REPORT BY THE U.S.

General Accounting Office

Better Management Of Metro Subway Equipment Warranties Needed

The Washington Metropolitan Area Transit Authority has expended about $300 million for subway equipment. The authority plans to buy additional equipment which it estimates will cost another $600 million to service its 100-mile system. But the authority's warranty administration for its present equipment contracts and future procurements must be improved.

GAO recommends that the authority's General Manager establish a consistent interpretation of equipment warranty and reliability provisions with clearly defined roles and relationships for those involved. These arrangements should fit Metro's existing operating conditions, and should be effectively implemented.

PSAD-79-41

FEBRUARY 27, 1979

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

PROCUREMENT AND SYSTEMS
ACQUISITION DIVISION

B-141529

Mr. Theodore C. Lutz
General Manager
Washington Metropolitan Area
Transit Authority
600 Fifth Street N.W.
Washington, D.C. 20001

Dear Mr. Lutz:

This report discusses the authority's weaknesses in warranty administration of recently procured subway equipment and contains recommendations to you on ways to improve this activity.

The review was made because of the significant amount of Federal grant funds used for equipment procurements to build the Washington Regional Rapid Rail Transit System, which include warranty costs, and the need to insure efficient and economical use of these funds.

We are sending copies of this report to the Chairman, Board of Directors, Washington Metropolitan Area Transit Authority; the Director, Office of Management and Budget; the Secretary of Transportation; the House Committee on the District of Columbia; the Senate Subcommittee on Governmental Efficiency and the District of Columbia, Committee on Governmental Affairs; the House Committee on Appropriations; the Senate Subcommittee on Transportation, Committee on Appropriations; and the administrative bodies representing the local jurisdictions.

(6607)

Sincerely yours,

for J. H. Stolarow
Director

GENERAL ACCOUNTING OFFICE
REPORT TO THE GENERAL MANAGER
WASHINGTON METROPOLITAN AREA
TRANSIT AUTHORITY

BETTER MANAGEMENT OF METRO SUBWAY EQUIPMENT WARRANTIES NEEDED

D I G E S T

The Washington Metropolitan Area Transit Authority, is building and operating the Washington Regional Rapid Rail Transit System, commonly called METRO, to relieve traffic congestion and improve the physical character, economic growth, and well-being of the Washington, D.C., metropolitan area.

As of December 1978, the authority had bought about $300 million of equipment, including rail vehicles, train control, communication and fare collection equipment, and escalators. Authority officials estimated that another $600 million is needed for similar equipment to service the total system.

The authority has not efficiently administered and taken full advantage of warranty and reliability clauses in various equipment contracts. This is due primarily to:

--Contract provisions that may be difficult to enforce in an operational environment which requires quick repairs to keep sufficient trains running.

--Lack of a clear and consistent interpretation of contract provisions.

--Unclear lines of authority and responsibility for enforcing the provisions.

GAO recommends that the General Manager, Washington Metropolitan Area Transit Authority:

--Investigate the feasibility of billback agreements in future contracts when operating conditions require quick in-house repairs.

--Establish clear and consistent interpretations of warranty clauses.

--Establish clear lines of authority for enforcing warranty provisions, and provide specific and operable warranty repair instructions for maintenance personnel.

The authority obtained warranty protection in its railcar contract, but is incurring added expense by performing railcar repairs which its consultant engineer identifies as covered by contract warranty. While authority maintenance officials believe such efforts are needed to maintain adequate service, the authority has not taken steps to recover the cost or to modify the contract. GAO estimates that since operations began, costs for this warranty work performed by the authority are in excess of $198,000. (See pp. 3 to 6 and 18.)

For the railcar equipment, GAO recommends that the General Manager determine the repair responsibility, notify the contractor of failures covered by warranty, and assure that all failed warranty items are repaired by the contractor within specified time periods. The General Manager should seek compensation from the contractor for warranty repairs made by the authority, including reimbursement in excess of the $198,000 disclosed by our review.

The authority has no assurance that it is obtaining the degree of reliability for

which it contracted, since it has not started the reliability program required in the contract. Undetermined future costs may be incurred to make repairs to equipment which should be corrected by the contractor under the contract provisions. (See pp. 6, 7, and 18.)

The authority identified some recurring railcar problems and informally notified the contractor, who then made corrections. (See pp. 6, 7, and 18.)

Contracts for automatic train control and communications equipment do not specify measurement criteria so that correction of deficiency clauses could be invoked. For communications equipment, the authority did not maintain adequate records to show the extent of equipment failures for reliability enforcement. Warranties from the subcontractors on communications equipment expired, in many cases, before equipment installation. (See pp. 10 and 18.) GAO recommends that the General Manager specify the criteria for starting corrective action on excessive failures of automatic train control and communications equipment.

For the automatic fare collection system, the authority has not evaluated the equipment reliability measurement program, handled by the contractor, to insure that the data is valid and that the equipment functions according to specification requirements. Unless the authority evaluates the data's validity, questions will remain about the measurement system and reliability of the equipment. (See pp. 13 and 19.) GAO recommends that the General Manager adequately assess the reliability data for the fare collection system.

For equipment already purchased, GAO recommends that the General Manager:

--Maintain records to determine if reliability thresholds are met, so that required contractor corrections of excessive failures or design deficiencies can be made.

--Start the reliability programs contained in the contracts.

The authority acknowledged its management weaknesses in enforcing warranties. It believed the need for continued rail operations required immediate maintenance, instead of sending components to the manufacturer, because of the uncertainty and time consuming repair turnaround. The authority stated that as operating experience was gained, warranty management has improved. Specific actions to strengthen warranty administration were outlined in its response to GAO. (See app. I.)

The Urban Mass Transportation Administration assessed the authority's operating equipment reliability problems and found that adequate monitoring and measurement systems for rail cars, train control, and escalator equipment do not exist. (See app. VI.)

Contents

CHAPTER 1

INTRODUCTION

The Washington Regional Rapid Rail Transit System, commonly called METRO, is the product of two decades of congressional and citizen efforts to relieve traffic congestion and improve the physical character, economic growth, and well-being of the Washington, D.C., metropolitan area. Passenger service began in March 1976, and as of December 1978 about 31 miles were in operation.

Rail operating expenses are budgeted at $59.3 million for fiscal year 1979. Operating funds are provided by transportation revenues and local subsidies, and construction funds are provided by local and Federal subsidies.

SYSTEM DESCRIPTION

The planned system will feature about 100 miles of track with 48 miles underground and 87 stations, of which 50 will be underground. When the system is completed it is estimated that 736 cars, each capable of carrying 220 passengers, will be required to meet service demands.

Access to underground stations is by escalator and elevators, except for one very deep station in Maryland which will be accessible only by high-speed elevators. Once inside the station mezzanine, vending machines dispense farecards which are used to automatically open faregates to the boarding area. The faregates record the station entered on the farecards to calculate the fares upon exit.

Train operation is controlled by the automatic train control system which regulates train speeds and station stops. The system's control center monitors and supervises train door operation, train locations, and provides security against accidents. The system uses communications equipment such as telephone, mobile radio public address, closed-circuit television, and fire and intrusion alarm equipment.

The electric-powered railcars run in trains of two, four, six, or eight cars. Train spacing is 5 to 6 minutes during rush hours and up to 10 minutes at other times. Train operators announce station stops over public address systems

in the cars and, if necessary, passengers can speak to the operator through a call box located in every car.

The authority bought equipment costing an estimated $300 million as of December 1978. This included railcars, train control, communications and fare collection equipment, and escalators. Based on the authority's December 1978 estimate, an additional $600 million will be required for similar equipment procurements to service the total 100-mile system.

PREVIOUS REPORTS ON METRO

Over the past 4 years we have evaluated numerous aspects of the authority's operations and construction. Reports have been issued on the authority's system of reporting its cost and construction status, the validity of the capital cost estimate, operational safety, construction safety, the effect of labor strikes on cost, and the need to resolve METRO funding.

SCOPE OF REVIEW

We reviewed pertinent contract warranty provisions of the railcar, automatic train control, automatic fare collection, communications, and escalator contracts. We examined reports, correspondence, and records, and interviewed authority officials and consultants. Our review was conducted at the authority's headquarters in Washington, D.C., and at its Brentwood major repair facility.

CHAPTER 2

RAILCAR WARRANTY ENFORCEMENT NEEDED

Although the authority's railcar contract contains clauses warranting the cars, the authority is not taking full advantage of these contract provisions. Repairs covered by warranty are being made by the authority and it is not systematically monitoring reliability performance. As a result, METRO is incurring unnecessary costs and may incur more if the warranty is not enforced.

In June 1972 the authority awarded a contract to Rohr Industries, Inc., for 300 rapid rail transit cars at a fixed price of $91.6 million. The contract price has risen to $93.6 million because of authority-initiated specification changes. The contract contains several clauses which warrant the cars against defective material and workmanship, and unreliable performance.

WARRANTY PROVISIONS

The contract's general provisions contain a correction of deficiencies clause 1/ taken from the Defense Acquisition Regulation (formerly entitled the Armed Services Procurement Regulation). The authority used this clause because it believed the contractor was responsible for designing the cars and the Defense Acquisition Regulation recommends this clause for fixed-price supply contracts where design or performance specifications are of major importance. This clause becomes effective for each car when the authority accepts that car, and it remains effective until the expiration of time or mileage limits specified in the contract technical specifications. These limits vary for individual systems and components, but are at least the greater of 2 years or 150,000 miles.

In identifying a deficiency, the authority must show that the failure was not caused by abusive or incorrect

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1/Correction is defined in the clause as any and all actions necessary to eliminate any and all deficiencies. Deficiency is defined as any condition or characteristics in any supplies not complying with the contract's requirements.

operator actions or by inadequate maintenance. The authority must notify the contractor of a deficiency within 30 days of its discovery. The contractor is required under the contract to "promptly" submit a recommendation for corrective action, after which the contracting officer gives the contractor written notice to correct the deficiency. Correction will be made promptly and at no cost to the authority. However, this time frame is not specifically defined in the contract.

If the contractor does not comply, the authority must give him written notice setting a period within which the correction must be made. If the deficiency remains uncorrected, the authority may make the repairs or have repairs made and, then, is entitled to reimbursement by the contractor.

The railcar contract also contains reliability criteria in terms of mean distance between failure for specific systems, such as brakes, and heating and air conditioning. Mean distance for a particular system is computed by dividing cumulative fleet mileage by the number of failures. The reliability test fleet is a minimum of 50 of the first 60 cars delivered and selected by the contractor. The reliability measurement runs for a period of 4 years or 7.5 million miles, whichever is first. The specification also contains a table with interim failure rates which, if exceeded, constitutes a reliability failure for individual systems and components. If these criteria are not met, the contractor must correct the deficiency on all the delivered railcars.

Also, if 25 percent of a warranted component fails within the warranty period, components on all delivered railcars must be repaired or adjusted under the contract.

AUTHORITY MAKES REPAIRS COVERED BY WARRANTY

All vehicle failures are not evaluated for warranty responsibility under current maintenance procedures. Consequently, the contractor is not notified of some warranty failures. Most cars are repaired by authority personnel because, according to a maintenance official, the need to keep the required number of cars available for revenue service and excessive turnaround time does not

permit the authority to turn over all warranty repair work to the contractor.

In 1976, authority officials responsible for administering railcar warranties implemented a procedure to have a designated warranty engineer review failures to determine repair responsibility. This procedure was only partially successful, and the authority attempted to strengthen it in September 1977. A November 1977 "Task Force Report on Rail Performance" cited several reasons for the limited implementation, including concern regarding the availability of a sufficient number of cars for revenue service and an "organizational situation that does not completely provide for full accountability and responsibility in this area." This deficiency is discussed more fully on page 20.

Because most failures are not documented as to warranty responsibility, we could not readily assess the extent and cost of the authority's warranty repair work. The authority submitted about two cars a day, as well as some parts, to the contractor for repair. This compares to about 70 repairs per day which the authority made.

We sampled the vehicle service reports. An authority railcar consultant, designated as warranty engineer, reviewed the reports we selected to determine whether repair responsibility was the contractor's or the authority's.

Based on his determinations, we projected that since March 1976 when service began until February 1978, 36 percent of the failures were the contractor's warranty repair responsibility. However, the contractor repaired only 14 percent of those for which it was projected to be responsible. The estimated cost of labor and overhead for warranty work performed by the authority is $198,600. Because of insufficient data on the service reports, we were not able to determine the authority's cost of parts used in repairs which should have been borne by the contractor.

With few exceptions, the authority has not notified the contractor in accordance with contract provisions, that warranted failures occurred because, according to authority officials, operating requirements and the lack of a satisfactory recordkeeping system limited their capability to follow notification procedures. Also, the authority has not examined the possibilities of recovering

the cost of making such warranty repairs. The contractor proposed negotiating changes to the warranty provisions so that acceptable procedures, consistent with the need for operating more railcars, could be established. But none have been negotiated, since authority officials believed that such changes would reduce the contractor's potential liability for exposure under the warranty; thus waiving the authority's contractual right without consideration and, thereby, potentially increasing its operating costs.

RELIABILITY NOT MONITORED

Although failure detection and reporting is the authority's responsibility, procedures to formally determine reliability responsibility and the recordkeeping and reporting systems necessary to monitor the contract reliability requirements have not been accomplished. Reliability procedures were not established even though the contractor submitted a plan, required by the contract, detailing procedures for carrying out the program.

We were informed that the program was not started because coordination problems existed between the authority's offices of equipment design and rail service. Concern over having enough cars available for revenue service was also emphasized as a factor preventing reliability enforcement.

CORRECTIVE ACTION ATTEMPTS

The authority attempted to obtain corrective action from the contractor in cases where there were excessive equipment failures. A substitute program was initiated under which railcar problems were informally reviewed on a daily basis. Weekly meetings were held with contractor personnel. Authority officials stated that corrections were made by the contractor. These officials, however, could not identify which of many contractor's railcar modifications resulted from those meetings, but stated that the majority were made by the manufacturers.

The contractor notified the authority that because of some modifications, it is preparing claims in addition to a $50 million claim the firm already submitted. One authority official stated that according to the contractor, these additional claims could total about $8 million. We were told that a small portion of the additional amount could

include reimbursement claims for the costs of some warranty corrective work.

The authority recently started using the 25-percent criteria (see page 4) on selected items by reconstructing repair histories. In March 1978 it notified the contractor of a deficiency, stating that the 25-percent criteria had been exceeded. The data to support the authority's position was assembled manually from vehicle service reports, because summary records and reports on railcar failures had not been prepared. Also, most failures were not identified as warranty failures at the time of occurrence which compounded the difficulties, since only warranted failures can be used to measure against the 25-percent criteria.

In April 1978 the contractor responded and claimed the authority did not properly notify it of the deficiencies. The contractor said the authority failed to provide, at the time of failure, information needed to establish that the deficiency was the responsibility of the contractor under the contract. The authority plans additional efforts to reconstruct repair histories for selected equipment to determine whether the 25-percent criteria has been met. However, authority officials recognize that all the reliability problems will not be identified this way.

OTHER FACTORS AFFECTING WARRANTY ADMINISTRATION

Authority officials identified other factors which they believe affected their capability to obtain the total benefits of contract warranty.

According to these officials, the railcar contractor suffered a loss of over $50 million during the performance of this contract. This financial loss, they said, forced the contractor to take steps to minimize its loss and improve its cash position. They stated that it was in the contractor's interest from a cash flow standpoint to use returned components for railcars to be delivered, rather than provide quick turnaround of warranty parts, since the firm was paid on a car delivery basis. The contractor, however, stated that it was severly impacted in production by shipping produced parts to the authority in an attempt to maintain the authority's service schedule.

Also, authority officials stated that warranty repair turnaround time was lengthy and confirmed that railcar components were needed to keep the rail system in operation. Thus, repairs on the components were made in-house to assure continued rail operation. According to these officials, the daily revenue service could not have been met if all warranty work had been returned to the contractor for corrective action. They stated that there was no assurance on when a component would be returned. Another alternative, according to authority officials, would have been for the authority to purchase an excessive inventory level. Thus, authority officials stated that they balanced operational needs and high inventory levels against the approach of repairing the components in-house, recognizing that some of the warranty work should have been performed by the contractor.

CONTRACTOR'S COMMENTS

The contractor questioned the warranty interpretations. It believed the authority's engineering consultant had the responsibility for car design and viewed its own role as that of a supplier. It stated that the authority's engineering consultant was given the task of administering the warranty and reliability clauses as they relate to the firm (Rohr Industries, Inc.). The contractor believes this situation makes the objectivity of the consultant engineer's warranty interpretations questionable and creates a conflict for the consultant regarding the interpretation of the specifications.

The authority, however, disagrees with the contractor's view as to who has the car design responsibility, since the Rohr contract contains provisions concerning car design. This matter is in dispute between them.

The contractor said that the reliability program contemplated by the contract is no longer possible. The firm stated that the criteria and "bench marks" for the reliability program established in the contract (speed rates, mileage, time, number and sequence of cars, etc.) are no longer applicable or appropriate, as the cars have been used by the authority in over 1 million miles of revenue service. (See app. II.) However, we believe this situation does not negate the possibility of negotiating and implementing a mutually acceptable substitute reliability program, since the test period under the contract is 4 years or 7.5 million miles, whichever occurs first.

The contractor also agreed with our observations as to the authority's lack of adequate monitoring procedures and its inability to accurately track warranty. The firm said that it is the authority's responsibility to maintain accurate time and accumulated mileage histories, and to establish a system to segregate components and materials bought directly from suppliers other than his firm so that a proper warranty determination can be made. According to a contractor official, such information has not been maintained by the authority or presented to his firm as part of warranty claims.

CHAPTER 3

TRAIN CONTROL AND COMMUNICATIONS EQUIPMENT--RELIABILITY AND WARRANTY PROBLEMS

Contracts for automatic train control and communications equipment do not specify measurement criteria so that correction of deficiency clauses could be invoked. For communication equipment, the authority did not maintain adequate records to show the extent of equipment failures for reliability enforcement. In some instances, the warranty coverage expired before the communications equipment was installed.

In September 1971 the authority contracted with the General Railway Signal Company to furnish a complete automatic train control system at a fixed price of $42.1 million. This price has since increased to an estimated $77.4 million as of December 1978, primarily because of construction delays and authority-initiated design changes.

The authority contracted with Seal and Company, Inc., in April 1972 to design, manufacture, install, and test a complete integrated communications network for approximately the first 30 miles of the transit system. As of December 1978, the total price of this contract has risen from $5.5 million to an estimated $17.8 million. According to an authority official, this increase is due to construction delays and the need for more equipment.

PROBLEMS IN ENFORCING RELIABILITY PROVISIONS

The automatic train control and the communications equipment contracts also contain the Defense Acquisition Regulation correction of deficiencies clause. Authority officials responsible for administering this clause interpret it to protect only against deficiencies in equipment design and excessive failures due to poor material or workmanship and not against random failures.

The contracts, however, do not contain quantitative reliability provisions and, therefore, do not define a specific number of failures that must occur before the correction of deficiencies clause can be used. Also, the

authority is not determining contractor repair responsibility and, therefore, is not considering all applicable failures in determining when an "excessive" number of failures has taken place.

The authority did not know the extent of repairs it made to communications equipment that might have been counted in determining excess failures, which under the contract would require contractor correction of deficiencies. Until recently it did not document all failures or identify whether the contractor or subcontractor may have had repair responsibility.

Similarly, trouble reports documenting failures within the railcar's automatic train control equipment do not indicate who has the repair responsibility or, in several cases, do not show the disposition of defective parts. When conducting our sample of railcar failures, however, we obtained a limited indication of the extent to which the authority is making repairs to parts which may be warranted. In this sample, the railcar warranty engineer identified 13 failures with the railcar's automatic train control equipment. Of these failures, we learned that nine were warranty type with eight occurring during the warranty period. Only two of these were sent to the contractor for repair. Complete repair data was not available on the remaining four.

Authority officials could not readily provide us a list of the contractor's modifications which resulted from excessive failures or design deficiencies. They said that it is generally easier, faster, and less costly to notify the contractor of a deficiency through informal phone calls and meetings, rather than through the formal written procedures required by the correction of deficiencies clause. They stated that the authority does not have to formally use the reliability clause to obtain corrective action from the automatic train control contractor.

The authority informally returned some equipment, which randomly failed, to contractors and subcontractors who made the repairs without billing the authority for the cost. Authority officials acknowledged that such repairs were made, and stated they had not intended to obtain such random failure warranty in the invitation for bid.

WARRANTIES EXPIRE BEFORE COMMUNICATIONS EQUIPMENT INSTALLED

The communications contractor purchased about 85 percent of its equipment from subcontractors, and manufactured the remainder. The subcontractors warranted their equipment against inferior material and/or workmanship, generally for 3 months to 1 year. Authority officials stated the subcontractors' warranty coverage was extended to the authority. However, in many cases, this warranty coverage expired before the equipment was installed.

According to authority personnel, this situation occurred when the contractor acquired the necessary communications equipment from the subcontractors in time to meet a specified delivery date, but was not able to install on that date because of authority construction delays. Some equipment remained in the contractor's warehouse, through no fault of its own making, for as long as 3 years and, consequently, the warranty expired before the equipment was installed.

The contractor recognized that supplier warranties, in some cases, expired before equipment installation, due to project delays. But the firm believed the warranty provisions bound it to correct recognized deficiencies regardless of any other considerations. (See app. III.) Authority officials, however, felt that the authority did not have protection against random failures under these same warranty provisions.

The authority's second communications contract corrected this situation by providing for the warranty against random failures in material and/or workmanship to remain in effect for a 1-year period after the authority's final acceptance of the equipment.

CHAPTER 4

LACK OF CONTROL OF RELIABILITY PROGRAM FOR AUTOMATIC FARE COLLECTION SYSTEM

The authority has not assured itself that the contractor-managed reliability program identifies and includes all valid failures, but has relied on the contractor to make the assessment.

The authority is procuring automatic fare collection equipment from Cubic Western Data for the complete 100-mile system. A fixed-price contract for $44.3 million was awarded in April 1975, and increased to $52.9 million in August 1975. Because of specification changes and additional equipment, the contract price has risen to $56.5 million as of December 1978. The contract included about $900,000 to measure achievement of the reliability criteria.

WARRANTY PROVISIONS

The contract warranty clause states that for a period of 1 year after acceptance, the fare collection equipment will be free from defects in material and workmanship and will conform with the specifications. The warranty provides for the cost of parts only. Labor for both routine maintenance and warranty repairs is paid for under a separate maintenance contract, which has a fixed price for labor. The contractor will bill the authority for parts used that are not under warranty.

NEED TO REVIEW RELIABILITY TEST PROGRAM

The fare collection contract contains reliability requirements given in mean time between failures and mean time to repair. The contractor must demonstrate reliability on 96 pieces of equipment over a 1-year period beginning last August 1977. The contractor is also responsible for test implementation, data evaluation, summarization, and periodic reporting.

The first quarterly reliability report for the period ending October 31, 1977, submitted by the contractor showed that of 10 types of equipment being tested, 1 type is not meeting the mean time between failure requirement and 2 are

not meeting the mean time to repair criteria. However, the validity of this interim data is questionable, because there is no assurance that all maintenance reports have been included in the calculations and there has been limited review to determine whether the failures are relevant for reliability measurement.

Questionable data accumulation

The contractor's test plan provided for an authority official to assign a number to each reported equipment failure, which would identify it for all subsequent reviews and data summaries. When the plan was implemented, authority officials determined that they did not have sufficient staff to receive calls and assign failure numbers. Consequently, they assigned this function to the contractor who is carrying it out.

The contractor summarizes these failures for the test equipment and prepares data on equipment reliability. Although testing began in August 1977, monthly reports required by the test plan have been submitted only for February and March 1978. However, as of May 1978, the authority had not made a review to determine that all maintenance reports are included in reliability calculations. Without some independent verification to assure that all maintenance actions on test equipment are being included in reliability calculations, only limited credibility can be given to the test results.

Validation of reliability data needed

The Reliability Review Board, consisting of representatives of the authority and the contractor, is required to meet monthly to review completed maintenance reports to ensure that all relevant failures are included in reliability measurement. Approximately 10 months after the test period began, the board met in May 1978 for the first time. According to authority officials, one reason the delay occurred is because they were waiting to hire a reliability engineer to monitor the reliability programs for all equipment contracts.

When the board met, it reviewed the first quarter reliability report covering the period August 1, 1977, through October 31, 1977, which was submitted in February 1978. Of the 722 maintenance reports accounted for in the quarterly

report, we were told that the board reviewed approximately 20 to 25. The reliability plan, however, requires that all maintenance reports be reviewed. Assuming an equal number of failures in each quarter, the board, ultimately would have had to consider at least an additional 2,100 maintenance reports.

Authority officials advised us after we completed our fieldwork, that the board met to evaluate the contractor's quarterly reliability reports and raised questions about their validity and accuracy. Also additional supporting information is being obtained to complete an assessment of the contractor's final report for the period ending July 31, 1978. No mention was made of the completeness of these reviews.

CONTRACTOR'S ACTION

The contractor has recently provided a voluntary extension of the warranty for 1 additional year. The firm stated that it is dedicated to providing a high quality and reliable product to the authority and that it will incorporate product improvement changes in the equipment. (See app. IV.)

CHAPTER 5

CUMBERSOME WARRANTY PROVISIONS FOR ESCALATORS

Escalators for the METRO stations through the first 45 miles of construction have been procured under five separate contracts with Westinghouse Electric Corporation at a total cost of $51 million. The first three contracts were awarded competitively, and included a 2-year maintenance service agreement covering all labor and parts to maintain the escalators. The remaining two contracts were sole-source, and separate maintenance agreements were negotiated with Westinghouse.

CUMBERSOME WARRANTY PROVISIONS

The first escalator contract in 1971 contained a correction of deficiencies clause because, according to authority officials, the contractor was using new type drive motors located every 20 feet, which turn on or off in sequence. Since then, a construction warranty clause has been used for the next four contracts which states that the

> "* * * contractor shall remedy at his own expense any failure of the work (including equipment), for a period of one year, to conform to contract specifications and any defect of material, workmanship, or design in the work * * *."

A 2-year maintenance clause in the first three contracts stated that the contractor must provide "all parts for all aspects of all equipment installed under this contract." An authority official stated that this does not duplicate contract coverage for parts to be provided by the contractor in event of a warranty failure for the first year's operation. According to this official, because this was a competitive fixed-price procurement, it is assumed that the cost of providing maintenance service was reduced in the bid by an amount equal to the cost for the warranty. However, this cannot be determined, because such information is not required to be made available under competitive bids.

The authority did not include the maintenance clause in the fourth and fifth escalator procurement contracts because maintenance is not a capital item; a requirement

for Federal funding. It negotiated separate maintenance agreements with Westinghouse. The maintenance agreements, however, resulted in redundant warranty coverage of material and workmanship for the first year's operation of the equipment procurred under these latest contracts. Also, in this situation, the authority had problems identifying and enforcing its warranted repairs.

We were told that Westinghouse officials could not isolate from their records the amount included for the warranty. Therefore, a credit should be negotiated for the unnecessary portion of warranted coverage.

RELIABILITY REQUIREMENT

The escalator technical specifications contain a reliability requirement. The requirement is for availability of not less than 98 percent. Availability is defined as the portion of normal operational time during which the equipment is available for use. Review of the contractor's quarterly reports for July through December 1977 indicate that the escalators are exceeding the specification criteria.

CONTRACTOR'S VIEWS

The contractor believed that the relationship between the authority and its key contractors progressed well, and stated that it would continue to work with the authority on any future improvements deemed appropriate. (See app. V.)

CHAPTER 6

CONCLUSIONS, AUTHORITY COMMENTS, AND RECOMMENDATIONS

CONCLUSIONS

The authority has not taken full advantage of warranty and reliability clauses in its procurement contracts. It has not effectively monitored the reliability of railcars, communications, and fare collection equipment. As a result, additional costs are being incurred by METRO.

Railcars

The authority obtained warranty protection in its railcar contract, but is incurring added expense by performing railcar repairs, which its consultant engineer identifies as covered by contract warranty. While authority maintenance officials believe such efforts are needed to maintain adequate service, it has not taken steps to recover the cost or to modify the contract.

The authority has no assurance that it is obtaining the degree of reliability for which it contracted, since it has not started the reliability program required in the railcar contract. Undetermined future costs may be incurred to make repairs to equipment, which should be corrected by the contractor under the contract provisions.

The authority identified some frequently occuring problems, and informally notified the contractor who then made corrections.

Train control and communications equipment

The authority did not know at what point the correction of deficiency clauses should have been invoked, because the contracts did not specify measurement criteria to be enforced. Also, it could not take full advantage of the reliability enforcement for communications equipment, because it did not maintain records needed to determine the extent of warranty failures.

Warranties extended to the authority from subcontractors on communications equipment have also expired, in some cases,

before equipment installation. This situation was corrected in a succeeding contract.

Automatic fare collection system

The reliability measurement program has been started by the contractor who is also manufacturing, installing, and repairing the equipment. However, unless the authority takes action to evaluate the validity of the contractor's data questions will remain about the measurement system and reliability of the equipment.

CAUSES OF PROBLEMS

The authority has not effectively administered the warranty and reliability provisions primarily because:

--Contract provisions may be difficult to enforce in an operational environment which requires quick repair to keep sufficient trains running.

--Lack of a clear and consistent interpretation of contract provisions.

--Unclear lines of authority and responsibility for enforcing the provisions.

Warranty and reliability provisions must suit the equipment and the conditions under which they will be administered. Before contracts are signed, warranty language should be reviewed by all parties to insure a consistent understanding of what the contract requires. To effectively enforce the provisions, the roles and relationships of those involved in warranty administration must be clearly defined and consistent with good management practices.

Contract provisions difficult to enforce

Contract provisions pertaining to the correction of deficiencies used in three of the five equipment contracts we reviewed were taken from the Defense Acquisition Regulation, without apparent consideration of their workability in an operational environment. The authority had to make railcar warranty repairs itself, because the repair turnaround time was too uncertain to assure a sufficient number of railcars would be available for revenue service. Also, the railcar

contract did not define what constituted "prompt" repairs, nor did it provide for the authority to recover costs of making repairs itself unless the contractor had been properly notified and refused to correct the deficiency.

In the automatic train control contract, the correction of deficiencies clause is rarely enforced because, according to officials, the paperwork required to invoke the clause is too time consuming, and correction can be agreed upon informally. Likewise, authority officials informally obtained equipment modifications to the railcars, because it took too long to accumulate the contract-required data.

Differing interpretations of provisions

Authority officials have interpreted the correction of deficiencies clauses differently. The authority's General Counsel indicated that the clause in the railcar contract covers random failures due to inferior material and workmanship. The official enforcing the contract believes that such failures are covered, but only because a specific warranty period is identified in the contract's technical specifications. Officials administering the automatic train control and communications warranty provisions insist that the correction of deficiencies clause does not provide contractor remedy for random failures due to poor material and/or workmanship. However, the contractors are, on occasion, making such repairs and have not billed the authority.

Unclear lines of authority and responsibility

Effective warranty management depends on close coordination and cooperation of the offices of equipment design and rail service. But, according to some authority officials, this has not always occurred in administering the railcar contract.

The authority's office of equipment design is responsible for administering equipment warranties. However, that office, which is primarily concerned with procurement, must administer the railcar and automatic train control warranties with the assistance of the office of rail service, which is primarily concerned with keeping the required number of cars ready for service.

In September 1977 the authority established a steering committee and task force to study the problem of train delays. The task force issued a report in November 1977 stating that the authority's responsibility and accountability are not adequately defined to promote optimum coordination, cooperation, and direction. According to the task force, this may result in delays in insuring quality and reliability and in enforcing equipment warranty provisions.

The November 1977 task force report cited the absence of overall guidance on the type of information and documentation required under numerous warranty provisions, and recommended an adequate definition of responsibilities and functions for warranty control and oversight, and for reliability. It also recommended that a management information system covering reporting of an incident to the action taken should be established.

AUTHORITY'S ACTIONS

The authority was in the process of corrective action when our fieldwork was completed.

Authority officials stated that as of June 1978, actions have been taken as a result of the task force report. They said these include:

--Developing a strict warranty handling procedure which has been implemented in part.

--Making the purchasing department a part of the normal flow for warranty parts to exercise tighter inventory control.

Authority officials believe the present contract provisions are clear. However, they recognize that the provisions could be simplified further to eliminate possible misinterpretations by various contractors. The Authority is rewriting the warranty and correction of deficiencies clauses for their new transit cars purchase order to clearly state the limit of responsibility and coverage the authority expects.

RECOMMENDATIONS

For equipment already purchased, we recommend that the General Manager, Washington Metropolitan Area Transit Authority:

--Maintain records to determine if reliability thresholds are met, so that required contractor corrections of excessive failures or design deficiencies can be made.

--Start the reliability programs contained in the contracts.

Additionally, for the railcar equipment, we recommend that the General Manager determine repair responsibility, notify the contractor of failures covered by warranty, and assure that all failed warranty items are repaired by the contractor within specified time periods. The General Manager should seek compensation from the contractor for warranty repairs made by the authority, including reimbursement in excess of $198,000 disclosed by our review.

Also, for the automatic train control and communications equipment, we recommend that the General Manager specify the criteria for starting corrective action on excessive failures.

We recommend further that for the automatic fare collection system, the General Manager adequately assess the validity of the data used in computing reliability and, on a test basis, review equipment failures reported by station attendants to assure all applicable maintenance reports are considered.

We also recommend that the General Manager:

--Investigate the feasibility of bill-back agreements when operating conditions require quick in-house repairs.

--Establish clear and consistent interpretations of warranty clauses.

--Establish clear lines of authority for enforcing warranty provisions and provide

specific and operable warranty repair instructions for maintenance personnel.

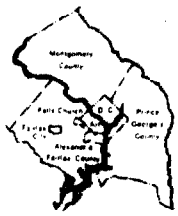
AUTHORITY AND AGENCY COMMENTS AND OUR EVALUATION

The authority acknowledged the existence of management weaknesses in its enforcement of warranties. It believed the need for continued rail operations required immediate maintenance instead of sending components to the manufacturer because of the uncertainty and time-consuming repair turnaround. It stated that as operating experience was gained, warranty management has improved. Specific actions to strengthen warranty administration was obtained in its response to us. (See app. I.)

In our view, the actions being taken by the authority should improve their warranty enforcement efforts, thereby reducing its operating expenses, assuring its entitlements are received, and protecting the significant Federal and local investments.

In responding to our draft report, the Department of Transportation stated that the Urban Mass Transportation Administration assessed the authority's operating equipment reliability problems. The Administration found that adequate monitoring and measurement systems for rail cars, train control, and escalator equipment do not exist. (See app. VI.)

APPENDIX I



WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
600 Fifth Street, N.W., Washington, D. C. 20001
(202) 637-1234

DEC 19 1978

metro

Mr. Henry Eschwege
Director
Community and Economic Development Division
United States General Accounting Office
441 G Street, N. W.
Washington, D. C. 20548

Re: GAO Draft Report, "Better Management of Metro Subway Equipment Warranties Needed"

Dear Mr. Eschwege:

The Authority has recognized that deficiencies in the management of warranties did exist. The need for continued rail operation required the performance of immediate maintenance, rather than shifting components back to the manufacturer with an uncertain and time-consuming delivery time. As operating experience was gained, warranty management progressed.

Significant changes to warranty management are being made in the forthcoming contract for car procurement and the recent automatic train control and communications contracts. The automatic fare collection contractor has extended the warranty for another year. The warranty aspects of the power contract have been successfully administered. Priority is being given to the establishment of a computerized maintenance data system to track reliability and performance of equipment. Clear lines of authority for enforcing warranty requirements have been established. Specifically, the following actions have been taken to improve warranty management:

- Experience gained on present rail car procurement on warranty management has been applied to forthcoming rail car procurement. Major modifications have been made to the warranty and reliability requirements for our next car procurement. The objective is to develop requirements that are "clear and consistent" and can be administered under day-to-day operation. Similar modifications will be considered for all future equipment contracts.

APPENDIX I

- In the automatic train control contracts, warranty requirements have been included and changes to the reliability provisions have been made in contracts since the initial contract.

- A major reassessment and analysis has been made of our automatic fare collection system. Actions have been taken with the contractor to improve the automatic fare collection reliability at no added cost to the Authority.

- Improved record-keeping systems now exists. A computerized maintenance data system is being developed.

- A formal reliability test program has been established for the automatic fare collection system, including an operational Reliability Review Board.

- Correction of deficiency clauses have been clarified, including the time at which warranty begins.

- Warranty handling procedures have been developed.

Steps in certain cases have been taken to recover warranty costs where deficiencies in product reliability exist. For example, on August 3, 1978, Rohr Industries, Inc. credited the Authority for $1,075,000 for items which were deficient or incomplete in the transit vehicles delivered.

Corrective action agreements have been made with the contractor where specific problems have arisen at no cost to WMATA. For example, on October 4, 1978, an agreement with the Vapor Corporation and Rohr Industries, Inc. was made for the door system relays to recalibrate all relays at no cost to WMATA on a specified time schedule, to provide a two-year warranty from date of installation, and to provide a fleet set of replacement relays if failure rate of three percent per year is exceeded during a six-month test period.

The general policy, criteria, and provisions of the Defense Acquisition Regulations have been followed in WMATA procurements. In certain instances, these regulations have been modified to reflect particular Authority requirements.

Extensive discussions have been held with your GAO representatives on the findings contained in the draft report and the WMATA improvement efforts. The report reflects those improvements. This extensive coordination process has been most helpful and beneficial.

Specific Authority comments and observations regarding the GAO Warranty Management Report are enclosed.

Sincerely,

Theodore C. Lutz

Enclosure
as stated

GAO note: Detailed comments in the enclosure have been considered and are not included in this report.

APPENDIX II

ROHR INDUSTRIES, INC.
Post Office Box 878
Chula Vista, California 92012
(714) 575-4111

November 13, 1978

Mr. J. H. Stolarow
Director, Procurement and
Systems Acquisition Division
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Stolarow:

This is in response to the invitation you extended by your letter of October 18, 1978, to comment on the draft report "Better Management of Metro Subway Equipment Warranties Needed" (the Report).

Our comments are based on the provisions of the contracts relating to the 300 rapid transit cars provided to the Authority[1]; and will be limited to three general areas of the Report. Pages shown in parenthesis refer to the Draft Report dated October 18, 1978.

Responsibility for Car Design

It is important to clarify the responsibilities and roles of Rohr, as contractor, and Louis T. Klauder and Associates, as the Authority's engineering consultant. Klauder's contract[2] specifically calls for the complete design of the cars by Klauder. A reading of Rohr's contract shows it was a supply contract and not a design contract. The statement (page 4) that the contractor was responsible for the design of the cars is therefore inconsistent with the express terms of these contracts.

---

1 See the Rohr Contract No. 2Z0061 for the furnishing of 300 rapid transit cars, and the Louis T. Klauder and Associates Contract No. 3Z8061 for preparation of a complete car design relating to those 300 vehicles. In addition, Klauder entered into four consecutive contracts, Nos. 1Z506A, -B, -C, and -D to render services as the Authority's engineering representative to monitor Rohr's supply contract.

2 Klauder Contract No. 3Z8061, Article I, and Appendix A, parts I, II, IV and V.

APPENDIX II

In light of these contract provisions, it is revealing to note that Klauder wrote or sanctioned the warranty and reliability clauses included in Rohr's contract. At the same time, Klauder was given the task of administering these same clauses as they relate to Rohr, which makes the objectivity of their warranty interpretations questionable.[3]

Certainly this creates a conflict for Klauder regarding interpretation of the specifications. Should they interpret the specifications as deficient or as having cost the Authority additional money, Klauder would be required to bear such costs by the terms of its design contract. An obvious alternative to Klauder bearing these costs is to shift responsibility to the contractor through contract interpretation.

The conflict noted above is not unique to the Authority's contract. I have attached an article from a recent edition of Government Executive. The article recites the devastating effect the consultant's role has had on the rail car equipment manufacturing industry. The consultant's unlimited control and lack of accountability is also reflected in your observations of the Authority's current problems.

Warranty Administration

Rohr agrees with your observations as to the Authority's lack of adequate monitoring procedures and its inability to accurately track warranty. It is the Authority's responsibility to maintain accurate time and accumulated mileage histories, and to establish a system to segregate components and materials bought directly from suppliers other than Rohr so that we can properly determine whether or not components remain under our warranty. This information has not been maintained by the Authority or presented to Rohr as part of warranty claims.

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[3] See Klauder Contracts 1Z506A, -B, -C and -D. Additional Klauder responsibilities are found in its contract at Article XI, Responsibility for Work. This Article makes Klauder responsible to the Authority for the accuracy of all designs, drawings, specifications and other work furnished; and further, provides Klauder shall remedy or correct any errors at no cost to the Authority.

APPENDIX II

The Report (page 6) states that most cars are repaired by the Authority as revenue service requirements prohibit taking the time to turn the cars over to the contractor. This relates to the "turnaround" considerations noted in the Report (pages i, 6, 11, 12 and 26).

Rohr's turnaround time on warranty repair, in most cases, has been better than that anticipated by the contract. Rohr's only responsibility was to perform warranty work under the contract terms. The warranty procedures set by the contract, if followed specifically, would make "quick" repairs very difficult. In spite of this, Rohr attempted to meet repair demands of the Authority by making concerted efforts to assist the Authority in continuing revenue service by providing new parts for those being serviced to reduce down time and by suggesting modifications to the various warranty provisions to provide a more realistic approach.

The Report (page 8) also refers to the contractor's proposed negotiation of changes to make the warranty procedures consistent with the need to operate more rail cars. It has always been, and remains, Rohr's firm opinion that a mutually agreeable change in the warranty procedures, as well as other aspects of its relationship with the Authority, is a desirable alternative to the current unsatisfactory situation.

The Authority's statement (page 11) that Rohr, in order to improve its cash position, utilized return components for rail cars to be delivered rather than providing quick turn-around of warranty work is not correct. In reality, Rohr was severely impacted in production as a result of shipping production parts to the Authority in an attempt to maintain the service schedule devised by the Authority. If anything, our cash position would have been better served by not attempting such "quick" repairs but rather enforcing the contract provisions to the letter.

Contract Reliability Program Is Not Possible

The reliability program contemplated by the Rohr contract is no longer possible. The criteria and "bench marks" for the reliability program established in the contract; i.e., speed rates, mileage, time, number and sequence of cars, etc., are no longer applicable or appropriate as the cars have been used by the Authority in over a million miles of revenue service.

APPENDIX II

General Comments

There are other particulars which your final review will no doubt modify. As an example, the reference (page 4) to a warranty against "inferior" material and workmanship is a confusion of concepts. The warranty clause requires the correction of deficiencies and does not set a standard to measure either "superior" or "inferior".

We hope these comments have been helpful to the G.A.O. review. We are encouraged by your efforts to effect an independent review of what has been a frustrating and costly burden on Rohr's performance under the warranty provisions of the contract.

We note you have evaluated numerous other aspects of the Authority's activities (page 3). We invite your attention to a related area - the Authority's failure to provide a workable forum for settling disputes under its contracts at the Contracting Officer level. Current Authority practice has required the resolution of these disputes to be transferred to the Corpos of Engineers Board of Contract Appeals at great expense to both the Contractor and the Authority.

Very truly yours,

Fred W. Garry
Chairman and Chief Executive Officer

Enclosure

GAO note: 1. Page references in this appendix refer to our draft report and may not correspond to the pages of this final report.

2. The enclosure is not included in this report.

APPENDIX III

SEAL
AND
CO., INC.

ELECTRICAL ENGINEERING AND CONTRACTING

1246 TAYLOR STREET N.W. • WASHINGTON, D.C. 20011 • (202) 882-4800

POWER
COMMUNICATIONS
ENERGY MANAGEMENT

December 1, 1978

Mr. J. H. Stolarow, Director
Procurement and Systems Arquisition Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Stolarow:

We have reviewed the draft report entitled "Better Management of Metro Subway Equipment Warranties Needed," which you forwarded to us by letter dated October 18, 1978. We have found several areas in the report where we feel that warranty of Metro communications equipment has not been presented accurately.

This letter addresses those areas generally without specific reference to heading, page and paragraph of the report. Our comments, which address only the communications equipment are as follows:

1. Combination of Train Control and Communications

In general, it appears that throughout the report train control equipment and communications equipment are treated as an entity. Since these separate equipments were procured from different contractors by separate contracts with differeing specifications, we recommend that they be clearly differentiated in the report.

2. Effectivity of Correction-of-Deficiencies Clause

The report states that the communications equipment contract does not specify when the correction-of-deficiencies clause is to be invoked.

WMATA Contract 1Z2021, which is not referred to explicitly, but which is the only communications equipment contract for the presently operational Metro system, has very specific provisions regarding the time period applicable to correction of deficiencies.

ESTABLISHED 1923

APPENDIX III

General Provisions 35(b)(2) states: "This clause shall apply only to those deficiencies discovered by either the Authority or the Contractor within one year after the start of revenue service, or a lesser time if indicated in the Special Conditions."

Special Conditions 49 states: "The full warranty of all equipment as covered in Article 35 of the General Provisons shall remain in effect for a period of two (2) years after acceptance of the equipment by the Authority."

These two provisions taken together signify two clocks running for correction of deficiencies. One clock, which may run for two years, starts when the Authority accepts the installation and becomes responsible for its care and custody. The second clock, which runs for only one year, starts at the time revenue service begins. The correction of deficiencies clause becomes inoperable when the second clock stops one year after initiation of revenue service. This is so because General Provisions 34 establishes that the General Provisions take precedence over the Special Conditions in the event of an inconsistency in the contract.

3. Expiration of Warranty Prior to Installation

The report states that in some cases the warranty coverage expired before the communications equipment was installed.

This statement is ambiguous. It is true to the extent that supplier warranties in some cases expired before equipment installation due to project delays, but in every case, the warranty provisions of theccontract cited in item 2 above binds the contractor to correct recognized deficiencies regardless of any other consideration.

In our view, inclusion in the report of a statement regarding expiration of supplier warranty prior to installation, is unwarranted and misleading.

4. Reliability

The report states that for communications equipment, the Authority did not maintain adequate records to show the extend of equipment failures so that the reliability provisions could be enforced.

APPENDIX III

The communications contract does not specify numerical values of reliability in mean-time-between-failure. There are no quantitative reliability provisions to be enforced.

The correction-of-deficiencies clause, however, is applicable to any deficiency determined to exist.

5. Definition of Deficiency

The report seems to imply that all failures, including random failures, should be correctable under the correction-of-deficiencies clause.

General Provisions 35(a)(i) states: "deficiency means any condition or characteristic in any supplies (which term shall include related technical data) or services furnished hereunder which is not in compliance with the requirements of this contract."

If a presumed deficiency exists, it exists in fact only where a specific requirement of the contract is violated. Some examination may be required to determine where a true deficiency exists, but in no way can every failure be classified a deficiency by the terms of the contract.

Should you care to review the preceding comments with us, please call Mr. H. B. Hoeper in our office.

Very truly yours,

Frank W. Seal,
President

FWS/pw

cc: H. B. Hoeper

APPENDIX IV

CUBIC
WESTERN DATA
A member of the Cubic Corporation family of companies.

5650 KEARNY MESA ROAD • POST OFFICE BOX 80787
SAN DIEGO, CA 92138

14 November 1978

Mr. J. H. Stolarow, Director
U. S. General Accounting Office
Procurement and Systems Acquisition Division
Washington, D. C. 20548

SUBJECT: Draft Report "Better Management of Metro Subway Equipment Warranties Needed"

Dear Mr. Stolarow:

Cubic Western Data appreciates the opportunity to review and comment on the subject report forwarded with your letter of 18 October 1978.

With respect to the recommendation that the Authority take action to evaluate the validity of the data, Cubic Western Data is prepared and totally willing to support any evaluation required.

Cubic has continually emphasized its dedication to providing a high quality and reliable product to the Authority. To this end we have and will continue to incorporate product improvement changes in the equipment. We have just recently provided a voluntary extension of the warranty period for one additional year.

If we can provide any additional assistance, please do not hesitate to contact me.

Sincerely,

Nelson C. Harnois
President

NCH:ss

TELEPHONE (714) 268-3100 CABLE ADDRESS: CUBIC TWX: (910) 335-1550

APPENDIX V

Westinghouse Electric Corporation
Transportation Division

Allegheny County Airport Site
2001 Lebanon Road
West Mifflin Pennsylvania 15122

November 16, 1978

United States Accounting Office
Procurement and Systems Acquisition Division
Washington, D.C. 20548

Attention: Mr. J. H. Stolarow, Director

Subject: GAO Draft Report on "Better Management of METRO Subway Equipment Warranties Needed"

Dear Mr. Stolarow:

Thank you for the opportunity to review the subject report.

Since this draft deals almost entirely with the internal practices of the Washington Metropolitan Area Transit Authority, we do not feel that we are in an appropriate position to comment in that area. However, as we know you are also aware, projects of this size and complexity frequently require a learning process between the contracting agency and their various key contractors. From our position on this program it is our view that this process has progressed very well and we will be happy to continue working with the Authority on any future improvements deemed appropriate.

In line with the notice on the face sheet, we are returning the five copies of the draft report that were enclosed with your letter to Mr. R. E. Kirby.

Sincerely,

R. J. Wigton
Transportation Division

hc

APPENDIX VI

OFFICE OF THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

ASSISTANT SECRETARY
FOR ADMINISTRATION

January 16, 1979

Mr. Henry Eschwege
Director
Community and Economic
Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

In response to your letter of October 18, 1978, this is the Department of Transportation's reply to the General Accounting Office (GAO) draft report, "Better Management of Metro Subway Equipment Warranties Needed."

The Urban Mass Transportation Administration (UMTA) has met with the Washington Metropolitan Area Transit Authority (WMATA) officials regarding the Draft GAO Report. WMATA will formally address the report and effect solutions to problem areas. Additionally, UMTA has recently finished a technical assessment of the Metrorail operating equipment reliability problems. UMTA has generally found that adequate reliability monitoring and measuring systems for the rail cars, train control, and escalator equipment do not exist. A small pilot project grant is planned to look at automation of rail car reliability and maintenance information.

If we can assist you further, please let us know.

Sincerely,

Edward W. Scott, Jr.

APPENDIX VI

DEPARTMENT OF TRANSPORTATION REPLY

TO

GAO DRAFT OF A PROPOSED REPORT OF OCTOBER 1978

BETTER MANAGEMENT OF METRO

ON

SUBWAY EQUIPMENT WARRANTIES NEEDED

SUMMARY OF GAO FINDINGS AND RECOMMENDATIONS

GAO has stated that the Washington Metropolitan Area Transit Authority (WMATA), in building and operating the Washington Regional Rapid Rail Transit System (Metrorail), has not efficiently administered and taken full advantage of warranty and reliability clauses in various equipment contracts. This is due primarily to contract provisions that may be difficult to enforce in an operational environment which requires quick repairs to keep sufficient trains running, a lack of a clear and consistent interpretation of contract provisions, and unclear lines of authority and responsibility for enforcing the provisions.

GAO recommends that WMATA investigate the feasibility of bill back agreements when operating conditions require quick in-house repairs, establish clear and consistent interpretations of warranty clauses, and establish clear lines of authority within WMATA for enforcing warranty provisions.

For equipment already purchased, GAO recommends that WMATA maintain records for determining whether reliability thresholds are met so that required contractor corrections of excessive failures or design deficiencies can be made, and initiate the reliability programs contained in the contracts.

Additionally, for the rail car equipment, it is recommended that the Authority determine repair responsibility, notify the contractor of failures covered by warranty, and assure that all failed warranty

APPENDIX VI

items are repaired by the contractor within specified time periods. Furthermore, the Authority should seek compensation from the contractor for warranty repairs made in-house.

GAO also recommends that criteria be specified for starting corrective action on excessive failures for the automatic train control and communications equipment.

Finally, WMATA should adequately assess the validity of the data used in computing reliability for the automatic fare collection system and on a test basis review equipment failures reported by station attendants to assure all applicable maintenance reports are considered.

SUMMARY OF DEPARTMENT OF TRANSPORTATION POSITION

The Urban Mass Transportation Administration (UMTA) has met with WMATA officials regarding the Draft GAO Report. WMATA will formally address the report and effect solutions to problem areas.

Additionally, UMTA has recently finished a technical assessment of the Metrorail operating equipment reliability problems. UMTA has generally found that adequate reliability monitoring and measuring systems for the rail cars, train control, and escalator equipment do not exist. A small pilot project grant is planned to look at automation of rail car reliability and maintenance information.

POSITION STATEMENT

UMTA is interested in WMATA's management of subway equipment warranties program because warranty costs are included in subway equipment purchases eligible as Capital Grants administered by UMTA. Efficient warranty programs also insure an efficient utilization of grant funds. UMTA has met and corresponded with WMATA officials regarding the Draft GAO Report. WMATA will formally address the report in detail and effect necessary solutions.

Additionally, UMTA has recently finished a technical assessment of the WMATA warranties system with emphasis on operating equipment and attendant reliability problems. The study group did not address questions of a contractual nature, but cited several technical problem areas.

APPENDIX VI

To the extent that UMTA is aware of the problem areas outlined, the following addresses the major issues and recommendations made by GAO:

Rail Car

WMATA maintenance personnel presently prepare Vehicle Service Reports (VSR) on each rail car scheduled for maintenance. These reports identify maintenance and repair problem areas and document scheduled maintenance and needed repair items. Due to the large number of reports (about 120 per week) and inadequate staffing, a consultant, hired by WMATA, reviews a selected number of the VSR's to determine repair responsibility. A computer system is presently being planned to enable detailed review of each VSR and resultant determination by WMATA of repair responsibility of every repair action.

All Future contract warranty clauses will specify contractor responsibility for parts only, excluding labor. Labor for warranty repair will be done by WMATA, thus eliminating prolonged disputes over repair and repair cost responsibilities. Additionally, since contractor warranty costs are expected to decrease under this procedure, lower relative bid prices can result.

WMATA is also initiating an in-house inventory stock and control system for all parts. By stocking and controlling all equipment parts and performing repair work in-house, WMATA thus will have complete control over the repair cycle. This should generate faster equipment repair and thus alleviate the major cause for WMATA's past reluctance to aggressively enforce its warranty repair provisions.

Automatic Train Control and Communications Equipment

WMATA has indicated that it has a system, similar to the VSR system, which identifies maintenance and repair problems for the automatic train control and communications equipment and documents scheduled maintenance and needed repair items.

Present WMATA equipment procurement contracts provide protection against deficiencies in equipment design and excessive failures due to poor material or workmanship. There is no protection against random failures.

Automatic Fare Collection System

WMATA has indicated that they do not have an adequate staff to completely review the contractor managed reliability measure-

APPENDIX VI

ment program. Additionally, since the fare collection system configuration is not yet complete, implementation of a thorough review system is difficult. WMATA is, however, independently reviewing selected system failures and analyzing problem areas. Additionally, the authority has plans to solicit an independent contractor to perform an overall equipment system analysis with a goal of obtaining a 95 percent reliability rate.

Since all new equipment procurement contracts have warranty clauses which assign responsibility for parts to the contractor and responsibility for inventory control and repair to WMATA, better data accumulation of failures will be possible.

A reliability review board established by WMATA has met numerous times and has substantially completed its review and analysis of the reliability measurements program. A final report is expected in January 1979.

Bill-Back Agreements

As already indicated on all equipment procurement contracts now containing warranty clauses covering parts only, bill-back agreements for repair by the Authority are no longer considered necessary by WMATA.

Interpretations of Warranty Clauses

WMATA staff has rewritten the warranty and correction of deficiency clauses for the new rail cars to clearly state the limit of responsibility and coverage.

Unclear Lines of Authority and Responsibility

WMATA readily admits that there were unclear lines of authority and responsibility in the past, resulting in lack of coordination and cooperation within the Authority. As the GAO report indicates and as a result of a task force report in November 1977, the Authority has developed a strict warranty handling procedure. Tight inventory control is possible under the new parts-only warranty provisions. A computerized management information system is being planned that will report each warranty incident and each action taken.

Reliability Programs

UMTA has recently finished a technical assessment of the operating equipment reliability problems. The assessment included rail cars, train control, fare collection, and escalator equipment.

APPENDIX VI

The primary finding of the assessment on rail cars indicates that an adequate reliability monitoring and measurement program does not exist. As a result, reliability terms cannot be effectively enforced. Additionally, data-taking is done manually, which is cumbersome, costly, and inefficient. UMTA, therefore, plans a small pilot project grant to look at automation of transit vehicle reliability and maintenance information.

UMTA did not find as many reliability problems on the train control and communications equipment (ATC) as on the rail car, but concludes that the lack of an automated reliability gathering system has hampered improvements to the ATC equipment system.

Regarding the automatic fare collection equipment, UMTA findings agree very closely with the GAO report. Meetings between the Authority and UMTA have been held to establish a plan in aiding the Authority to solve problems with the equipment. The lack of a centralized data system, however, will make data gathering laborious and time-consuming, thus delaying the start of any corrective actions.

The lack of good data on the escalator system prevents any absolute or comparative judgments by UMTA, other than developing a position that improvement is needed.

(951419)

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