

January 16, 2020

TO:	Vice Chair Sebesky and PRTC Commissioners
FROM:	Perrin Palistrant Perrin Palistrant Perrin Palistrant Director of Operations and Operations Planning
THROUGH:	Robert A. Schneider, PhD Executive Director
SUBJECT:	October 2019 Fleet Maintenance Audit

Overview

The most recent fleet maintenance audit (attached) was conducted in October 2019. Random sample audits are conducted three times per year by Potomac and Rappahannock Transportation Commission's (PRTC) independent contractor, Transit Resource Center (TRC). A summary of their report is presented below.

There was an increase in average defects for active and contingency vehicles, which is a break from the trend of either stable defect rates or slight decreases in prior audits. While we believe this was an anomaly, particularly for mechanical defects, PRTC management and Quality Assurance staff has taken steps to increase the oversight of the maintenance program to ensure the items mentioned below are being addressed and that steps are in place to reduce the defect rate before this becomes a trend. First Transit management is working to keep the average fleet defects low and improve processes to assist maintenance staff.

Report Summary

As previously mentioned, bus maintenance audits are conducted three times annually (one every four months) on behalf of PRTC by Transit Resource Center (TRC). First Transit is under contract to PRTC to maintain PRTC's bus fleet. This is the twentieth audit conducted of First Transit since their contract with PRTC began on July 1, 2013.

Audits consist of a physical bus inspection of 51 buses, which represents about one-third of the total fleet. The audits also include a fluids analysis, records review, and road testing one-quarter of the sample. A review is also made of maintenance worker qualifications as agreed to by PRTC and First Transit. Reporting is based on a random sampling of the active fleet (47 buses) with separate analysis made of the contingency fleet (4 buses).

For this audit there was an average of 4.1 defects per bus for all buses inspected (active and contingency buses combined), compared to 3.1 last audit and 2.6 for each of two audits before that. The 47 active buses inspected averaged 3.8 defects per bus, compared to 3.1 per bus last audit. The four contingency buses averaged 7.7 defects per bus compared to 3.75 last audit.

The summary table which follows compares active and contingency buses in several defect categories for the past four audits. On-time adherence to preventive maintenance inspections (PMIs), scheduled at 6,000-mile intervals, continues to be perfect at 100% for thirty-five consecutive audits.

TABLE 1							
Comparison of Active & Contingency Buses							
Aug. '18 Feb. '19 June '19 Oct '19							
Average # of Defects per							
Bus:	2.6	2.6	3.1	4.1			
All Buses							
Average # of Defects per							
Bus:	2.6	2.5	3.1	3.8			
Active Fleet							
Mechanical Defects (net of							
cosmetic defects): Active	1.4	1.4	1.8	2.8			
Fleet							
Average # of Defects per							
Bus:	3.3	3.75	3.75	7.7			
Contingency Fleet							
Average # of "A" Defects							
per Bus: All Buses	0.20	0.23	0.18	0.31			
Average # of "A" Defects							
per Bus: Active Fleet	0.21	0.23	0.17	0.34			
Average # of "A" Defects							
per Bus: Contingency Fleet	0.0	0.25	0.25	0.00			
PMI Adherence	100%	100%	100%	100%			

The number of "A" defects for all buses inspected, which totaled 9 last audit, increased to 16 this audit. "A" defects are those agreed upon by PRTC and First Transit as being more serious, those that would keep a bus from resuming revenue service until repaired. "A" category defects were reported to First Transit shortly after being identified. A copy of the "A" defect list used for all audits is attached as Appendix B.

The four contingency buses inspected averaged 7.7 defects per bus, compared to 3.75 last audit. This compares to an average of 3.8 defects for the active fleet. Conclusions drawn from such a small fleet sampling (only four buses) are difficult to make.

Vice Chair Sebesky and PRTC Commissioners January 16, 2020 Page 3

TRC will continue to conduct a separate analysis of contingency buses, determine if operators are reporting defects as part of their pre and post-trip inspections, and whether First Transit is correcting those defects. In conducting the analysis of four contingency buses, TRC found that 11 of the 31 contingency fleet defects should have been noted by the operator. Of the 11, four (4) were noted by operators on the Zonar inspection reports. Last audit, operators also did not note any of the four (4) defects that should have been listed on Zonar reports. Despite the improvement for this audit, there is a need to more closely examine operators' use of Zonar.

Other aspects of the audit revealed:

- The workshop continues to be clean.
- PMI records, filed electronically, continue to be extremely well organized and easy to locate.
- Bus exteriors and interiors are exceptionally clean.
- Exterior-related body defects for the active fleet decreased to 37 for this audit compared to 55 last audit and 51 the audit before last. Despite the decrease, exterior-related body defects account for the second highest defect category with Engine Compartment defects now topping the list at a total of 61 for the active fleet this audit.
- The number of interior condition defects for the active fleet increased to nine (9) compared to four (4) last audit.
- When cosmetic (interior condition and exterior body) defects are removed from the active fleet totals, the number of mechanical defects equals 2.8 per bus compared to 1.8 last audit.
- Bus areas where no defects were found on any of the active buses inspected include Differential and Passenger Controls compared to six (6) such categories last audit.
- Six (6) categories saw a significant increase in the number of average defects per bus: Air/Brake Systems, Climate Control, Destination Signs, Engine Compartment, Interior Condition and Exhaust.
- Three (3) categories saw a significant decrease: Driver's Controls, Exterior Body Condition and Suspension/Steering.
- The road tests of the 13 buses selected at random revealed no defects this audit compared to one (1) defect last audit.
- Refrigerant-related air conditioning (AC) repairs examined were all performed by EPA certified personnel as required by PRTC.
- First Transit management continues to show a willingness to minimize defects by immediately repairing "A" defects shortly after being identified.
- The review of PMI records revealed that First Transit continues to have a process to follow up on defects identified during PM inspections.
- Testing of fluid samples showed six (6) alerts compared to four (4) last audit: two (2) engine, two (2) transmission, and two (2) coolant. Of the six (6) alerts, four (4) require some action to be taken before the next PM interval. Results appear to be providing an early warning of possible problems as opposed to neglected maintenance.

Vice Chair Sebesky and PRTC Commissioners January 16, 2020 Page 4

- Regarding fluid alerts reported last audit where First Transit was recommended by the lab to take corrective action, an examination found that follow-up action was taken in all cases.
- First Transit is compliant in three (3) of the four (4) workforce categories (one employee does not meet minimum work experience requirements; 96% compliance (up from 92%) instead of the required 100%). Required annual refresher training is at full compliance. All mechanics/foremen now have ASE certifications and all are AC certified. Steps are in place to bring the total to 100%.
- First Transit management continues to be cooperative with regard to providing the buses and workspace needed for carrying out audit inspections in a timely fashion.
- A review of all contingency bus records revealed that all were driven at least 30 miles per month. All contingency buses have current registrations, all are being given required maintenance attention, and all four contingency buses selected for inspection for this audit did start prior to being inspected.

Given the increase in defects across several categories, the primary recommendation is to decrease exterior-related defects, engine/engine compartment defects, contingency bus defects, and "A" defects. In addition, the long-standing recommendation continues: operators need to be trained to note more defects on their Zonar records. Of the 11 contingency bus defects that an operator should have noted, only four (4) were found in the Zonar inspection records. Last audit, operators also failed to note such defects. This has been an ongoing recommendation for several audits.

Attachment: As stated



Presents:

Fleet Maintenance Audit Report October 2019

Presented to:



Potomac & Rappahannock Transportation Commission

14700 Potomac Mills Road Woodbridge, VA 22192

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road Suite 165 Winter Springs, FL 32708 Phone: (407) 977-4500 Fax: (407) 977-7333 Email: tranrc@earthlink.net

November 27, 2019

Potomac and Rappahannock Transportation Commission (PRTC)

VEHICLE MAINTENANCE AUDIT Conducted October 21-25, 2019

TABLE OF CONTENTS

SECTION	PAGE
Summary	1
Buses Inspe	ected3
Findings .	
C	Overall Fleet Condition – Active Buses
C	Overall Defect Summary – Active Buses4
	A" Defect Summary - All Buses5
C	Contested Defects
Γ	Defect Analysis
Т	Frend Analysis7
Records Re	view
F	MI Schedule Adherence
F	Repair of Defects Identified During PMIs
Ν	Aechanic Training & Certification
Ν	Anagement of Fluid Analysis Program10
Road Test I	nspection12
Analysis of	Contingency Buses Inspected13
Analysis of	All Contingency Buses Records14
A	Additional Contingency Bus Records Inspection15
Recommen	dations16
Appendix A	– List of Buses Inspected
Appendix B	B – Evaluation Criteria and Methodology
Appendix C	C – Excel Spreadsheet Reports (Electronic copy provided on CD)
Appendix D) – Listing of "A" Category Defects
Appendix E	2 – Listing of Contested Defects and TRC Response
Appendix F	- Road Test Protocol

POTOMAC AND RAPPAHANNOCK TRANSPORTATION COMMISSION VEHICLE MAINTENANCE AUDIT Conducted October 21-25, 2019

FINAL REPORT

SUMMARY

Bus audits are conducted of First Transit three times annually (one every four months) on behalf of the Potomac and Rappahannock Transportation Commission (PRTC) by Transit Resource Center (TRC). First Transit is under contract to PRTC to maintain PRTC's bus fleet. This is the nineteenth audit conducted of First Transit since their new contract with PRTC began on July 1, 2013.

Audits consist of a physical bus inspection of 51 buses, which represents about one-third of the total fleet. The audits also include a fluids analysis, records review, and road test of one-quarter of the sample. A review is also made of maintenance worker qualifications as agreed to by PRTC and First Transit. Reporting is based on a random sampling of the active fleet (47 buses) with separate analysis made of the contingency fleet (4 buses).

For this audit there was an average of 4.1 defects per bus for all buses inspected (active and contingency buses combined), compared to 3.1 last audit and 2.6 for each of two audits before that. The 47 active buses inspected averaged 3.8 defects per bus, compared to 3.1 per bus last audit. The four contingency buses averaged 7.7 defects per bus compared to 3.75 last audit.

The summary table which follows compares active and contingency buses in several defect categories for the past four audits. On-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals continues to be perfect at 100% for thirty-five consecutive audits.

TABLE 1							
Comparison of	Comparison of Active & Contingency Buses						
Aug. '18 Feb. '19 June '19 Oct '19							
Average # of Defects per Bus:							
All Buses	2.6	2.6	3.1	4.1			
Average # of Defects per Bus:							
Active Fleet	2.6	2.5	3.1	3.8			
Mechanical Defects (net of							
cosmetic defects): Active Fleet	1.4	1.4	1.8	2.8			
Average # of Defects per Bus:							
Contingency Fleet	3.3	3.75	3.75	7.7			
Average # of "A" Defects per							
Bus: All Buses	0.20	0.23	0.18	0.31			
Average # of "A" Defects per	Average # of "A" Defects per						
Bus: Active Fleet	0.21	0.23	0.17	0.34			
Average # of "A" Defects per							
Bus: Contingency Fleet	0.0	0.25	0.25	0.00			
PMI Adherence	100%	100%	100%	100%			

The number of "A" defects for all buses inspected, which totaled 9 last audit, increased to 16 this audit. "A" defects are those agreed upon by PRTC and First Transit as being more serious, those that would keep a bus from resuming revenue service until repaired. "A" category defects were reported to First Transit shortly after being identified. A copy of the "A" defect list used for all audits is attached as Appendix B.

The four contingency buses inspected averaged 7.7 defects per bus, compared to 3.75 last audit. This compares to an average of 3.8 defects for the active fleet. Conclusions drawn from such a small fleet sampling (only four buses) are difficult to make.

TRC will continue to conduct a separate analysis of contingency buses, determine if operators are reporting defects as part of their pre and post trip inspections, and whether First Transit is correcting those defects. In conducting the analysis of four contingency buses, TRC found that 11 of the 31 contingency fleet defects should have been noted by the operator. Of the 11, four were noted by operators on the Zonar reports. Last audit, operators also did not note any of the four defects that should have been listed on Zonar reports. Despite the improvement for this audit, there is a need to more closely examine operators' use of Zonar.

Other aspects of the audit revealed:

- The workshop continues to be clean.
- PMI records, filed electronically, continue to be extremely well organized and easy to locate.
- Bus exteriors and interiors are exceptionally clean.
- Exterior-related body defects for the active fleet decreased to 37 for this audit compared to 55 last audit and 51 the audit before last. Despite the decrease, exterior-related body defects account for the second highest defect category with Engine Compartment defects now topping the list at a total of 61 for the active fleet this audit.
- The number of interior condition defects for the active fleet increased to nine compared to four last audit.
- When cosmetic (interior condition and exterior body) defects are removed from the active fleet totals, the number of mechanical defects equals 2.8 per bus compared to 1.8 last audit.
- Bus areas where no defects were found on any of the active buses inspected include Differential and Passenger Controls compared to six such categories last audit.
- Six categories saw a significant increase in the number of average defects per bus: Air/Brake Systems, Climate Control, Destination Signs, Engine Compartment, Interior Condition and Exhaust.
- Three categories saw a significant decrease: Driver's Controls, Exterior Body Condition and Suspension/Steering.
- The road tests of the 13 buses selected at random revealed no defects this audit compared to one defect last audit.
- Refrigerant-related air conditioning (AC) repairs examined were all performed by EPA certified personnel as required by PRTC.
- First Transit management continues to show a willingness to minimize defects by immediately repairing "A" defects shortly after being identified.
- The review of PMI records revealed that First Transit continues to have a process to follow up on defects identified during PM inspections.
- Testing of fluid samples showed six alerts compared to four last audit: two engine, two transmission, and two coolant. Of the six alerts, four require some action to be taken before the next PM interval. Results appear to be providing an early warning of possible problems as opposed to neglected maintenance.
- Regarding fluid alerts reported last audit where First Transit was recommended by the lab to take corrective action, an examination found that follow-up action was taken in all cases.

- First Transit is compliant in three of the four workforce categories (one employee does not meet minimum work experience requirements; 96% compliance (up from 92%) instead of the required 100%). Required annual refresher training is at full compliance. All mechanics/foremen now have ASE certifications and all are AC certified.
- First Transit management continues to be cooperative with regard to providing the buses and workspace needed for carrying out inspections in a timely fashion.
- A review of all contingency bus records revealed that all were driven at least 30 miles per month. All contingency buses have current registrations, all are being given required maintenance attention, and all four contingency buses selected for inspection for this audit did start prior to being inspected.

Given the increase in defects across several categories, the primary recommendation is to decrease exterior-related defects, engine/engine compartment defects, contingency bus defects, and "A" defects. In addition, the long-standing recommendation continues: operators need to be trained to note more defects on their Zonar records. Of the 11 contingency bus defects that an operator should have noted, four were found in the Zonar records. Last audit, operators failed to note such defects. This has been an ongoing recommendation for several audits.

Audit details are presented in the various sections found in the body of this report. Various tables used throughout this report are based on more complete data contained in Excel spreadsheets included on a separate CD.

BUSES INSPECTED

TRC selected at random 47 active buses and four contingency buses (51 in total) for a physical fleet inspection and then selected 13 of them at random to receive a Fluids Analysis Audit and a Records Review. Thirteen buses were also selected at random by TRC to undergo road tests. Appendix A identifies those buses.

FINDINGS

Overall Fleet Condition – Active Buses

The PRTC fleet continues to be exceptionally clean. The number of interior condition defects for the active fleet increased to nine compared to four last audit. Exterior body defects actually decreased to 37 compared to 55 last audit. Tight parking conditions where approximately 122 parking spots must accommodate 153 buses make it difficult to minimize exterior body damage defects.

Defects continue to remain in the three-per-bus average for the active fleet, although on the high side at 3.8 for this audit. Only once in the past twenty-one audits did defect averages exceed four for the active fleet. **Table 2** which follows shows the historical defect trend for the last 20 audits of First Transit. Although the industry does not have a standard for per-bus defects, an average of defects in the range traditionally exhibited by First Transit is exceptional based upon similar audits conducted by TRC for other transit agencies. A more detailed analysis of the defects is provided in report sections that follow.





Note: A December 2018 audit was not conducted

Overall Defect Summary – Active Buses

All 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, which are included as a CD attachment to this report.

Table 3, which follows summarizes active bus defects under each of the 18 functional categories and compares them to the previous audit. For this audit, six categories saw a significant increase in the number of average defects per bus: Air/Brake Systems, Climate Control, Destination Signs, Engine Compartment, Interior Condition, and Exhaust. Three categories saw a significant decrease: Driver's Controls, Exterior Body Condition, and Suspension/Steering.

Three of the active buses inspected had no defects found. In addition, as shown in **Table 3**, there were no defects found in two of the 18 functional categories for all active buses inspected: Passenger Controls and Differential.

Defects by category for the last four audits are shown in **Table 3 which follows**. Trend tabs in the attached spreadsheet show defect trends over longer intervals.

TABLE 3					
	Defects by Co	ategory - Act	ive Buses		
Defect Category	Aug. '18 Defects Avg. per Bus	Feb. '19 Defects Avg. per Bus	June '19 Defects Avg. per Bus	Oct '19 Defects Avg. per Bus	Significant Increase (+) or Decrease (-) Current vs. Prior Audit
Accessibility Features	0.19	0.21	0.19	0.23	1 Hor Muult
Air System/Brake System	0.06	0.06	0.06	0.28	+
Climate Control	0.09	0.00	0.00	0.11	+
Destination Signs	0.04	0.00	0.00	0.17	+
Differential	0.06	0.02	0.00	0.00	
Driver's Controls	0.09	0.15	0.23	0.09	-
Electrical System	0.00	0.04	0.06	0.11	
Engine/Engine Compartment	0.49	0.51	0.70	1.30	+
Exhaust	0.00	0.00	0.00	0.11	+
Exterior Body Condition	0.13	1.09	1.17	0.79	-
Interior Condition	0.02	0.09	0.09	0.19	+
Lights	0.17	0.00	0.28	0.17	
Passenger Controls	0.00	0.06	0.00	0.00	
Safety Equipment	0.04	0.09	0.06	0.04	
Structure/Chassis/Fuel Tank	0.09	0.00	0.00	0.02	
Suspension/Steering	0.04	0.09	0.17	0.09	-
Tires	0.02	0.02	0.02	0.02	
Transmission	0.04	0.04	0.02	0.06	
Active Bus Defect Totals:	121	116	144	161	
Active Buses Inspected:	47	47	47	47	
Average Defects per Bus:	2.6	2.5	3.1	3.8	

As indicated above, 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.

"A" Defect Summary – All Buses

A total of 16 "A" defects were identified for this audit for all buses inspected compared to nine last audit and 12 the audit before last. **Table 4** which follows shows a breakdown of those defects classified under active and contingency buses.

TABLE 4 A-Category Defects					
A-Defects A-Defects Defect Category Active Fleet Contingency Fleet					
Accessibility					
- Wheelchair related	8				
Safety Equipment					
- Signage	1				

TABLE 4 A Catagory Defeate						
A-Calegory Dejects A-Defects A-Defects Defect Category Active Fleet Contingency Fleet						
Air/Brake System		~ .				
- Leaks	4					
- Alarm	2					
Suspension/Steering	Suspension/Steering					
- Drag link	1					
Subtotal "A" Defects	16					
Total "A" Defects 16						

First Transit understood they would not operate buses with "A" defects until those defects were repaired. It should be noted that not all "A" defects will keep the bus from service according to DOT standards. Air leaks, for example, have an acceptable DOT allowance and can lose three pounds of air pressure in just two minutes.

Contested Defects

First Transit contested 15 defects compared to none last audit. Appendix D provides further detail of contested defects.

Defect Analysis (Active and Contingency Buses)

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

There were 16 "A" category defects identified during this audit for all buses inspected compared to nine found last audit. Of the 16 "A" defects, 13 should have been noted by operators during their daily inspections understanding that some may be difficult for operators to detect. There was one defect related specifically to safety equipment compared to one last audit.

Comfort and Convenience

Exteriors and interiors continue to be exceptionally clean. There were five climate control defects this audit for all buses compared to none for the previous two audits. There were no Passenger Control defects for this audit compared to the same last audit. Interior-related defects for all buses inspected totaled 10 compared to six last audit.

Structural Integrity

There continue to be no defects that impact structural integrity.

Life Expectancy of Major Components

First Transit continued its perfect adherence to scheduled PM inspections. The changing of fluids that occurs during these inspections combined with fluid analysis maximizes the life expectancy of major components.

Regarding fluid samples taken by TRC, there were six alerts reported this audit compared to four last audit: two engine, two transmission, and two coolant. Of the six alerts, four require action to be taken before the next PM inspection. First Transit immediately responded with the action it would take in response to these alerts. The alerts are consistent with First Transit's fluid analysis program providing an early warning of potential problems as opposed to neglected maintenance.

Records also continue to show that First Transit has a program in place to identify defects as part of the PM inspections and a process of getting those defects repaired in a timely fashion. They also have a process to quickly investigate fluid sampling alerts reported by their own testing lab, which together help extend vehicle and component life.

Trend Analysis

The long-term trend lines for defects for active buses as shown in the separate spreadsheet tab continue to indicate a very gradual upwards trajectory. Mechanical defects (excludes interior and exterior body defects), however, continue on a more pronounced downward slope (fewer defects). Other categories where defects are on a downward trend (less defects) include Driver's Controls, Interior Body, Lights, Climate Control, Steering/Suspension, Transmission, Lights, and Passenger Controls. Categories with an overall long-term trend increase (more defects) include Electrical Systems, Accessibility, and Exterior Body Condition.

The trend for "A" defects for all buses had increased steadily from December of 2016 (10) to December 2017 (21), and then reversed that trend falling to a range of 11-12 from April '18 to February '19. Last audit "A" defects decreased to nine, but then increased to 16 for this audit. TRC will continue to monitor.

RECORDS REVIEW

PMI Schedule Adherence

TRC examined the records of 13 buses selected at random (12 active, 1 contingency) to determine if PMIs are being done at scheduled 6,000-mile intervals. PMI intervals are considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles).

All PMI records, now filed electronically, are well organized and very easy to access and locate.

Table 5 which follows shows the PMI intervals compared to the previous PMIs performed by First Transit for each of the 13 buses selected at random.

	TABLE 5	
	PMI Schedule Adherence	
Bus #	PMI Mileage Intervals	Notes
184	6394	On time
196	6118	On time
272	5680	On time
286	5730	On time
291	6168	On time
332-C	5785	On time
349	5642	On time
354	5756	On time
369	6186	On time
385	5935	On time
1009	6418	On time

TABLE 5 PMI Schedule Adherence				
Bus #	PMI Mileage Intervals	Notes		
3009	6200	On time		
3019	6348	On time		

The review of records by TRC revealed that all 13 buses (100%) had their PM inspections done on time. The on-time performance for PMI schedule adherence remains at 100% for thirty-six consecutive audits, an impressive accomplishment. First Transit management continues its process whereby upcoming PMIs are identified and reviewed daily to ensure on-time completion.

Repair of Defects Identified During PMIs

TRC reviewed the last two PMI e-files for all 13 buses chosen at random (26 PMI records total) to determine if repairs were performed properly and made promptly. TRC examined the PMI files 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.

Of the 26 bus records reviewed, there were six cases where similar defects seem to reappear. An in-depth review revealed that in all cases First Transit had taken action to correct the defect.

With its electronic filing system, First Transit continues to have a record-keeping system that clearly distinguishes defects that get deferred or repaired as a follow-up to scheduled PM inspections.

Mechanic Training & Certification

TRC set out to determine if qualified mechanics are performing maintenance tasks by virtue of documented training and certification by selecting five HVAC repairs/inspections at random. TRC then asked First Transit to provide a copy of the repair order and the name of the mechanic performing the repair or inspection. **Table 6** which follows shows the five HVAC work orders examined.

	TABLE 6 A/C Repairs by Certified Mechanics				
Bus #	Date	HVAC Repair	Mechanic		
		AC inop. Repair leak and recharge			
367	07-31-19	system	Nanthavongsa		
		AC overcharged. Evacuate and	Nanthavongsa		
192	07-24-19	recharge system to correct level	Alemayehu		
			Nanthavongsa		
		AC low. Freon leak. Repaired and	Nickens		
294	07-25-19	recharge system	Ahanda		
		AC low. Repaired leaking hose and			
355	07-30-19	recharge system	Ndiaye		
		Freon leak. Repaired and recharge	Nickens		
352	08-09-19	system			

TRC then compared the mechanic(s) who performed the HVAC repairs to the listing of certified technicians compiled for this audit. **Table 7** which follows shows all mechanics along with those certified to perform HVAC (refrigerant-related) repairs and their AC certification status.

TABLE 7					
Mechanic and Foreman Wo	Mechanic and Foreman Work Status				
Mechanic's Name	AC Certification				
Andy Velez (Foreman) (FT)	YES				
S. Nanthavongsa (FT)	YES				
F. Brownell (Foreman) (FT)	YES				
W. Nickens (FT)	YES				
R. Ahenkora (15 per week – 50%)	YES				
F. Artieda (FT)	YES				
J. Mitchell (30 per week -75%)	YES				
A. Romano (FT)	YES				
D. Alemayehu (30 per week – 75%)	YES				
A. Ahanda (30 per week – 75%)	YES				
W. Morales (FT)	YES				
M. Osei (FT)	YES				
T. Criste (FT)	YES				
M. Moore (FT)	YES				
C. Graham (15 per week -50%)	YES				
T. Tsega (FT) (15 per week – 50%)	YES				
J. Bowles (FT)	YES				
M. Amankwah (15 per week – 50%)	YES				
J. Galo (FT)	YES				
F. Reinoso (15 per week – 50%)	YES				
A. Gugessa	YES				
D. Haile	YES				
B. Brooks	YES				
M. Ndiaye	YES				
T. Barlow (new hire)	YES				
E. Hopkins	YES				
T. Hexstall	YES				
D. Simmons	YES				

TRC found that all HVAC repairs involving refrigerant were performed by a certified AC technician. In fact, all mechanics/foremen are now AC certified.

As part of this inspection, TRC also requested an updated listing of all First Transit technicians and a summary of their experience and ASE certifications to determine compliance with the following PRTC requirement:

Maintenance Personnel will be trained to proficiency on each of PRTC's vehicles and subsystems prior to the start of service. Contractor will be required to ensure that all repairs involving warrantied 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 (defined as mechanics and foremen) 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 33 percent of the maintenance staff (defined as mechanics only) shall be ASE Master Certified for medium and heavy duty trucks (or transit buses). In addition, all mechanics (defined as mechanics and foremen) shall receive a minimum of 16 hours of technical/refresher training annually.

PRTC also requires that the ratio of buses per mechanic (excluding foremen) not exceed eight. As indicated in **Table 7** above, full-time employees are classified as "(FT)"; others include the number of hours they work per week (e.g., 30 per week). Those working 15-20 hours per week are classified as 0.50; 30 per week are classified as 0.75 equivalent of a full-time worker. **Table 8** which follows shows required versus actual staffing levels, experience/certifications, and annual refresher/technical training compliance.

The table is based on First Transit's current staffing levels of 23.75 full time equivalent mechanics (18 full time + 5 @ 0.50 + 3 @ 0.75 = 22.75 excluding foremen). There are a total of 28 maintenance employees: two full-time foremen and 26 full or part-time mechanics. Two mechanics left PRTC and one new mechanic was hired since the last audit.

TABLE 8 Mechanic Staffing Level, Certifications, and Experience						
	Ratio of buses to mechanics (excluding	Mechanics/foremen with ASE & 5 years exp. or voc. degree	Mechanics w/ ASE Master	Mechanics/foremen w/ min. 16 hours annual refresher/technical		
Measure	foremen)	& 2 years exp.	Certification	training		
Required	Max. 8.0	100%	Min. 33% of techs	100%		
	6.7 (153/22.75 full time equivalent	96% (27 of 28 total	34% (9 of 23.75 full time equivalent	100% (28 of 28 total		
Actual	mechanics)	mechanics/foremen)	mechanics)	mechanics/foremen)*		

Based on a review of the documentation provided, First Transit is compliant in three of the four workforce categories. One employee does not meet the experience requirements as described above, which brings compliance to 96% instead of the required 100%. Compliance is up from 92% last audit, and the one mechanic that does not meet full requirements does have an ASE certification, two years of truck experience and is AC certified. Given the total qualifications of all mechanics/foremen, the impact on the maintenance operation would be minimal with this minor workforce deficiency especially when all 28 maintenance employees (mechanics and foremen) now hold ASE certifications and all are AC certified.

Management of Fluid Analysis Program

First Transit is required to send engine oil, transmission, and coolant 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 had easy access; and
- c) the contractor is making use of the fluids analysis results as part of its maintenance program.

Samples are sent out weekly and results are returned in about seven days. Copies are made of each report and filed; this is in addition to computerized records that First Transit maintains for each sampling. Locating fluid analysis reports for each of the 13 buses examined was again made easy because of the well-organized electronic recordkeeping system.

First Transit's fluid analysis vendor uses a coding system of 1-5, where "1" indicates the sample finding is normal and "5" indicates the most critical condition. There were two cases where corrective action was recommended by the lab for the 26 bus records reviewed for this audit. In both cases, there was evidence that corrective action was taken.

In examining the last two PMIs for each of the 13 buses selected at random (26 records), TRC found that:

- Evidence exists that all fluid samples were taken at the appropriate interval.
- Recordkeeping of the fluid analysis program is adequate.

TRC also drew engine, transmission, and coolant fluid samples from 13 buses selected at random (39 samples) to provide another level of fluid condition verification. The results from TRC's lab, which uses a different grading system than First Transit's lab, are shown below. In each case, First Transit responded with an action plan for resolving the deficiencies.

Engine Oil

There were two engine oil alerts compared none last audit.

196 – Caution: Engine wear levels appear satisfactory for first sample. Sodium level (possible coolant chemical) elevated. Water content acceptable. Viscosity within specified operating range. Action: Check for source of possible coolant leak. As oil and filter(s) already changed, resample at a reduced service interval to monitor and establish wear trend.

Response: First Transit lube oil sample taken 10/10/2019 indicated extremely high levels of Copper where it was normal before; no Glycol contamination was present. We suspect the sample was contaminated by outside sources. Subsequent sample results after 6,000 miles show oil has returned to Normal.

349 – **Severe:** All engine wear rates normal. Sodium and potassium levels indicate internal coolant leak. Water content acceptable. Viscosity within specified operating range. Action: Check for source of coolant leak and repair. As oil and filter(s) already changed, resample after corrective action to further monitor.

Response: First Transits last 5 lube oil samples have remained normal across all evaluated spectrums including Sodium and Potassium with negative report for Glycol in the system. First Transit has completed a PMI on 11/4/2019 and we are currently awaiting results and will take action if confirmation of audit results are verified.

Transmission Fluid

There were two transmission fluid alerts compared to two last audit.

184 – **Caution:** Increase in aluminum level noted. All other wear rates normal. Silicon level (dirt/sealant material) satisfactory. Water content acceptable. Viscosity within specified operating range. Action: Resample next recommended service interval to further monitor.

Response: Normal results based on 45,400 miles sense last transmission service, it is coming due in 3,600 miles. This bus has been taken out of revenue service and potentially going to be sold in the near future. First Transit will create a work order reminder to service the transmission should the bus reenter revenue service.

3009 – **Caution**: Aluminum appears slightly high. All other wear rates normal. Silicon level (dirt/sealant material) satisfactory. Water content acceptable. Viscosity within specified operating range. Action: Resample next service interval to monitor and establish wear trend.

Response: This is a new bus which was due its first transmission fluid and filter service. It had reached the end of its service life therefore slightly elevated readings are completely normal. A transmission service has been completed and a fluid sample has been submitted for analysis. First Transit awaits the results and will take further warranty action if sample results indicate required action.

<u>Coolant</u>

There were two coolant alerts compared to two last audit.

272 – **Abnormal**: Glycol level is high. pH level is normal. Pressure check radiator cap, if it fails replace cap and recheck pressure. Check that proper coolant volume is being maintained. Recommend adjust coolant to a 50/50 mix. Recommend take corrective action and resample to monitor.

Response: First Transit will follow recommendations by replacing the Pressure cap, pressure testing the system and replacing the coolant with a 50/50 mix ratio. We will continue to monitor every 6,000 miles.

1009 – **Abnormal**: Glycol level is high. pH level is normal. Pressure check radiator cap, if it fails replace cap and recheck pressure. Check that proper coolant volume is being maintained. **Recommend adjust coolant to a 50/50 mix. Recommend take corrective action and resample to monitor.**

Response: First Transit will follow recommendations by replacing the Pressure cap, pressure testing the system and replacing the coolant with a 50/50 mix ratio. We will continue to monitor every 6,000 miles

For this audit, the number of fluid alerts from the samples taken by TRC totaled four compared to six last audit. Of the six alerts, four require corrective action before the next scheduled PM inspection. First Transit initiated corrective action as indicated above as a result of the findings. The findings are consistent with a program that provides early warning of more serious potential future problems. Regarding alerts reported by TRC's fluid sampling last audit, there was evidence to support that First Transit followed up and took necessary corrective action as recommended by TRC's lab.

ROAD TEST INSPECTION

TRC conducted a road test of 13 buses selected at random after the static inspections had been conducted. The road testing began during the October 2007 audit. As indicated earlier, a protocol for assigning any defects identified during the road test was established for this audit. Road test defects are classified as those that would render a vehicle out of service or not according to PRTC's "Out of Service Defects – While Operating" criteria. The Road Test protocol is fully described in Appendix E.

Defects identified during the road tests are <u>not</u> included with the static inspection defects to maintain consistency with previous audits where road tests were not part of the audit. Details of any road test defects found are shown in the "Road Test Defects" tab of the attached spreadsheet.

No road test defects were found this audit compared to none last audit. A historical summary of road test defects, including those that would render a bus out of service, is shown in **Table 9**.

TABLE 9Summary of Road Test Defects					
Apr. '18 Aug. '18 Feb. '19 June '19 Oct '19					
Total Road Test Defects	1	0	0	1	0
Out-of-Service Total	1	0	0	0	0
Nature of Out-of-Service	Erratic				
Defect(s)	acceleration	n/a	n/a	n/a	n/a

ANALYSIS OF CONTINGENCY BUSES INSPECTED

The four contingency buses inspected averaged 7.75 defects per bus compared to 3.75 for the previous two audits. The active bus fleet averaged 3.8 defects per bus by comparison. There were no "A" defects found on contingency buses for this audit compared to the same last audit. While "A" defects for contingency buses remain low, other defects for this audit more than doubled. TRC will continue to monitor contingency buses to determine if the sharp increase is an anomaly or the beginning of an upward trend.

It should be noted that direct comparisons between the two fleets is difficult to make because of the small sampling size of the Contingency Bus fleet. Contingency Buses are also older and are driven less frequently than active buses, which typically results in a higher number of defects.

No contingency bus was found with an abnormal fluid finding.

TABLE 10Summary of Contingency Bus Defects					
Aug. '18 Feb, '19 June '19 Oct '19					
Total Defects - Contingency Bus	13	15	15	31	
Average Defects per Contingency Bus	3.25	3.75	3.75	7.75	
Average Defects per Active Bus	2.6	2.5	3.1	3.8	
Average # of "A" Defects per Bus:					
Contingency Fleet	0.0	0.25	0.25	0	
Average # of "A" Defects per Bus:					
Active Fleet	0.21	0.23	0.17	0.34	

All contingency buses selected at random for inspection were inspected first to determine if their engines would start -- an indication if First Transit is keeping the fleet ready for operation. Of the four contingency buses inspected, all did start this audit compared to one bus that did not start last audit.

ANALYSIS OF ALL CONTINGENCY BUS RECORDS

An analysis of all Contingency Bus records was conducted to determine if First Transit is meeting its contractual requirements to conduct the following:

- Perform PMIs twice per year, including oil and filter changes
- Keep batteries charged, air systems operational, etc.
- Maintain current state inspections
- Operate buses frequently and for substantial periods of time (minimum 30 miles per month)

It was agreed that a minimum of 30 miles per month (360 miles per year) would be sufficient for the contingency fleet, and two full PMs including oil and filter changes would be conducted annually regardless of accumulated mileage and regardless of the number of specialized "Contingency Bus Inspections" already conducted to check safety items. It was also agreed that subsequent audits would first begin with an inspection of the Contingency Buses selected for the audit as a way to determine if buses would start and, therefore, be ready for service on a moment's notice if needed. The 30-miles-permonth-per-contingency-bus requirement will be monitored and is subject to change.

A review of all Contingency Buses in meeting contract requirements is shown in **Table 11**. The number of designated Contingency Buses in the fleet totaled 10 this audit compared to the same last audit. The review revealed all of the 10 Contingency Buses received a minimum of two full PMIs during the past year. The review also indicated that four of the 10 Contingency Buses showed activities related to battery maintenance, and eight buses had air system maintenance activity. It should be noted that not all buses need this service within a three-month period. **Table 11** also shows that all annual state inspections are current and all traveled a minimum of 30 miles per month. Seven of the 10 Contingency Buses traveled over 1,000 miles in at least one of the three months examined.

TABLE 11 Review of Contingency Bus Records				
Bus Number	Last Two PMs Performed	Batteries Charged & Air Systems	Valid State Inspections	Miles Traveled Per Month (30 min.) Last 90 Days
262	02/27/19 10/30/19	Check charging and new batteries: 02/27/19 Check air system: 02/27/19	Yes	July - 33 August - 41 September - 35
267	04/04/19 10/12/19	Check batteries: 04/04/19 Check air system: 04/04/19	Yes	July - 32 August - 31 September -37
268	04/01/19 10/12/19	No battery activity found No air system activity found	Yes	July - 31 August - 134 September - 35
313	04/11/19 08/01/19	No battery activity found	Yes	July - 1224 August - 2972

TABLE 11				
Review of Contingency Bus Records				
Bus Number	Last Two PMs Performed	Batteries Charged & Air Systems	Valid State Inspections	Miles Traveled Per Month (30 min.) Last 90 Days
		Air dryer: 04/11/19 & 08/01/19		September - 2370
317	04/18/19 08/23/19	Check batteries: 04/18/19 Repair alternator: 08/23/19	Yes	July - 1084 August - 63 September - 611
		Air dryer: 08/23/19 Air compressor: 04/18/19		
320	05/8/19 08/16/19	Jump start connector: 08/16/19 No air system activity	Yes	July - 2395 August - 925 September - 1748
321	05/21/19 08/13/19	No battery activity found Air dryer: 05/21/19	Yes	July - 2640 August - 1496 September - 1420
322	05/20/19 09/24/19	No battery activity found Air compressor: 05/20/19	Yes	July - 1477 August - 982 September - 1716
329	05/09/19 08/07/19	No battery activity found Air leaks (2): 05/09/19	Yes	July - 2002 August - 1545 September - 1660
332	06/14/19 09/13/19	No battery activity found Air pressure gauge: 06/14/19 & 09/13/19	Yes	July – 2597 August - 1758 September - 2298

Additional Contingency Bus Records Inspection

Of the four Contingency Buses inspected, the analysis found 11 of the 31 defects identified were ones that an operator should have noted (see **Table 12**). Of the 11 defects that an operator should have noted, references to four of them were found in the Zonar records. Last audit, operators also failed to note such

Table 12					
Dug	Additional Review of Contingency Bus Records				
Dus Number	Been Identified by Operator	Zonar Becord	ACHOIL LAKEIL		
262	Destination sign some	No such defects			
202	- Destination sign, some	- NO SUCH defects	11/a		
	Water lask shows driver	noted			
	- water leak above driver		1		
	- Destination sign, some	- No such defects	n/a		
	sections inop	noted			
	- Check engine light				
267	- Roof hatch leak				
313	- Loose reading light	- No such defect noted	n/a		
	- Reverse light internal	- 10/10/19 (rear	Repaired		
	moisture	lighting)	11/12/19		
332	- Worn wheelchair platform	- No such defect noted	n/a		
	bushing				
	- Destination sign, some	- 10/21/19 rear	Repaired		
	sections inop	destination sign not	11/12/19		
		working			
	- Body damage	-10/15/19: multiple	Body work		
		body damage	deferred		
	- Loose body trim	-10/15/19: multiple	Body work		
		body damage	deferred		

defects. TRC will continue to monitor Zonar records and continue to recommend that steps be taken to make better use of the Zonar system.

RECOMMENDATIONS

Given the increase of defects for this audit, the primary recommendation is to reduce exterior-related defects, engine/engine compartment defects, contingency bus defects, and "A" defects. Another recommendation is to increase the oversight of PM inspections to make certain mechanics are identifying all defects and use that same oversight to ensure action is taken to repair those defects. In addition, operators need to be trained to note more defects on their Zonar records. Of the 11 defects that an operator should have noted, only four were noted by drivers in Zonar records. Last audit, operators failed to note any such defects. Reporting of defects by operators is an essential part of any PM program.

APPENDIX A – List of Buses Inspected

Buses Inspected			
	RECORDS &	ROAD TEST	
FLEET INSPECTION	FLUIDS ANALYSIS	INSPECTION	
2005-06 GILLIG 40'			
Phantom			
184-188			
Second bus Not available			
184	184	184	
2010-12 GILLIG 40' LF			
189-199,1000-1002			
192			
193			
197			
	196		
198		198	
1000			
2004-13 GILLIG 30'			
262, 267-288			
262-C			
267-C			
272	272	272	
279			
282			
284		284	
286	286		
2002 MCI			
313-337			
313-C			
332-C	332-C	332-C	
2003-06 MCI			
338-360			
338		338	
345			
346			
349	349		
350			
352			

Buses Inspected			
FLEET INSPECTION	RECORDS & FLUIDS ANALYSIS	ROAD TEST INSPECTION	
354	354		
360		360	
2008-14 MCI			
361-393			
362			
367			
369	369		
370			
375		375	
377			
382			
385	385		
389			
391		391	
393			
2016 Gillig			
1003-1009			
1008		1008	
1009	1009		
2016 Gillig Low Floor 289-294			
289			
291	291	291	
2017 MCI			
394-398			
394			
398			
2019 MCI			
3000-3036			
3002		3002	
3003	2000		
3009	3009		
3010		3010	
3017	2010		
3019	3019		
3024			
3027			
3030			
3031			
		TOTAL 13	
101AL: 51	101AL: 13 12 Activo	101AL: 13	
47 Acuve 4 Cont.	12 Active 1 Cont.	12 Active 1 Cont.	

APPENDIX B – Evaluation Criteria & Methodology

TRC continued its audit process of evaluating fleet condition, records, fluids, and worker certification/training using identical procedures from the previous audits. A team of three bus inspectors was assigned to physically inspect the buses, conduct road tests, and draw oil samples. A separate Project Manager organized the overall inspection process, performed the Records and Fluids Analysis Audit, and prepared the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the various audit inspections.

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 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 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-critical defect, the repair of which could be deferred to a later time.

"A" category defects were agreed upon by PRTC and First Transit early in the audit process and remain the same to keep audit comparisons consistent. A copy of the "A" defects used for all audits is attached as Appendix B. TRC informed First Transit management of "A" category defects as soon as they were identified, which First Transit repaired immediately or scheduled for repair soon afterwards. First Transit was given an opportunity to contest defects as soon as they were brought to their attention.

TRC shared the entire list of preliminary defects found during each day's inspections with First Transit management with the understanding that the defects would need to be reviewed by TRC and may change based on that review. The sharing of defects is 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 confirm operation of certain controls in advance 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

Thirteen buses were selected at random by PRTC 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 thirteen 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).

Repairs

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

- 1) PMI sheets going back three PMIs were examined for each of the thirteen buses selected at random to determine if and when defects noted during the PMI process were repaired.
- 2) Defects from the previous 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 five (5) air conditioning (AC) repairs at random from the work orders.

TRC examined 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 refrigerant) are not required to be certified.

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 established requirements.

Fluids Analysis Management

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

TRC also drew engine oil, transmission fluid, and coolant samples from thirteen buses selected at random and reviewed those results (39 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 fluids analysis results. In addition, TRC reviewed the actions recommended by the lab for the samples it took during the last audit to determine if First Transit did, in fact, act on those recommendations.

Road Test Protocol

A defined protocol based on PRTC's "Out of Service Defects While Operating" list was used for assigning defects identified during the road test of 13 buses. All road test defects continue to be listed separately and are <u>not</u> included in the fleet defect totals. Instead of assigning an "A" or "B" designation as is done with static inspection defects, road test defects are classified as either:

- Those that in the opinion of the operator would render the vehicle out of service according to PRTC's "Out of Service Defects While Operating" list.
- Those that would <u>not</u> render the vehicle out of service in the opinion of the operator.

PRTC's "Out of Service Defects While Operating" list is attached as Appendix F, which also describes the entire Road Test Protocol as agreed to by PRTC and First Transit.

Contingency Bus Records Review

A review of all contingency bus records (9 in total for this audit) was made to determine if contract obligations are being met by First Transit to:

- Conduct a minimum of two PM inspections annually, including oil and filter changes
- Make sure batteries are charged and air systems operational
- Make sure current annual state inspections are maintained
- Make sure buses are operated frequently and for sustained periods of time (minimum 30 miles per month).

APPENDIX C – Excel Spreadsheet Reports (Attached as a CD)

- Defect Summary All Buses
- Defect Summary Active Buses
- Defect Summary Contingency Buses
- Static Defects All Buses
- Road Test Defects All Buses
- Defects by Category All Buses
- "A" Defects All Buses
- Static Defects Active Buses
- Road Test Defects Active Buses
- Defects by Category Active Buses
- "A" Defects Active Buses
- Static Defects Contingency Buses
- Road Test Defects Contingency Buses
- Defects by Category Contingency Buses
- "A" Defects Contingency Buses
- Defect Category Trends Active Buses
- All Buses Inspected
- Active Buses Inspected
- Contingency Buses Inspected

APPENDIX D – Listing of "A" Category Defects

PRTC "A" Defect List

- Fire extinguisher (expired tag OK unless indicator in red)
- 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 dryer and air operated wipers on delay)
- Brake lining thickness @ 7/32-inch; Disc lining at 1/8-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 E – Listing of Contested Defects and TRC Response (none for this audit)

Bus Number	Defect and Reason for Being Contested	TRC Response
282	Dirty AC filters	Others with less restriction were not
289		written up as defects; the filters
291	Considered normal wear and tear	identified here were excessively dirty.
1000		All four defects stand as is.
279	Multiple engine leaks	TRC policy in the past was to group
1009		multiple leaks in one location as one
	Multiple oil leaks written up on engine	because origin of leak difficult to
	could be coming from a single location	determine. Accepted, multiple defects
		changed to a single defect for each bus.
198	Moisture in lens	TRC has written these defects up in the
313		past as ones that that need to be repaired
349	Still passes DOT inspection	(sealed). All four defects stand as is.
382		
3019	Cracked AC belt	Cracked belts lead to failure and need to
		be changed as preventive measure.
	Normal wear and tear	Defect stands as is.
184	Hazy coolant condition	TRC called the lab, which stated that
196		"hazy" refers to a "mild" visual
286	Based on First Group's Laboratory, ANA	condition, whereas "cloudy," which
385	Laboratories INC, sample readings	these samples are not, implies a serious
	indicate no troubles in the test report.	condition. Given that lab does not
	Parts per million fall within normal	consider this serious, no other
	parameters making it difficult to take	abnormalities were found in these
	action on appearance alone. First Transit	samples, and FT does its own testing
	will continue to test and monitor Coolant	with no abnormalities found, the four
	at every 6,000 miles and take appropriate	coolant findings in questions are
	action as necessary.	removed.
	-	

APPENDIX F – Road Test Protocol

A) Process

First Transit assigns consistent operator(s) to road test approximately 25% of buses selected for each maintenance audit. The process consists of a TRC inspector accompanying the operator during the road test, asking questions if needed to ensure the operator has not overlooked a defect.

Defects and abnormalities are classified as either:

- Those that in the opinion of the operator would render the vehicle out of service according to PRTC's "Out of Service Defects While Operating" list (see below).
- Those that would <u>not</u> render the vehicle out of service in the opinion of the operator.

Defects that render the vehicle out of service are then inspected by First Transit with a TRC inspector serving as an observer. First Transit indicates the findings of their investigation to the TRC inspector along with the proposed corrective action (if any). The TRC inspector records this information and gains concurrence from First Transit that the report is accurate. The TRC inspector then adds his observations separately.

All road test defects and reporting are itemized separately in the Audit Report and are not counted or reported with the static defect totals.

B) Out of Service Defects – While Operating

Per the PRTC/First Transit Bus Service Operating Procedures, the following items require the operator to stop the bus as soon as it is safe to do so and contact dispatch. If they occur during a road test, they will be noted as such in the Audit Report.

- 1. Transmission
 - a. slips b. will not shift
 - c. overheats
- 2. Engine Problems
 - a. hot engine
 - b. cuts off
 - c. unusual acceleration (e.g., bucks, hesitates, sticking accelerator)
- 3. Oil System Problems
 - a. Oil light
 - b. Severe oil leak
- 4. Air System Problems
 - a. No or low air pressure (under 80 psi)
- 5. Brake System Problems
 - a. Hot brakes or wheels
 - b. Slack brakes

- 6. Fuel leak or smell
- 7. Excessive steering condition
- 8. Exhaust fumes leaking into bus (obvious smell)
- 9. Inoperative defroster system
- 10. Flat tire(s)
- 11. Inoperative windshield wiper(s)
- 12. Any other defect rendering the vehicle unsafe to operate