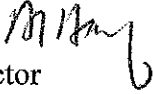


March 6, 2008

TO: Chairman Jones and Commissioners

FROM: Alfred H. Harf   
Executive Director

RE: February 2008 Fleet Maintenance Audit

At the November 2007 Commission meeting, the Board was informed that the first of what are now tri-annual fleet maintenance audits had been conducted in October; it was the first such audit performed under First Transit's new maintenance management team, which had just been installed the prior month. Given the short time they were given to begin showing improvements, we were pleased to report that "critical" safety defects had fallen from 0.57 per bus in May 2007 to 0.46 in October. Overall fleet condition, however, had actually worsened, increasing from 3.7 defects per bus in May to 8.2 defects per bus in October; this was not a surprise since staff expected the new team to focus first on the most critical problems. Staff anticipated further and more significant improvements would be evident in the next tri-annual audit.

PRTC's maintenance audit firm, Transit Resource Center (TRC), performed the second tri-annual audit during the week of February 4-8. Staff is delighted to report that "critical" safety defects fell again from 0.57 per bus in October to 0.23 per bus this audit. Overall average defects per bus also fell dramatically from 8.23 in October to 5.09 in February and, all defect categories, save one, decreased or remained constant – nearly half the categories experienced *significant* decreases.

Other highlights of the audit include:

- When cosmetic (interior and exterior related) defects are removed from the totals, more mechanically significant defects total 4.6 defects per bus for this audit compared to 7.2 in October, a 38% reduction.
- PMI records examined were well organized and easy to locate.
- Required annual refresher training now fully complies with PRTC's requirements.
- PRTC's requirement that at least 30 percent of the maintenance staff (five technicians) be ASE Master Certified has improved since the last audit, but remains one technician short of full compliance.

Chairman Jones and Commissioners

March 6, 2008

Page 2

- PRTC's requirement that all technicians meet ASE certification and work experience requirements (18 technicians) has also improved since the last audit, but remains two technicians short of full compliance.
- Bus interiors and exteriors are kept clean. Interior defects decreased significantly from a total of 23 defects in October 2007 to only eight for this audit; exterior defects decreased from 12 to 10.
- First Transit management continues to be cooperative with regard to providing the buses and workspace needed for carrying out inspections.
- First Transit management continues to show a willingness to minimize defects by immediately repairing the majority of "A" related defects as soon as they were identified by TRC, and drawing up work orders for the others.
- First Transit continues placing more of its historical maintenance data into a computerized management information system (MIS), which will help them better manage their maintenance operation.
- Use of First Transit's new Risk Assessment Card was evident. This card allows technicians to note if they have been properly trained for the task at hand and have the necessary resources.
- The review of PMI records revealed that First Transit has a process to follow-up on those defects identified by mechanics during PM inspections and is being followed except in one case.
- The fluid samples tested showed no signs of neglected maintenance.
- The portion of the oil analysis program that provides early warning of potential impending failures has greatly improved since the last audit. Steps are now taken to review this information online on a more regular basis.

Staff is heartened by the tremendous strides evidenced in this most recent audit and is grateful to the new maintenance management team, Messrs. Todd Johnson and Jerry Vincent, for the tireless effort they have put forth these last months. and the dedication they have shown and are sure they will continue to show to maintaining PRTC's fleet in top condition.

TRC's full audit report is attached for your perusal.

Attachment: As stated

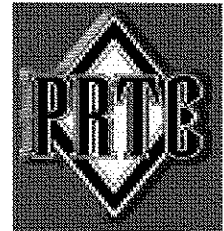


TRANSIT RESOURCE CENTER

Presents:

# Fleet Maintenance Audit Report—February 2008

Presented to:



## Potomac & Rappahannock Transportation Commission

14700 Potomac Mills Road  
Woodbridge, VA 22192

**February 25, 2008**

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# Potomac and Rappahannock Transportation Commission (PRTC)

## VEHICLE MAINTENANCE AUDIT Conducted February 4-8, 2008

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## POTOMAC AND RAPPAHANNOCK TRANSPORTATION COMMISSION

### VEHICLE MAINTENANCE AUDIT Conducted February 4-8, 2008

#### SUMMARY

This eighth maintenance audit of First Transit conducted by Transit Resource Center (TRC) for the Potomac and Rappahannock Transportation Commission (PRTC) showed a marked improvement over the previous audit conducted four months earlier in October 2007. At that time a new maintenance management team was put in place by First Transit. Like the previous one, this audit conducted February 4-8, 2008, consisted of a Fleet Inspection of 35 buses, a road test of nine buses, and a Records and Fluid Analysis of nine buses selected at random.

This most recent audit showed an average of 5.1 defects per bus, significantly lower (38%) than the 8.2 defects per bus found in October 2007, and approaching the number of 3.7 and 3.8 defects found back in May 2007 and June 2006 respectively. On-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000 mile intervals was again perfect at 100% for the fifth consecutive audit.

The summary table below compares the average defects per bus and adherence to PMI intervals, two critical performance indicators, for the past six audits.

	July '04	June '05	June '06	May '07	Oct. '07	Feb. '08
<b>Average # of Defects per Bus</b>	4.3	1.8	3.8	3.7	8.2	5.1
<b>PMI Adherence</b>	80%	100%	100%	100%	100%	100%

Other aspects of the audit revealed:

- When cosmetic (interior and exterior related) defects are removed from the totals, more mechanically significant defects total 4.6 defects per bus for this audit compared to 7.2 in October, a 38% reduction.
- PMI records examined were well organized and easy to locate.
- All refrigerant-related air conditioning (AC) repairs examined were performed by qualified personnel.
- Required annual refresher training now fully complies with PRTC's requirements.
- PRTC's requirement that at least 30 percent of the maintenance staff (five technicians) be ASE Master Certified has improved since the last audit, but remains one technician short of full compliance.
- PRTC's requirement that all technicians meet ASE certification and work experience requirements (18 technicians) has also improved since the last audit, but remains two technicians short of full compliance.
- Bus interiors and exteriors are kept clean. Interior defects decreased significantly from a total of 23 defects in October 2007 to only eight for this audit; exterior defects decreased from 12 to 10.

- Bus exteriors were not as clean as the previous audit, but this was most likely due to the rainy weather where First Transit suspends daily washing (particular attention will be paid to exterior cleanliness during the next audit).
- First Transit management continues to be cooperative with regard to providing the buses and workspace needed for carrying out inspections.
- First Transit management continues to show a willingness to minimize defects by immediately repairing the majority of "A" related defects as soon as they were identified by TRC, and drawing up work orders for the others.
- First Transit continues placing more of its historical maintenance data into a computerized management information system (MIS), which will help them better manage their maintenance operation.
- Use of First Transit's new Risk Assessment Card was evident. This card allows technicians to note if they have been properly trained for the task at hand and have the necessary resources.
- The review of PMI records revealed that First Transit has a process to follow-up on those defects identified by mechanics during PM inspections and is being followed except in one case.
- The fluid samples tested showed no signs of neglected maintenance.
- The portion of the oil analysis program that provides early warning of potential impending failures has greatly improved since the last audit. Steps are now taken to review this information online on a more regular basis.
- Road test defects increased from seven to nine; "A" defects, however, decreased from three to two when compared to the last road test audit.
- Shop work areas appeared to be more cluttered and dirtier since the last audit and would benefit from periodic cleaning. This is especially the case in the men's room where one technician on a Risk Assessment Card asked that mold be killed there.

The number of "A" defects found during this audit was also reduced significantly from an average of 1.6 per bus in October, to 0.7 per bus for this audit (there were a total 23 "A" defects for this audit compared to 55 for the previous audit). "A" defects for the purposes of these audits are more critical in that once identified during a scheduled PMI, PRTC requires that they be repaired before the bus can be released for revenue service, as opposed to other defects that can be scheduled for repair at a later time.

First Transit contested three of the 23 "A" defects identified by TRC during the static inspection, and did not contest the single "A" defect identified during the road test inspection. The list of contested defects including TRC's response to each is included as Appendix C. "A" category defects were reported to First Transit shortly after being identified. The table below summarizes the average number of "A" defects found per bus since July 2004.

	<b>July '04</b>	<b>June '05</b>	<b>June '06</b>	<b>May '07</b>	<b>October '07</b>	<b>February '08</b>
<b>Average "A" defects per Bus</b>	0.3	0.02	0.2	0.9	1.6	0.7

TRC also conducted a road test on nine buses selected at random and found a total of eight defects on five of those buses. This compares to a total of seven defects found on five buses during the last audit. Of the nine road test defects found during this most recent audit, only one was an "A" defect compared to three for the last audit. None of the defects identified during the road tests are included with the static inspection defect summaries to maintain consistency with previous audits.

Audit findings are summarized in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included on a separate CD as Appendix A. Appendix B consists of the "A" defect list; Appendix C lists all of the defects contested by First Transit, the reason why the defects are being contested, and TRC's response to each.

**BACKGROUND**

This is the eighth maintenance audit of First Transit conducted by TRC; the second under a new contract between PRTC and TRC, and the second under new maintenance management for First Transit. Audits are conducted periodically in a consistent manner to determine the contractor's maintenance performance over time.

**BUSES INSPECTED**

PRTC used a random number generator to select 35 buses at random for a physical fleet inspection and then selected nine (9) of them at random to receive a Records and Fluids Analysis Audit. Nine buses of the 35 were also selected at random to undergo a road test. This audit process will be repeated three times annually to provide PRTC with more timely indications of First Transit's maintenance performance. Previous audits occurred annually.

**Table 1** shows the buses that received a physical inspection, and the nine (9) buses selected at random for a Records and Fluids Analysis and Road Test inspection.

<b>TABLE 1</b> <i>Buses Inspected</i>		
<b>FLEET INSPECTION</b>	<b>RECORDS &amp; FLUIDS ANALYSIS</b>	<b>ROAD TEST INSPECTION</b>
<b>1993 – MCI</b>		
145		
146	146	
<b>1995 - MCI</b>		
148		
<b>2000 – ORION</b>		
172		
173		
174	174	
175		
177	177	177
<b>2005 – GILLIG PHANTOM</b>		
181		
186		186
<b>2004 GILLIG LOW-FLOOR</b>		
250*	251	
252	252	252
253		
255		255
266		
267		

<b>TABLE 1</b> <i>Buses Inspected</i>		
<b>FLEET INSPECTION</b>	<b>RECORDS &amp; FLUIDS ANALYSIS</b>	<b>ROAD TEST INSPECTION</b>
<b>2001 – MCI</b>		
300		
301		
302	302	302
305		
306		
309		309
311		
322	322	
<b>2002 – MCI</b>		
324	324	
326		326
329		
330		330
332		
333		
335		
<b>2003 – MCI</b>		
<b>2005 - MCI</b>		
347	347	
349		
350		350
<b>2006 - MCI</b>		
360		
<b>TOTAL: 35</b>	<b>TOTAL: 9</b>	<b>TOTAL: 9</b>

\*Bus 251 was originally scheduled for static bus inspection and fluids analysis. The fluids were drawn on Sunday for 251, but the bus was not available when it came time to inspect it later in the week. As a result, bus 250 was selected in its place for a static inspection.

**EVALUATION CRITERIA & METHODOLOGY**

TRC continued its process of evaluating the fleet, records and fluids using procedures from previous audits, and also continued with a road test inspection and review of worker certification/training that was started in the previous audit. A team of three bus inspectors were assigned to physically inspect the buses, conduct road tests, and draw oil samples: Roger Matthews, John Walters and Jim Wilson. Roger Matthews also served as on-site supervisor and was responsible for entering the defects identified by the inspection team. John Schiavone served as Project Manager, organized the overall inspection process, performed the Records and Fluid Analysis Audit, and prepared the final report. All TRC staff identified above participated in previous PRTC audits.

The material below describes the evaluation criteria and methodology used by TRC to conduct the various audit inspections, which is identical to the last audit to maintain consistency.

## **Fleet Inspection**

Specific defects noted during the bus inspections were classified under 18 functional categories:

- 1) Accessibility Features
- 2) Air System/Brake System
- 3) Climate Control
- 4) Destination Signs
- 5) Differential
- 6) Driver's Controls
- 7) Electrical System
- 8) Engine/Engine Compartment
- 9) Exhaust
- 10) Exterior Body Condition
- 11) Interior Condition
- 12) Lights
- 13) Passenger Controls
- 14) Safety Equipment
- 15) Structure/Chassis/Fuel Tank
- 16) Suspension/Steering
- 17) Tires
- 18) Transmission

An "A/B" designation system was used to denote defects requiring immediate repair from those that could be repaired at a later time.

**A** – Indicates a critical safety-related defect that when identified during a regularly scheduled PMI requires immediate repair and would keep the vehicle from returning to revenue service until the defect is corrected.

**B** – Indicates a non-safety-critical defect, the repair of which could be deferred to a later time.

A third "BR" classification was used to note those "B" defects that were "R"eported to First Transit upon being identified because TRC considers them to be critical even though they are not on the "A" list.

"A" category defects were discussed with PRTC and First Transit prior to the inspections, and it was mutually agreed that the previous list would also be used for this inspection. A copy of the "A" defect guidelines used for this audit is attached as Appendix B. TRC informed First Transit management of "A" and "BR" category defects shortly after they were identified, which First Transit repaired immediately or scheduled for repair soon afterwards. First Transit was given an opportunity to contest "A" defects as soon as they were brought to their attention; "B" defects were reviewed by First Transit throughout the day when copies of noted defects were presented to them. All defects contested by First Transit were entered into the database verbatim and are shown separately in Appendix C along with TRC's response to each.

TRC shared the entire list of preliminary defects found during each day's inspections with First Transit with the understanding that the defects would need to be reviewed by TRC and may be changed based on that review. The sharing of defects was intended to keep First Transit informed of TRC's findings as part of a cooperative and objective evaluation process. TRC inspectors also worked with First Transit personnel to verify operation of certain controls to ensure that defects were legitimate and not the result of the inspectors not being familiar with specific PRTC bus equipment. If there was any doubt about a defect, TRC either removed it from the list or downgraded "A" defects to "B" level status.

### **Records and Fluids Analysis Audit**

Nine (9) buses were selected at random for the Records and Fluids Analysis Audits. The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly;
- Qualified mechanics performed maintenance tasks by virtue of documented training certification; and
- The fluids analysis program is being administered properly.

#### PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the nine buses selected at random. Mileage between the last two PMIs was calculated to determine if the inspections were performed on time, (within 10% or 600 miles of the scheduled 6,000-mile interval), or if they were late.

#### Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

- 1) PMI sheets going back two previous PMIs (at minimum) were selected and examined for each of the nine buses selected at random to determine if and when defects noted during the PMI process were repaired.
- 2) Defects from the previous two PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison TRC could determine if the defects were repaired or if they were simply noted on subsequent inspections.

#### Mechanic Qualification

To determine if qualified mechanics performed maintenance tasks by virtue of documented training and certification, TRC selected four (4) air conditioning (AC) repairs at random from the work orders.

TRC examined the AC-related work orders to identify a) the nature of the repair, and b) the mechanics performing the actual work. TRC then compared the name of the mechanic performing the repair to the list of AC certified technicians that TRC updated with First Transit to determine if the technicians were certified to perform the tasks. Technicians performing routine mechanical tasks to AC systems (i.e., those that do not involve Freon) are not required to be certified.

As a requirement beginning with the last audit TRC also collected and reviewed a listing of Automotive Service Excellence (ASE) certifications and work experiences of all First Transit mechanics to allow PRTC to determine compliance with ASE/work experience contract requirements.

Fluids Analysis Management

To determine if the fluids analysis program is being administered properly, TRC examined oil analysis records for each of the nine buses selected at random for the Records Inspection. TRC noted if the oil analysis was being performed at the appropriate PMI interval, if oil analysis records were properly filed for easy reference, and if any actions were being taken as a result of the oil analysis findings.

TRC also drew engine oil, transmission fluid, and coolant samples for nine of the buses selected at random and reviewed those results (27 samples total). In reviewing the results TRC looked for evidence of inappropriate levels of deterioration. TRC also looked for evidence that First Transit is making use of the fluid analysis results.

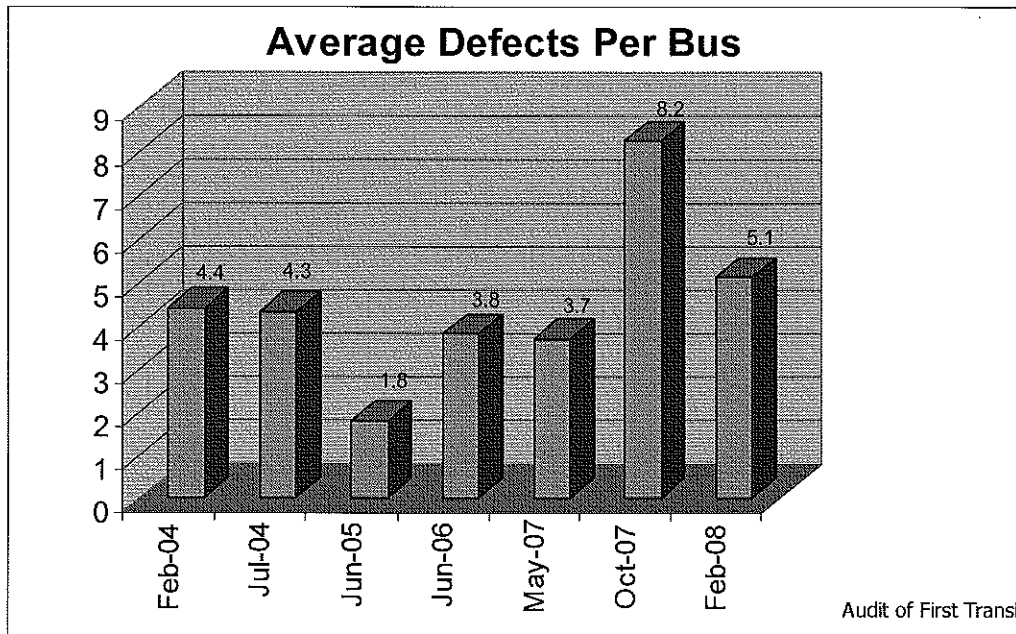
**FINDINGS**

**Overall Fleet Condition**

The PRTC fleet was again found to be clean inside. Exteriors, however, appeared dirtier, which was most likely the result of the rainy weather.

The number of defects identified by TRC during this inspection totaled 178 for the 35 buses inspected for an average of 5.1 defects per bus, compared to an average of 8.2 defects per bus during the previous audit. This significant decrease (by 38%) indicates that First Transit has become more familiar with the operation and has implemented needed changes to improve fleet condition. The average of 5.1 defects per bus is closer to the average number of defects identified prior to October 2007. It should be noted that First Transit's best performance to date of only 1.8 defects per bus occurred in June 2005 when a large number of new buses made up PRTC's fleet. Table 2 shows the historical defect trend for the last seven audits of First Transit. A more detailed analysis of the defects, including the more critical "A" defects, is provided in report sections that follow.

**Table 2: Summary of Average Defects per Bus**



**Specific Defect Summaries**

All of the defects identified during the inspections were entered in a database, which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for PRTC are included as a CD attachment to this report:

- **Static Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Road Test Defects (Master Road Test Defect Sheet):** identifies all defects found during road testing
- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **“A” Defects:** identifies all A-category defects
- **“BR” Defects:** identifies all BR-category defects
- **Buses Inspected:** A listing of all buses inspected

**Table 3** below summarizes defects under their functional category and compares them to the previous audit conducted in October. Virtually every category saw decreases in the number of average defects per bus. Categories with significant decreases in defects include Electrical System, Air System/Brake System, Transmission, Interior Condition, Tires, Lights, Accessibility Features, and Differential. By contrast, the previous audit saw ten categories with significant increases in defects.

Defect Category	October '07 Defects Avg. per Bus	February '08 Defects Avg. per Bus	Significant Increases (+) and Decreases (-)
Electrical System	0.11	0.00	-
Air System/Brake System	0.66	0.17	-
Engine/Engine Compartment	1.23	1.11	
Suspension/Steering	0.37	0.31	
Transmission	0.51	0.17	-
Safety Equipment	0.63	0.46	
Climate Control	0.23	0.20	
Driver's Controls	1.20	1.26	
Passenger Controls	0.09	0.09	
Interior Condition	0.66	0.23	-
Exterior Body condition	0.34	0.29	
Tires	0.14	0.00	-
Lights	0.77	0.17	-
Accessibility Features	1.11	0.49	-
Differential	0.11	0.06	-
Destination Signs	0.00	0.00	
Structure/Chassis/Fuel Tank	0.00	0.03	

Defect Category	October '07 Defects Avg. per Bus	February '08 Defects Avg. per Bus	Significant Increases (+) and Decreases (-)
<b>Defect Totals:</b>	<b>288</b>	<b>178</b>	
<b>Total Buses Inspected:</b>	<b>35</b>	<b>35</b>	
<b>Average Defects per bus</b>	<b>8.23</b>	<b>5.09</b>	

As mentioned earlier, each defect was given a severity code:

**A** – Indicates a critical defect that when identified during a regularly scheduled PMI requires immediate repair before the vehicle could resume revenue service.

**B** – Indicates a non-critical defect, the repair of which could be deferred to later time.

There were a total of 23 “A” defects. **Table 4** below shows a breakdown of the “A” category defects identified during this audit.

Defect Category	Number of Defects
<b>Accessibility Features</b>	
<u>Wheelchair Flip Seat Defects</u>	5
<u>Wheelchair Restraint Defects</u>	5
<u>Wheelchair Lift will not Operate</u>	1
<u>Wheelchair Lift Alarm Defects</u>	1
<b>Air/Brake Systems</b>	
<u>Air Leak Defects</u>	1
<b>Engine</b>	

<b>Defect Category</b>	<b>Number of Defects</b>
<u>Fuel Leak</u>	2
<b>Interior Condition</b>	
<u>Sharp Edge Defects</u>	2
<b>Lights</b>	
<u>Turn Signal Defects</u>	1
<b>Safety Equipment</b>	
<u>Fire Extinguisher/Suppression Defects</u>	4
<u>Emergency Decals</u>	1
<b>Total "A" Defects</b>	<b>23</b>

All A-Category defects identified during the Fleet Inspection were either repaired immediately or shortly afterwards by First Transit. Buses identified with "A" defects were not to return to service until repaired.

Understanding that some "A" level defects are more severe than others, a review of the most severe (i.e., those with greater likelihood of causing serious injury or accident) were examined. Of the 23 "A" defects identified, only eight (0.2 per bus) were considered most critical, compared to 16 (0.5 per bus) for the last audit.

First Transit contested three of the 23 "A" defects compared to contesting 31 of the 55 "A" defects identified by TRC during the last static inspection. Concerning the single "A" defect identified during the road test, First Transit did not contest it. The list of contested defects including TRC's response to each is included as Appendix C.

### **Defect Analysis**

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, structural integrity, and life expectancy of major components.

#### Safety

Safety was greatly improved as "A" defects decreased from 55 to 23. The 23 A-category defects identified during this inspection, however, would have kept 15 buses from returning to service if First Transit had not corrected them after being identified by TRC. It is important to note that "A" defects are not necessarily those that would place a vehicle out-of-service if identified during a random roadside inspection; the criteria for those inspections are not as severe. The standard used for PRTC inspections is a defect that when identified during a scheduled PMI would keep the bus from resuming service until repaired. Most importantly, for consistency purposes in evaluating performance from one audit to another, the same standard is used for assigning "A" between inspections.

The improved safety comes as a result of defect reductions in five specific areas:

- Accessibility Features (wheelchair flip seats and wheelchair restraints)
- Air/Air Brake Systems
- Exhaust Leaks
- Safety Equipment (emergency exit windows)
- Tires

It is clear that First Transit has instituted specific work actions to reduce these defects and improve overall safety.

Comfort and Convenience

TRC found that interiors continue to be kept clean. Exteriors were dirtier than usual, but most likely a factor of the rainy weather experienced during this audit. Both interior and exterior related defects decreased for this audit.

Structural Integrity

There were no defects that impacted structural integrity.

Life Expectancy of Major Components

First Transit's continued perfect adherence to scheduled PM inspections and the changing of fluids that occurs during these inspections maximizes the life expectancy of major components. First Transit also made needed improvements to the oil analysis program whereby management now goes online on a regular basis to identify abnormal conditions and take corrective action based on the lab's recommendations.

**PMI Schedule Adherence**

TRC examined the records of nine buses selected at random to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles).

As in the past, all PMI records were well organized and easy to locate.

**Table 5** below shows the PMI intervals going back to the previous PMI performed by First Transit for each of the nine buses selected at random.

<b>TABLE 5</b>		
<b><i>PMI Schedule Adherence</i></b>		
<b>Bus #</b>	<b>PMI Mileage Intervals</b>	<b>Notes</b>
174	6477	On time
251	6216	On time
322	6533	On time
302	6362	On time
146	5800	On time
177	6559	On time
347	6494	On time
252	6124	On time
324	6318	On time

The review of records by TRC revealed that all nine buses (100%) had their PM inspections done on time. The on time performance for PMI schedule adherence remains perfect at 100%.

### **Repair of Defects Identified During PMIs**

To determine if repairs were performed properly and made promptly, TRC selected a minimum of the last three PMI sheets for all nine buses chosen at random (minimum of 27 PMI records total). TRC examined the PMIs to determine if First Transit has:

- A process in place to distinguish those defects identified and repaired during the PMI from those scheduled for repair at a later date; and
- Actually followed-up and repaired the defects identified during the previous PMI.

From its investigation TRC determined that First Transit continues to have a record-keeping system that clearly distinguishes defects that are repaired as a follow-up to scheduled PM inspections. Each PMI checklist is attached to a repair order (RO) showing the repair of defects noted during the inspection process. In addition, First Transit's move to put more historical data generated from PMIs into a computerized management information system (MIS) is more evident.

First Transit has a QA program where follow-up inspections by management are periodically conducted to ensure that technicians properly identify defects during the inspection process. The reduced number of per-bus defects indicates that First Transit's new maintenance management team has improved its PMI QA program. Reports showing QA oversight of PMIs is sent to PRTC on a regular basis for their review.

An exception to conducting follow-up repairs was noted on Bus 146 where three defects were identified on back-to-back PMIs, indicating that they were simply carried over and not repaired. The three defects include: dash lights out, power steering fluid leak and battery door damage. Despite the age of this bus (1993 MCI), which has recently been refurbished and is in active use, the defects should have been repaired prior to the next PMI.

### **Mechanic Training & Certification**

TRC set out to determine if qualified mechanics are performing maintenance tasks by virtue of documented training and certification. TRC selected four (4) HVAC repairs/inspections at random and asked First Transit to provide a copy of the repair order and the name of the mechanic performing the repair or inspection.

Table 6 below shows the four HVAC work orders examined.

<b>TABLE 6</b>				
<i>A/C Repair/Inspections</i>				
<b>Bus #</b>	<b>Date</b>	<b>HVAC Repair</b>	<b>Mechanic</b>	
302	10-02-07	AC Recharge	Zaragoza	
271	10-19-07	Inoperative Gauge - AC Recharge	Brownell	
310	10-03-07	AC Recharge	Brownell	
148	10-10-07	AC Recharge	Brownell	

TRC then compared the HVAC mechanic who performed the repair to the listing of certified technicians compiled from the earlier audit and updated during this audit to include Messrs. Comfort and Krantz. **Table 8** lists the mechanics certified to perform HVAC-related repairs and their AC certification status.

<b>Mechanic's #, Name</b>	<b>Proof of AC Certification</b>
Andy Velez	VGI Training, Technician Type II (EPA cert)
Nelson Zaragoza	ASE, Refrigerant Recovery & Recycling
Anthony Crook	Motorcoach Training Development, EPA Certification, Type I & II
W. Brownell	AC 609
W. Nickens	AC 609
M. Comfort	AC 608
D. Krantz	AC 608
J. Coburn	AC 609
T. Kolhaus	AC 609

TRC found that all HVAC repairs involving refrigerant were performed by a certified AC technician included in Table 8. As a result of its examination, TRC finds that the contractor does have qualified mechanics performing HVAC maintenance tasks by virtue of documented training and certification.

As part of this inspection TRC also requested a listing of all First Transit technicians and a summary of their experience, Automotive Service Excellence (ASE) certifications, and Air Conditioning (AC) certifications as follows:

Maintenance Personnel will be trained to proficiency on each of PRTC's vehicles and sub-systems prior to the start of service. Contractor will be required to ensure that all repairs involving warranted vehicles, sub-systems, parts, etc., are performed at all times by maintenance personnel who are properly certified to perform such work such that qualifications cannot be questioned when submitting warranty claims. All mechanics must have at least one ASE certification and five (5) years' experience on heavy duty trucks or buses. Alternately, mechanics may be graduates of a certified two-year technical/vocational institute and have two (2) years' experience with heavy duty trucks or buses. At least 30 percent of the maintenance staff shall be ASE Master Certified for medium and heavy duty trucks, not including the maintenance manager. In addition, all mechanics shall receive a minimum of 16 hours of technical/refresher training annually.

Table 9 shows mechanic certification, experience and training status for the 18 mechanics (excluding foremen and the maintenance manager) currently employed by First Transit at PRTC. The table was updated since the last audit based on information provided by First Transit.

Mechanics with at least one ASE certification and five (5) years' experience	Mechanics certified from two-year technical or vocational institute and two (2) years' experience	Maintenance staff with ASE Master Certification	Mechanics with min. 16 hours refresher training annually
N. Zaragosa	M. Amankwah	N. Zaragosa	N. Zaragosa

M. Farrell (expired) W. Nickens T. Crook F. Russo J. Coburn (4 years) M. Moore D. Talley Jacob D. Krantz T. Kolhaus M. Comfort W. Brownell (AC cert) A. Velez (AC cert)	S. Amoh (one-year degree)	T. Kolhaus M. Comfort J. Coburn	J. Coburn S. Amoah F. Reinoso W. Brownell W. Nickens K. Mensah M. Amankwah J. Amartey M. Comfort A. Crook M. Farrell A, Gaal T. Kohlhaus D, Krantz M. Moore D. Talley A. Velez
Requirement: 18 Actual: 16		Requirement: 5 Actual: 4	Requirement: 18 Actual: 18

Based on the findings, First Transit is deficient in the number of mechanics with at least one ASE certification and five (5) years' experience by two (2) mechanics, and is short by one (1) for mechanics with ASE Master Certification. This count assumes that AC certification counts in lieu of an ASE certification; in addition, one mechanic with four years' experience was credited with five and another with a one-year degree was credited for having a two-year degree for the purposes of this review.

According to documentation provided by First Transit, all 18 mechanics received the required annual refresher training of at least 16 hours.

**Management of Oil Analysis Program**

First Transit is required to send engine oil and transmission fluid samples to a laboratory for testing and evaluation at each PMI to determine if:

- a) fluid samples were taken at each PMI;
- b) fluid records were filed and easy to gain access to; and
- c) the contractor is making use of the fluid analysis results as part of its maintenance program.

In examining the last two PMIs for each of the nine buses selected at random (18 records), TRC found that:

- All engine and transmission oil samples were taken at the appropriate interval.
- Recordkeeping of the oil analysis program is adequate

A shortcoming with the previous audit revealed that the procedure to inform First Transit of any abnormal conditions was deficient in that information was late getting to First Transit. In this audit, however, First Transit has taken a more proactive approach by regularly going online to actively seek out any abnormal conditions noted. An inspection of the records indicated that for every abnormal condition noted, First Transit had complied with the recommendation.

TRC also drew engine, transmission, and coolant fluid samples from nine buses selected at random (27 samples). The results are as follows:

Coolant:

All reports were normal.

Transmission Fluid:

All reports were normal.

Engine Oil:

Bus 177: Lead content appears to be high. Recommend close monitoring. Recommend resample to verify metal content.

First Transit was informed on the fluid analysis results as soon as they were received by TRC. The engine oil report of Bus 177 above does not appear to be caused by neglected maintenance on First Transit's part (oil was changed at the appropriate interval). Instead, this is an example of the early warning benefit provided by the fluid analysis program to offer a cautionary note of possible internal engine wear that needs to be monitored and verified.

## **ROAD TEST INSPECTIONS**

TRC conducted a road test of nine buses selected at random after the static inspections had been conducted. The road testing began during the previous audit conducted in October. Of the nine buses road tested, four buses had no defects. Of the remaining buses, there were a total of eight defects, up by one from the seven defects identified during the previous audit.

Of the nine defects identified during the road test only one was an "A" defect, down from the three "A" defects identified in October. In that one case brake travel was excessive.

None of the defects identified during the road tests have been included with the static inspection defects to maintain consistency with previous audits where road tests were not part of the audit. A listing of the defects identified during the road test inspections is found in the "Road Test Defects" tab of the attached spreadsheet.

## **SUMMARY OF RECOMMENDATIONS**

- Continue making improvements to the overall maintenance operation to reduce defects into the four-per-bus range or better
- Pay closer attention to cleanliness of the work environment, especially the men's rest room.

**APPENDIX A – Excel Spreadsheet Reports  
(Attached as a CD)**

## **APPENDIX B**

### **PRTC**

#### **“A” Defect List**

##### **“A” Defects**

- Fire extinguisher
- Headlights
- Wipers (either)
- Cracked windshield in driver’s view (larger than a quarter)
- Seat belts, driver
- Turn signals
- Horn
- Emergency Flashers
- Brake Lights (more than one)
- Air pressure/Air leaks (except series 60 EGR engines at drier and air operated wipers on delay)
- Brake lining thickness @ 7/32-inch
- Tire tread depth @ 2/32 rear, 4/32 front
- Fuel Leak
- Exposed wires (insulation missing)
- Oil/Grease on Brakes (saturated)
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi (tag tires 70 psi)
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw: 30=2”; 36=2.5”
- Emergency window won’t open

## APPENDIX C – Listing of Contested Defects and TRC Response

### Static Defects

Bus #	Category	Defect	Reason Contested	Response
148	Accessibility	W/C seat, S/S #2 position, will not lock in track	Locked in sliding seat several times	Inoperative at time of inspection
311	Accessibility	Seat, S/S #1 position, will not lock in track	Locked in sliding seat several times	Inoperative at time of inspection
347	Accessibility	W/C restraint strap, S/S #2 W/C position, red inop (belt will not extend)	Pulled belt out	Inoperative at time of inspection

Appendix D – Critical vs. Non-Critical “A” Defects,

Bus #	Category	Defect	Critical
148	Accessibility Features	W/C seat, S/S #2 position, will not lock in track	NO
173	Accessibility Features	WC lock, S/S #1 W/C seat, inop/lock handle missing	NO
186	Accessibility Features	W/C restraint belt, S/S #2 W/C position, inop	NO
306	Accessibility Features	Belt restraint, W/C lift, too short to work properly	NO
306	Accessibility Features	Safety interlock, W/C lift, safety interlock on restraint belt inop	NO
311	Accessibility Features	Seat, C/S #1 position, will not lock in track	NO
326	Accessibility Features	Alarm, W/C, inop	NO
326	Accessibility Features	W/C lift, C/S, inop	NO
330	Accessibility Features	Seat, C/S #1 W/C position, won't latch up	NO
347	Accessibility Features	W/C restraint strap, S/S #2 W/C position, red inop	NO
186	Safety Equipment	Seat, S/S #2 W/C position, won't latch up	NO
360	Accessibility Features	W/C restraint belt, W/C lift, inop	NO
266	Air/Brake System	Air leak, front, R14 valve leaking	YES
148	Engine/Compartment	Fuel leak, fuel pump, line leaking	YES
266	Engine/Compartment	Fuel leak, tank, leaking	YES
300	Interior Condition	Window trim, C/S #4, front bottom edge broken and sharp	NO
302	Interior Condition	Stepwell, entrance door, rubber trim missing/exposing sharp metal edge	NO
302	Lights	Turn signal, C/S rear, inop	YES
181	Safety Equipment	Fire suppression, side console, inop	YES
186	Safety Equipment	Fire extinguisher sign, C/S #2 seat, missing	YES
305	Safety Equipment	Fire suppression indicator light, dashboard, green light inop	YES

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347	Safety Equipment	Fire extinguisher sign, C/S #2 seat, missing	YES
350	Safety Equipment	Decal, C/S #1 window, emergency exit decal missing	NO