

M E M O R A N D U M

Final AUDIT REPORT

Internal Operations No.11- 002



SUBJECT: Review of Office of Bus Maintenance Inspection Program **DATE:** June 3, 2011

FROM: IG/OIG – Helen Lew /s/

TO: AGM/BUSV - Jack Requa

This Final Audit Report entitled, *Review of Office of Bus Maintenance Inspection Program*, presents the results of our audit. The objective of the audit was to determine whether adequate internal controls are in place for the bus maintenance inspection program to ensure the safety and reliability of bus revenue vehicles.

BACKGROUND

The mission of the Department of Bus Services (BUSV), Office of Bus Maintenance (BMNT) is to provide safe, clean, and reliable bus revenue vehicles for the public. BMNT is responsible for oversight and quality controls to ensure full adherence to Standard Operating Procedures (SOPs) that include regularly scheduled bus inspections.

All active buses within the WMATA bus fleet are scheduled to have four major types of preventive maintenance to ensure optimum fleet performance. The four types are "A-Level" Preventive Maintenance Service (PM-A); "B-Level" Preventive Maintenance Service (PM-B); Accessibility Equipment Preventive Maintenance Service; and Heating, Ventilation, and Air Conditioning Service Procedures (HVAC).

PM-A inspections include comprehensive vehicle preventive maintenance inspections (PMIs) and maintenance activities. PM-A inspection items include but are not limited to brakes, transmission, electronic farebox, and exhaust system. The PM-A inspection goal is to inspect buses every 6,000 miles, with a 600-mile grace period.

PM-B inspections include performing safety checks and reviewing the interior and exterior condition of the bus. The PM-B inspection goal is to inspect buses every 14 days, with a three-day grace period.

Accessibility Equipment Preventive Maintenance Service inspections include a review of American Disability Act (ADA) equipment, such as the wheelchair lift, every 42 days, with a three-day grace period. The wheelchair ramp-equipped buses are inspected every 90 days.

HVAC inspections include a review of bus heating, ventilation, and air conditioning systems. These inspections are scheduled every 90 days, with a 10-day grace period.

The BUSV SOP 1.1 states that all preventive and corrective maintenance procedures shall be performed by appropriately trained BMNT or contract personnel at each bus division.

BMNT has a Weekly Performance Indicator Report that management uses to determine the effectiveness of the PMI's and to provide oversight and monitoring of the program. Some components used in that analysis include the following:

- mean¹ distance between failures,
- mean distance between service interruptions,

¹ Mean is the average range of values or quantities.

- bus availability, and
- road calls.

BMNT has a goal of 85 percent compliance with the preventive maintenance inspection program.

BMNT uses Maximo, a computerized asset maintenance system that provides asset management, work management, materials management, and purchasing capabilities, to help maximize productivity and extend the life of revenue-generating assets. BMNT also uses Maximo to track work orders and schedule preventive maintenance.

During the execution of PMI's, some defects are repaired immediately during the inspection; other defects found that do not impact the safe operation of the bus while in revenue service are deferred or scheduled for a later repair.

WMATA reportedly has a total of 1,468 buses in its fleet as of February 24, 2011. Maintenance costs during calendar year 2010 were \$142,550,193.

The Office of Quality Assurance (QUAL) has responsibility for monitoring the BMNT inspection program to ensure safe and reliable bus vehicles to the public. QUAL conducts inspections to determine if preventive maintenance inspections are performed in accordance with SOPs.

AUDIT RESULTS

We generally found that internal controls were adequate for the bus maintenance inspection program to ensure the safety and reliability of bus revenue vehicles. We found that 1,166 or 85 percent of the total/overall

inspections we reviewed conformed to the BMNT inspection goal. Although the overall inspection goal of 85 percent was met, two types of inspections in our sample, ADA and PM-B, did not always conform to the BMNT goal. On-time inspections for ADA equipment at the Northern Division met the goal 79 percent of the time, while the remaining three divisions in our sample attained the 85 percent goal. On-time inspections for PM-B at the four divisions met the goal between 74 percent and 83 percent of the time (see Appendix I).

According to the BMNT Core Performance Measures and Targets Report, BMNT's actual statistics for all divisions showed they inspected buses within the prescribed collective time interval 96 percent of the time. However, BMNT did not maintain individual statistics for each inspection type performed at the divisions.

Although adequate internal controls were generally in place, we found policies and procedures were not always followed, specifically:

1. preventive maintenance service records were not always properly completed, and
2. completed work orders were not always closed in Maximo.

During our review, we also identified an issue concerning the availability of parts for the PMI Service Program. This issue is discussed in the "Other Matters of Concern" section of this report.

In the response from the Assistant General Manager/Bus Services (AGM-BUSV) dated May 26, 2011, to a draft of this report, he indicated general concurrence/agreement with our findings and recommendations. The complete text of the AGM/BUSV's response is included as Appendix II of this report.

Finding 1. Preventive Maintenance Service Records Were Not Always Properly Completed.

We reviewed 1,379 inspection records and found 135 records, or 10 percent, where the signature certifications were missing on the manual work order forms. Mechanics, lead persons or designees, and/or management were not always signing the work orders or inspection checklists certifying that repair work was completed. We also noted that some of the work order forms did not include the vehicle mileage.

The Government Accountability Office (GAO) *Standards for Internal Control in the Federal Government* state that transactions should be promptly recorded to maintain their relevance and value to management in controlling operations and making decisions. This applies to the entire process or life cycle of a transaction or event from initiation and authorization through its final classification in summary records.

SOP 1.1 Preventive/Corrective Maintenance Program states supervisors must sign the documentation indicating that they have reviewed the reporting forms, and based on this review, authorize the bus to be placed into revenue service or taken out of service.

SOP 1.2 "A-Level" Preventive Maintenance Service (PM-A) states that garage/shop supervisors and lead persons must review and certify both the performance and accuracy of any maintenance actions performed. Each completed and signed service documentation package will include:

- a) completed and signed line card,
- b) all completed and signed defect sheets,
- c) copy of completed work order with completed miles recorded (vehicle mileage), and

- d) copy of completed Work Order Details Report with all issued material listed.

SOP 1.3 "B-Level" Preventive Maintenance Service (PM-B) states that the mechanic performing the service should sign the service worksheet indicating they have completed the entire service and have properly noted all identified discrepancies. The SOP also states that the supervisor shall initial the appropriate action for each defect listed.

According to division superintendents we interviewed, the mechanic or supervisor involved did not always follow procedures. They also stated that the divisions have a lot of work to accomplish during the work day, and sometimes procedures are inadvertently not completely followed. One division superintendent said they are always putting out "fires," there are usually approximately 50-70 vacancies in the divisions, and they need additional personnel to complete the paper work.

Superintendents further stated there are several pages in the PMI inspection records that required signatures. Sometimes the responsible mechanic or supervisor overlooked their signature pages because they assumed the respective mechanic or supervisor responsible had certified that the inspection was conducted.

Superintendents also stated that the supervisors know which buses are being inspected and when the inspection is completed. Supervisors might not always complete the paper work needed to indicate the inspections were conducted; however, they said they are confident that the work was conducted and completed.

The failure to certify that the work was completed on the documentation results in lack of assurance of both the performance and accuracy of

maintenance work performed. It also leaves an incomplete audit trail during any monitoring or verification process.

Recommendation

We recommend that the AGM – BUSV:

1. Strengthen internal controls to ensure work orders and inspection documents are signed to certify work was completed in accordance with BMNT SOPs.

Finding 2. Completed Work Orders Were Not Always Closed in Maximo.

We reviewed the status of 77 work orders for corrective maintenance repairs and found that 58 or 75 percent were appropriately closed; however, the remaining work orders were not closed in Maximo at the time of our review even though the work orders were completed.

According to the MAXIMO User's Guide,² the status of a work order completed or not completed is captured in the MAXIMO system. Completed work orders are subject to review and approval by a supervisor prior to their closing in MAXIMO by the superintendent or his/her designee.

SOP 1.2 "A-Level" Preventive Maintenance Service (PM-A) states that all required corrective maintenance must be documented in Maximo when completed.

² Tivoli, IBM Maximo, User's Guide, Release 6.2.1, dated January 2007

Management could not provide us with a definitive explanation for why all the work orders in our sample had not been closed. One superintendent stated that when Maximo is down, they try to keep manual records, but they may not always update the information in Maximo. Management further stated that it is difficult to track what information goes in Maximo.

Another superintendent stated that inspection records should not be closed out in Maximo when buses need corrective repairs or when they undergo rehabilitation. When buses are in this status, they cannot close out the work order in Maximo. Sometimes when buses are returned to service, the divisions do not get notification, which would allow maintenance personnel to go back into Maximo and close out the work order.

Failure to document and close work orders appropriately in Maximo after the repairs are completed could result in BMNT putting revenue buses in service without the proper documentation that the work order was completed, reviewed, and approved, as well as provide evidence that the bus is safe and reliable. Also, the system will not accurately track when the next preventive maintenance inspection should occur.

The Office of Inspector General (OIG) issued a report, titled *Review of WMATA's Maximo Work Orders Module* on March 28, 2011, (IT 11-002) and found that Maximo did not have adequate controls in place to prevent and detect completed work orders that were not closed.

Because this finding is similar to a finding in our Maximo report, we believe that the recommendation made in connection with the Maximo report is applicable here. In that report, we recommended that the Deputy General Manager Administration/Chief Financial Officer (DMGR-CFO) in conjunction with the Deputy General Manager Operations (DGMRO) and the AGM - BUSV "develop a formal quality assurance plan, policy and/or procedure to

ensure that all business units review, approve, and close Maximo work orders within a specified time period after the work is completed. The plan should clearly delineate each level of responsibility for reviewing, approving and closing of work orders.” We will monitor management’s action to address this finding until it is corrected.

Recommendation

We recommend that the AGM – BUSV:

2. Ensure that work orders for corrective maintenance are completed and documented in Maximo in accordance with BMNT SOPs.

OTHER MATTERS OF CONCERN

Concern Over Insufficient Parts in Storerooms for Preventive Maintenance

During our audit, we noted a lack of bus parts needed for PMI repairs. The parts needed were not readily available from the main warehouse storerooms (Storerooms 100, 110, and 400). For example, on December 10, 2010, 12 different parts used for PMI repairs were out of stock in the main warehouse storerooms. These parts consisted of oil filters, oil pan gaskets, and crankcase breathers.

The WMATA Procurement Procedures Manual Supplement Simplified Acquisition Handbook states that inventory should have no more than a 5 percent Stock Out Rate (SOR).

BMNT calculates its SOR by comparing available parts in the WMATA inventory (Storerooms 100, 110, and 400) to stock not in the inventory. The SOR was 3 percent in December 2009, and 11 percent in December 2010.

The SOR increased because PRMT relinquished its responsibility as inventory planners. Inventory planners were shifted to BMNT, and according to the BMNT General Superintendent, they were not provided written guidance for their new responsibilities or policies and procedures that would allow BMNT to communicate their parts and materials needs to PRMT. Because the SOR increased, purchase cards were used to obtain parts. Using purchase cards, however, affects the calculation of the reorder point because the demand for parts is not captured in Maximo. As a result, demand for parts purchased with a purchase card is understated. Also, using a purchase card could result in higher costs to obtain parts.

PRMT, in recognition of the parts availability concerns, is in the process of establishing long-term contracts with suppliers to fill anticipated needs for parts and materials. BMNT acknowledged that PRMT has started establishing long-term contracts to address the parts availability concerns.

Recommendation

We recommend that the AGM – BUSV, in conjunction with the Deputy General Manager/Chief Financial Officer:

3. Develop a written process to communicate and coordinate the purchase of parts by BMNT and PRMT in order for parts to be readily available in storerooms for PMI services.

OBJECTIVE, SCOPE AND METHODOLOGY

The objective of the audit was to determine whether adequate internal controls are in place for the bus maintenance inspection program to ensure the safety and reliability of bus revenue vehicles.

The survey was conducted between September 2010 and February 2011 with emphasis on identifying weaknesses and strengths of internal controls during the said time period. The scope of the work included the testing of internal controls that included verification that PMIs were actually performed, documents were properly completed, supervisory reviews were conducted, Maximo records were closed out properly, and monitoring of the availability of PMI parts was performed.

A risk assessment was conducted to determine what risks existed, the significance of those risks, likelihood of their occurrence, and possible impact on WMATA. We reviewed inspection records that were completed between January 2010 and October 2010 for 60 buses located at four bus divisions. We reviewed records to determine if the PMIs were conducted at specified intervals to assure buses were being properly maintained, reviewed records to determine if documents were completed by the mechanics, and reviewed documents to identify fraud and assessed the impact of parts not being readily available in stock for PMIs for safe and reliable bus service.

Four bus divisions were selected for review during the survey phase: Bladensburg, Landover, Northern, and Western. These divisions were chosen because collectively they had all of the bus types in the WMATA bus fleet, and they represented the various sizes of the bus divisions.

We selected 60 buses for our sample. The sample size chosen represents the suggested minimum sample size in accordance with the American Institute of Certified Public Accountants Single Audit Sampling Guidance. The 60 buses chosen for our sample included the various bus models in the BUSV bus fleet. To select the buses chosen in our sample, we randomly chose one bus and then every tenth bus from the divisions' list of assigned buses. If the inspection records for the buses initially selected were unavailable for our review, we made a subsequent selection by randomly pointing to a list of buses at the respective division.

We reviewed 1,379 inspection records associated with the 60 buses in our sample. We also reviewed inspection data that were completed by QUAL for buses that were included in our sample, as well as buses that were not selected in our sample. We reviewed inspection records that were completed by BMNT and QUAL between January and October 2010.

We interviewed the BMNT General Superintendent, Bus Division Superintendents and Managers at the four selected divisions, the General Superintendent in the Office of Bus Transportation, the Director and staff in QUAL, and personnel in PRMT. We also attended preventive maintenance training for BMNT supervisors. The training emphasized team building, how to manage people, leadership and preventive/corrective maintenance. We held an exit conference on March 29, 2011, with management personnel from BUSV, and PRMT to discuss the findings and recommendations.

We conducted our audit in accordance with *Government Auditing Standards*, appropriate to our scope. Those standards require that we plan and perform the audit to afford a reasonable basis for our judgments and conclusions regarding the organization, program, activity or function under audit. An audit also includes assessments of applicable internal controls and compliance requirements of laws and regulations when necessary to

satisfy our audit objectives. We believe that our audit provides a reasonable basis for our conclusion.

ADMINISTRATIVE MATTERS

Corrective actions proposed (resolution phase) and implemented (closure phase) by the affected Departments/Offices will be monitored and tracked through the Office of Inspector General's Audit Accountability and Resolution Tracking System. Department policy requires that you develop a final corrective action plan (CAP) for our review in the automated system within 30 days of the issuance of this report. The CAP should set forth the specific action items and targeted completion dates necessary to implement final corrective actions on the findings and recommendations contained in this report.

We appreciate the cooperation and assistance extended by your staff during the audit. Should you or your staff have any questions, please contact Andrew Clemmons, Assistant Inspector General for Audits on (202) 962-1014, or me on (202) 962-2515.

Helen Lew
Inspector General

Attachment

cc:	DGMA-CFO	Carol Kissal
	COUN	Carol A. O'Keeffe
	CHOS	Shiva K. Pant

APPENDIX I

Major BMNT Preventive Maintenance Inspections (PMI) Results by Bus Division

Inspection	BLAD	LAND	NORTH	WEST
PM-A	100%	100%	93%	98%
PM-B	81%	79%	74%	83%
ADA	85%	94%	79%	87%
HVAC	90%	86%	97%	91%
Average	89%	90%	86%	90%
Source:	OIG Test Sample			



APPENDIX II

M E M O R A N D U M

~ REVISED ~



SUBJECT: Review-Office of Bus Maintenance
Inspection Program
Internal Operations No. 11-002

DATE: May 26, 2011

FROM: BUS/AGM – Jack Requa

A handwritten signature in black ink, appearing to read 'Jack Requa', written over the 'FROM' line.

TO: OIG/IG – Helen Lew

The following is our response to the recommendations in the Draft Audit Report, Internal Operations No. 11-002 Review of Office of Bus Maintenance Inspection Program.

1. Recommendation – Strengthen internal controls to ensure work orders and inspection documents are signed to certify work was completed in accordance with BMNT's Standard Operating Procedure.

Response – Bus Services concurs with the recommendation.

BMNT is in the process of reviewing all pertinent Standard Operating Procedures (SOPs) and the requirements that are outlined in the SOPs. BMNT will modify the SOPs by eliminating the need for signature certifications and the recordation of mileage on the manual work order documents. The SOPs will be revised to accept the official "electronic signature" in Maximo enabling BMNT to track the employee who verifies each step of the preventive maintenance process through closure of the work order. Additionally, since Maximo tracks vehicle mileage, the SOPs will be revised to utilize the vehicle mileage indicated in Maximo rather than recording the completed miles manually on the completed work order.

BMNT remains committed to accountability and by fully utilizing the automated system, unnecessary steps can be eliminated thereby reducing confusion and ensuring compliance with published procedures. The aforementioned SOP revisions will be made no later than July 1, 2011.

2. Recommendation - Ensure that work orders for corrective maintenance are completed and documented in Maximo in accordance with BMNT's SOPs.

Response – Bus Services concurs with the recommendation.

BMNT has developed a Work Order Count Summary Report which Division Management reviews on a monthly basis to monitor the number of work orders which have been open in excess of 30 days.

These work orders are researched to determine the reason for non-completion. If completion of a work order is delayed due to non-availability of parts, the BMNT Materials group is notified to take appropriate action to obtain the necessary part(s). If non-completion is due to labor issues, the matter is referred to the Assistant General Superintendent, Maintenance Operations for resolution. This report has assisted BMNT in better managing revised SOP 1.17 – Management of Deferred Maintenance.

Written Business Processes have also been developed that define the roles and responsibilities and required data elements for the preventive and corrective maintenance process.

These reports and business processes have provided BMNT with a vastly improved review and oversight process ensuring timely completion and documentation of corrective maintenance work orders in Maximo.

Finally, as outlined in the Final Audit Report, Review of WMATA Maximo Work Orders Module, Information Technology No. 11-002, the upcoming Gap Analysis will highlight the current state of business processes and recommend necessary improvements to an Executive Steering Committee which includes the DGMO, DGMA and the Assistant General Manager of Bus Services. The Gap Analysis will further assist in providing future improvements related to work order processes.

3. *Recommendation - Develop a written process to communicate and coordinate the purchase of parts by BMNT and PRMT in order for parts to be readily available in storerooms for PMI services.*

Response – Bus Services concurs with the recommendation.

BMNT has followed the Metro Maintenance and Materials Policy and Procedure Manual (June 2008) and the Simplified Acquisition Procedures (Revised April 2009) as guidelines of how to communicate part needs to PRMT using the existing Maximo and Peoplesoft systems. We will work with PRMT to see that these manuals and related systems are up to date and include additional methods for communication of part needs for Preventative Maintenance Inspections to PRMT in accordance with the Audit Report Internal Operations No. 11-002.

cc: DGMA/CFO – C. Kissal
BMNT – P. Wallace

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