Coast Guard's revised specifications for the overhaul of gas generator engines.

We obtained official oral comments concerning this report from the Section Chief, High Endurance Section of the Cutter Maintenance Branch, U.S. Coast Guard Headquarters, and considered his comments in preparing the report. The work was performed from March through May 1985 in accordance with generally accepted government auditing standards.

#### COAST GUARD PROCUREMENT OF AN ENGINE THAT IT DID NOT USE IN ITS CUTTER

In a September 7, 1984, letter to you, we reported that the Coast Guard's Seattle, Washington, District Office, in December 1982, requested a gas generator engine for the cutter Boutwell to be delivered by January 17, 1983, in order to meet the ship's scheduled sailing date. When a District Office requests an engine, the Coast Guard's policy is to issue a repaired/rebuilt engine from its inventory. However, the SICP determined that it did not have a rebuilt engine in inventory or sufficient time to have the Boutwell's engine repaired. Consequently, the SICP purchased a replacement engine. In January 1983, the Coast Guard awarded a contract to Energy Maintenance Corporation (EMC) amounting to \$388,000 for a rebuilt gas generator engine. When the Coast Guard received the engine in January 1983 in Seattle, it discovered that the engine contained disks that had been used in an aircraft engine. The original engine manufacturer recommended that disks previously used in aircraft engines not be used

in marine engines because the disks could fail and cause extensive damage to the ship and injury to the crew. Because the engine's safety was in question, the Coast Guard decided not to use the purchased engine in the Boutwell. (The Boutwell did meet its scheduled sailing date by sailing with less than full engine capacity.)

As of September 1984, when we issued our letter to you, the Coast Guard had not decided what to do with the purchased engine. At that time, the engine had been shipped to the Curtis Bay, Maryland, Coast Guard station and was in storage.

COAST GUARD IS PLANNING TO USE  
THE ENGINE FOR TRAINING

In November 1984, the Coast Guard shipped the engine to its Reserve Training Center, located in Yorktown, Virginia. The Center provides training on a variety of subjects, including the repair and maintenance of gas turbine engines. The Center has been using an acquired Air Force engine for the past 10 years in its training program, and many of the engine's parts are worn and no longer useful for instruction. The Coast Guard needed a replacement engine, had the Boutwell's engine in storage, and decided to use it to meet this training need.

As of May 2, 1985, the engine was scheduled to be uncreated at the Yorktown facility and set up, before the end of May, as a training aid for the gas turbine repair class. In addition, the Coast Guard had documented plans to remove high-priced parts from the engine and use them to repair other engines. These parts include the inlet case and the manifold assembly. According to Coast Guard officials both at the Center and the SICP, these parts will be replaced with older parts for training purposes. The Coast Guard expects to save about \$190,000 worth of parts, or about 50 percent of the engine's cost, through this replacement process; we did not, however, validate this estimate.

COAST GUARD HAS REVISED PROCUREMENT  
SPECIFICATIONS FOR REBUILT GAS  
GENERATOR ENGINES

The Coast Guard has also revised its specifications for the repair and overhaul of gas generator engines. These specifications now prohibit the use of disks previously used in aircraft engines and should, according to the Coast Guard, eliminate the potential for such problems as the Boutwell's. Also, all new or refurbished parts must be approved for marine application unless a written exemption is requested from and granted by the Coast Guard. According to Coast Guard officials, these specifications were developed in conformance with industry standards and because of the problems experienced with the Boutwell's engine.

The Coast Guard is also increasing its inventory of rebuilt gas generator engines to meet future anticipated demand. To maintain this inventory, the SICP requires a requesting command

to provide an engine in exchange for the rebuilt one it requests from the SICP. Using the new specifications, the SICP then overhauls or rebuilds the exchange engine and puts it into the inventory of engines. The goal is to have a sufficient number of rebuilt engines on hand to preclude the need to purchase one.

#### WARRANTY WAS NOT EXERCISED

The January 1983 contract for the Boutwell's engine included a 24-month warranty which covered, after completion of contractor performance testing, the low- and high-compressor and turbine assemblies for any failure if the cause of failure occurred within the confines of the engine. However, the Boutwell engine has never been used, and consequently there have been no failures. Therefore, the Coast Guard does not believe the warranty is applicable.

According to the Coast Guard's Office of General Counsel, the Boutwell's engine problem resulted from inadequate Coast Guard specifications in its Invitation to Bid (IFB) for the engine. The Coast Guard officials at the Curtis Bay SICP (responsible for preparing the IFB) presumed that the specification requiring that the engine be fully marinized would eliminate the potential of a contractor's using flight disks in the rebuilt engine. The officials point to a Service Bulletin issued by the original engine manufacturer which recommends against the use of such disks in marine engines. The basis of that warning, according to the engine manufacturer, is that disks operated in aircraft engines are subjected to a different operating environment than they are in a marine engine.

According to the engine manufacturer, disks used in the two engines have different operating characteristics and are subjected to different amounts of stress. He stated that aircraft disks are subjected to greater stress and reach the end of their useful life more rapidly. The manufacturer stated that in his opinion the probability of a rebuilt marine engine's failing or exploding can therefore be increased when it contains disks previously used in aircraft. However, he stated that no empirical data exist comparing disks used in aircraft and marine engines. In addition, he had no record of any such failure or explosion of an engine using flight disks nor was he aware of any criteria by which a reliable forecast of safe operations could be made. In summary, he stated that the use of flight disks in marine engines is the subject of differing views and the issue is still unresolved.

Upon receipt of the engine and finding that it contained flight disks, the Commanding Officer of the Curtis Bay SICP requested a legal review to determine if the contractor could be made to replace the disks. However, in requesting that review, he acknowledged that, in fact, the term "marinization" did not apply to the use of the subject disks.

The Coast Guard's General Counsel found, after reviewing the data, that there was no "legal justification" to require the contractor to replace the subject disks. The General Counsel stated that the IFB did not require compliance with the cited Service Bulletin and even if it had, the Bulletin does not require compliance but rather only recommends compliance. Finally, on the basis of discussions it had with SICP officials, it was agreed that there was "no basis for argument that marinization or fitness for the purpose intended rendered the use of flight disks impermissible."

On the basis of that opinion, the Coast Guard did not pursue any legal or warranty action against the contractor when it decided not to use the engine in the Boutwell. Additionally, the Coast Guard advised us that it does not plan to initiate any future warranty action because of the disks.

As noted, the Coast Guard's revised specifications for the repair and overhaul of gas generator engines preclude the use of disks that have been previously used in aircraft engines. Other restrictions have been added, and contractors are now held responsible for the replacement of any part which does not meet these specifications--even if the warranty period of 18 months after acceptance, or 12 months/3,600 operating hours after installation, has elapsed. This responsibility exists whenever a part is discovered which does not meet the Coast Guard's specifications. Additionally, should the contractor refuse to replace the part, the Coast Guard can have the part replaced by another source and can bill the original contractor for the cost of the replacement. We believe these actions are appropriate and should prevent a recurrence of the specific problem experienced with the Boutwell engine.

- - - -

We are sending copies of this report to Senator Christopher J. Dodd and former Representative William R. Ratchford, who have also expressed an interest in this matter. As arranged with your office, copies are being sent to the Secretary of Transportation and the Commandant of the Coast Guard. We will make copies available to others upon request.

Sincerely yours,



J. Dexter Beach  
Director

