



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



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PROCUREMENT, LOGISTICS,
AND READINESS DIVISION

B-199281

MARCH 24, 1983

The Honorable Caspar W. Weinberger
The Secretary of Defense

Dear Mr. Secretary:

Subject: M1 Tank Engine Depot Maintenance Plan Needs
Clarification (GAO/PLRD-83-57)

We reviewed the Army's decision on where to overhaul the M1 tank engine. We found that there is a lack of coordination and control between the various Army organizations involved in planning and establishing the depot maintenance capability for the M1 turbine engine. This has resulted in a significant difference between the original plan proposed by the Army and endorsed by the Secretary of Defense and the action plan being followed by the depots to establish overhaul capability. Due to the different interpretations of the Secretary of Defense guidance and mandates, overhaul capability at Anniston, Alabama, and Mainz, Germany, is being created which duplicates existing underutilized capability in the Department of Defense (DOD).

BACKGROUND

The Army's Abrams tank is the first ground combat vehicle to use a turbine engine. Consequently, performing depot level overhaul was a major concern of DOD. On September 26, 1978, DOD, in accordance with its policy, asked the military services to prepare proposals as to how, where, and at what cost they would overhaul the engine if assigned the responsibility. DOD's Maintenance Interservice Support Group-Central was responsible for evaluating these proposals.

In August 1979 the U.S. Army Depot System Command, at the direction of the Materiel Development and Readiness Command, completed an overhaul site study to select the Army's candidate depot(s). The study, submitted to the Maintenance Interservice Support Group-Central, identified Anniston and Mainz Army Depots for respective continental U.S. and European overhaul responsibility.

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In September 1979, the Maintenance Interservice Support Group-Central requested formal data submissions from the Air Force, Navy, and Army. The three services recommended respectively, the Air Force Air Logistics Center, San Antonio, Texas; the Naval Air Rework Facility, North Island, California; and Anniston and Mainz Army Depots. The Maintenance Interservice Support Group-Central based its decision primarily on investment cost, and selected the Army candidate. The decision stipulated, however, that engine overhaul at Anniston/Mainz would be limited to disassembly, cleaning, replacement, balancing, final assembly, and test. All engine components requiring depot maintenance/overhaul would be assigned to the Corpus Christi Army Depot in Corpus Christi, Texas.

On September 5, 1980, the Director for Maintenance Policy, DOD, submitted comments on the Army plan to the Secretary of Defense and expressed several concerns about the planned assignment of overhaul responsibility. Some of these concerns were:

- Key industrial processes required for reclamation of turbine components not available at Anniston or Mainz already exist at the Corpus Christi Army Depot.
- Given the small workload estimated through fiscal year 1986, the requirements could easily be absorbed by any existing DOD gas turbine overhaul facility.
- The Army plan could result in fragmented management and mechanical expertise.
- The technical and engineering support personnel in the Corpus Christi material labs, who segregate repairable components and develop techniques for reclamation, would not be involved with the total engine overhaul facility.

Subsequently, in endorsing the Army's site selection, the Office of the Secretary of Defense mandated that: (1) no new overhaul capability be created at either location and (2) any engine or component overhaul/reclamation that could not be performed at Anniston or Mainz within existing capability be assigned to the Corpus Christi Army Depot where underutilized capability exists.

On September 29, 1980, the Assistant Secretary of Defense, responding to a GAO inquiry about the plans for performing the depot maintenance on the engine, emphasized that no new facilities were planned for this effort. The response reiterated the Maintenance Interservice Support Group-Central recommendation

that Anniston/Mainz perform only limited, intermediate level maintenance and that all engine and component overhaul be performed at Corpus Christi.

OBJECTIVES, SCOPE, AND METHODOLOGY

Our objectives were to (1) evaluate the DOD and Army plan to establish overhaul capability for the M1 turbine engine and (2) assess the continued feasibility of the plan. We interviewed personnel at both the Anniston and the Corpus Christi Depots, as well as representatives of Headquarters at the Department of the Army, Depot System Command, and Materiel Development and Readiness Command. We analyzed DOD and Army studies and cost information. We also examined existing capability at both depots through discussions with key personnel and observations made during extensive tours.

Our review was conducted in accordance with generally accepted government audit standards.

DIFFERING INTERPRETATIONS OF SECRETARY OF DEFENSE GUIDANCE AND MANDATE

We found different interpretations of the Army plan and the Secretary of Defense mandates. The original plan called for full integration of all underutilized capability at Corpus Christi. The depots' action plan, however, incorporates utilization of only the special industrial processes unique to Corpus Christi. As a result, only 28 percent of the 126 overhaulable items have been assigned to Corpus Christi. The Army is duplicating capabilities at both Anniston and Mainz for many of the remaining items.

Materiel Development and Readiness Command interpretation

The Materiel Development and Readiness Command's understanding of the Secretary of Defense mandate was that Anniston and Mainz could not expand beyond their existing capability as of September 5, 1980. Further, the mandate did not apply to only the special industrial processes unique to Corpus Christi but to all depot repair/overhaul capability.

When advised of our findings concerning duplicate capability being established at Anniston and Mainz for 15 items, the Commander, Materiel Development and Readiness Command, on September 2, 1982, requested an immediate assessment of Corpus Christi's capability to overhaul the items we identified. He also

reiterated the present Army maintenance policy for the M1 turbine engine to the commanders, Depot System Command, and the depots. The policy as stated was that

"while ANAD [Anniston] is designated as the CTX [Center for Technical Excellence] and prime depot for the M1 tank system, the turbine engine components will be repaired/overhauled at the depot with existing turbine engine overhaul capability. In this case, CCAD [Corpus Christi] is the designated depot. Neither MZAD [Mainz] nor ANAD will facilitate to repair/overhaul engine components beyond their existing organic capability."

Depot System Command/
Depot interpretation

The action plan followed by the Depot System Command and the two depots involved was based on a different interpretation of the Secretary of Defense mandate. Their interpretation was that in mandating no new capability be established at either Anniston or Mainz, the Secretary of Defense was considering only the high cost special industrial processes unique to Corpus Christi. Any capability other than those processes could be established at both locations. As a result, Corpus Christi's support role was identified through development of identical Memoranda of Agreement with both Anniston and Mainz. The Memoranda, however, only identified 34 items that either required the special industrial processes or involved overhaul of engine bearings which is only performed at Corpus Christi. The remaining overhaulable items were assigned to Anniston and Mainz for depot repair/overhaul since Corpus Christi's unique capabilities were not required. No consideration was given to existing capability at any location, including Corpus Christi.

IMPACT OF THE INTERPRETATION

As a result of the different interpretation, depot overhaulable items are assigned to the wrong facility and expenditures are being made to establish duplicate depot level overhaul capability.

During our review, we identified four additional items scheduled for overhaul at Anniston and Mainz that require the special industrial processes at Corpus Christi. (See enc. I.) To comply with the mandate and the Memoranda of Agreement, these items should be assigned to Corpus Christi. Further, we found that both Anniston and Mainz were proceeding to obtain additional equipment to provide overhaul capability for 15 of the 88 overhaulable items assigned to both locations. (See enc. II.) While

they took exception to the costs identified by our review, the Army confirmed that new capability either was or would be in-place once additional equipment was modified or purchased.

Enclosure II identifies a minimum of \$1.2 million to establish overhaul capability for the 15 items at both locations. Army officials stated that only \$41,525 would be spent to modify surplus equipment at Anniston. They added, however, that the modification costs would only allow Anniston to respond to current needs. In order to meet the need of increasing capacity requirements in the future, \$215,000 will be spent to purchase a new test stand for the 15 items.

Regarding Mainz, the Army stated that while Mainz will also attempt to obtain surplus equipment the availability of surplus equipment is questionable. As a result, the Army plans to spend \$335,000 for new test stand equipment to meet capability needs for the 15 items in enclosure II.

Enclosure III is the Army's updated costs to establish overhaul capability for only 15 items at both Anniston and Mainz, at least \$592,000 in investment and modification costs. On the other hand, the modification costs at Corpus Christi, allowing operational capability, would, according to the Army, equal that spent at Anniston, or about \$42,000.

During our review, we advised representatives of the Materiel Development and Readiness Command of the need for an immediate assessment of the balance of items assigned to Anniston and Mainz to ensure that all items assigned to those locations could be overhauled within existing capability. Based on the results of our review, they stated that such an assessment should be performed. They also said that this assessment would identify additional items for assignment to Corpus Christi and stated that if a high percentage of the total items are assigned to Corpus Christi, a reassignment of the entire engine overhaul program to Corpus Christi may be warranted.

CONCLUSIONS

There is a lack of coordination and control between the various Army organizations in implementing the depot maintenance plan for the M1 turbine engine. The Army is incurring expenditures to create duplicate capability at both Anniston and Mainz when underutilized capability exists at Corpus Christi. In our opinion, the action plan being followed by the depots is contrary to the original plan proposed by the Army and endorsed by the Secretary of Defense.

We found that the Army assigned 88 of the overhaulable engine items to Anniston and Mainz since these items did not require the special industrial processes unique to Corpus Christi. We believe that assigning these items to Anniston and Mainz without an assessment of existing capability at other locations, including Corpus Christi, (1) is in violation of the Secretary of Defense mandate, (2) is contrary to the maintenance concept intended for the M1 engine, and (3) results in additional capital investments to create duplicate capability. In our opinion, an assessment of existing capability must still be performed at all three depots to determine if modification costs at Corpus Christi will be cheaper than the establishment of high cost duplicate capability at Anniston or Mainz.

This opinion is supported by the documented costs to establish duplicate capability for only 15 of the 88 engine items assigned to both locations. Current Army estimates show that \$42,000 has already been spent at Anniston, and at least \$550,000 will be spent for both locations to establish this capability. In comparison, the Army has stated that in order to assign the 15 items to Corpus Christi where capability exists, modification costs similar to those incurred at Anniston would be required. In other words, for a modification cost of about \$42,000 at Corpus Christi, expenditures of \$550,000 at Anniston and Mainz could be avoided and the Army would be in compliance with the mandate.

We are also concerned over what capital investment might be required if duplicate capability is permitted for the remaining 73 items.

RECOMMENDATIONS

In order to realign the current action plan with the maintenance concept proposed by the Army and mandated by your office, we recommend that you direct the Secretary of the Army to

- establish effective coordination and control between the various Army organizations who plan and establish depot maintenance capability for the M1 turbine engine,
- reassign overhaul responsibility for the 19 items in enclosures I and II to Corpus Christi Army Depot,
- reassess the remaining engine items scheduled for overhaul at Anniston and Mainz to ensure assignment of items requiring depot level repair/overhaul to Corpus Christi, and

--reassign overhaul responsibility for the M1 engine from Anniston and Mainz to Corpus Christi if the above assessment results in assignment of a high percentage of total overhaulable items to that facility.

AGENCY COMMENTS

On December 30, 1982, we provided the Departments of Defense and the Army with copies of our draft report and asked for official comments within 30 days. Defense officials advised us that certain issues in the report are still being investigated and they will not be able to provide an official position on the report within the time frame allowed. We are therefore issuing the report without agency comments.

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As you know, 31 U.S.C. § 720 requires the head of a Federal agency to submit a written statement of 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.

We are sending copies of this report to the Director, Office of Management and Budget; the Secretary of the Army; and the Chairmen of the appropriate congressional committees.

Sincerely yours,



Donald J. Horan
Director

Enclosures - 3

ENGINE ITEMS THAT REQUIRE INDUSTRIAL
PROCESSES LOCATED AT CORPUS CHRISTI AND
NOT AVAILABLE AT ANNISTON OR MAINZ

<u>Part number</u>	<u>Item</u>	<u>Industrial process</u>
12271246	APR seal	Vacuum brazing
12302272	Seal assembly	Vacuum brazing
12286562	Seal assembly	Vacuum brazing
12302234	Shield assembly	Vacuum brazing

ENGINE ITEMS IDENTIFIED BY GAO THAT REQUIRE
TEST STAND EQUIPMENT AVAILABLE AT CORPUS CHRISTI
AND NOT AVAILABLE AT ANNISTON OR MAINZ

<u>Test equipment</u>	<u>Planned expenditure at Anniston</u>	<u>Planned expenditure at Mainz</u>	<u>Applicable part number</u>	<u>Item</u>
Hydromechanical test stand	\$243,000	\$880,000	12286731	Electromechanical fuel
			12286971	Fuel control
			2540462	Fuel control housing
			2540345	Linear valve
			12286946	Pump rotary
Oil flow bench	120,000	(a)	12302050	Accessory gearbox
			12286323	Bearing housing
			12302058	Housing and cover
			12286049	Inlet housing
			12286227	Internal housing
			12286242	Internal housing
			12286305	Internal housing
Combustion chamber drain valve, and fuel nozzle test stand	(b)	(a)	12271568	Combustion chamber drain valve
			12302049	Fuel nozzle

a/Limited cost data obtained for Mainz did not identify these costs.

b/Anniston officials stated that capability could be achieved through minor modification costs. Officials at Corpus Christi stated, however, that Anniston would have to buy this test stand as the modification would not work. Current purchase price was unavailable.

ARMY'S UPDATED COST TO ESTABLISH DUPLICATE
OVERHAUL CAPABILITY FOR THE 15 ENGINE ITEMS

IN ENCLOSURE I

<u>Test equipment</u>	Actual or planned expenditure at <u>Anniston</u>	Actual or planned expenditure at <u>Mainz</u>	Total <u>cost</u>
Hydromechanical	<u>a/\$ 40,600</u>		\$ 40,600
Test stand	<u>b/215,000</u>	\$215,000	430,000
Oil flow bench	<u>a/300</u>	120,000	120,300
Combustion chamber drain valve and fuel nozzle test stand	<u>a/625</u>		625
Total cost			<u>c/591,525</u>

a/Modification to surplus equipment.

b/New procurement to meet future anticipated capacity needs.

c/Represents a minimum total cost due to unknown expenditures at Mainz.