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of Transportation

**Urban Mass
Transportation
Administration**

Transit Reliability Information Program: PATCO-WMATA Propulsion System Reliability/Productivity Analysis

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16. Abstract

The Transit Reliability Information Program (TRIP) is a government-initiated program to assist the transit industry in satisfying its need for transit reliability information. TRIP provides this assistance through the operation of a national data bank. This data bank collects, stores, and analyzes data generated by transit operators during the course of revenue service operation and equipment maintenance. The results of the periodic analyses of the stored data are distributed to TRIP participants and users.

This report provides a description of the utilization of TRIP data as a tool for reliability/productivity analysis. The Port Authority Transit Corporation (PATCO) and the Washington Metropolitan Area Transit Authority (WMATA) are the participating transit authorities for which there is some maintainability data (labor hours by maintenance action) on the data base, thus restricting the reliability/productivity analysis to these two authorities.

17. Key Words

Rail Transit, Reliability, High Driver, Labor Hours, Labor Rate, Maintenance Actions, Maintenance Rate, Maintainability, Productivity, Propulsion

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PREFACE

This document describes the utilization of the Transit Reliability Information Program (TRIP) as a tool for conducting a reliability/productivity analysis on rapid rail car systems. This document has been prepared by the Dynamics Research Corporation (DRC), Wilmington, Massachusetts, under contract number DTRS-57-81-C-00084, issued by the U.S. Department of Transportation (DOT), Transportation Systems Center (TSC), on behalf of the Office of Systems Engineering of the Urban Mass Transportation Administration (UMTA), Office of Technical Assistance, U.S. Department of Transportation.

The purpose of this document is to demonstrate the analytical capabilities of the TRIP Data Bank using maintainability data (labor hours by maintenance action).

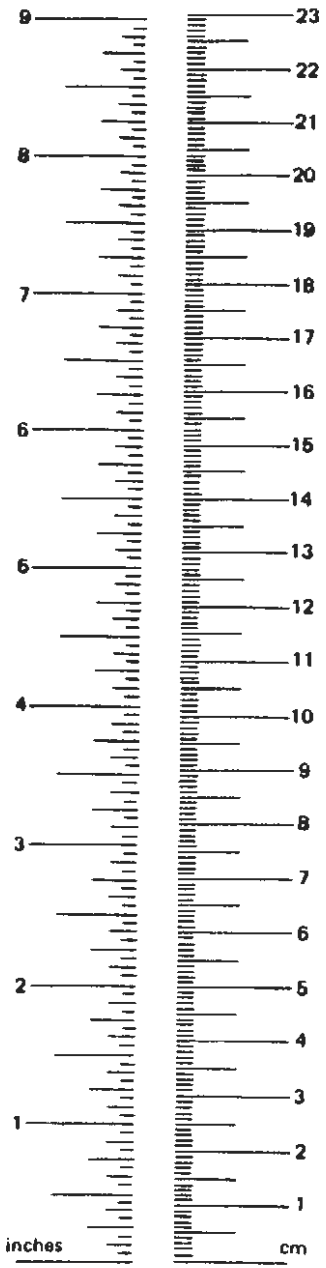
The authors wish to thank all those individuals from the transit authorities, the suppliers, the American Public Transit Association, and the U.S. Department of Transportation, who provided data and assistance during this effort.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

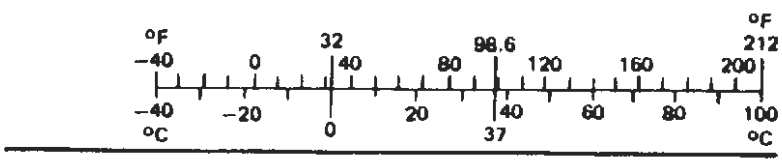
Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.96	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in. = 2.54 cm (exactly). For other exact conversions and more detail tables see NBS Misc. Publ. 286, Units of Weight and Measures. Price $2.25 SD Catalog No. C13 10 286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	36	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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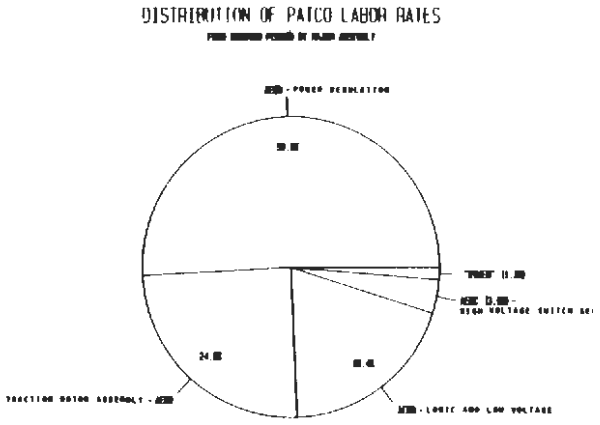
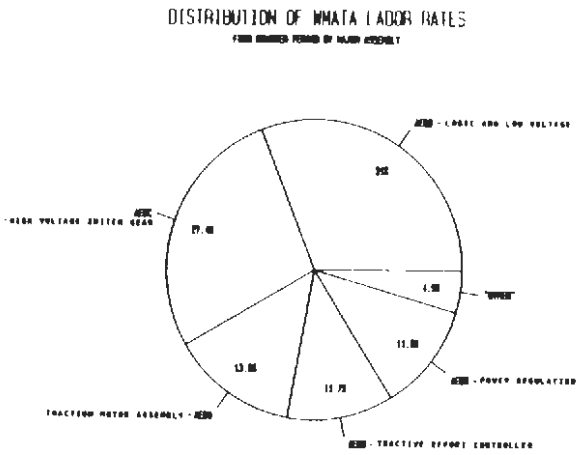
EXECUTIVE SUMMARY

This Special Report (Number 8) of the TRIP Data Bank (DB) has been prepared by Dynamics Research Corporation, operators of the TRIP DB. The purpose of this report is to compare detailed maintenance (reliability and maintainability) information on propulsion systems in use at the Port Authority Transit Corporation (PATCO) and the Washington Metropolitan Area Transit Authority (WMATA).

The report shows that PATCO's propulsion system is more reliable. PATCO's Maintenance Rate (maintenance action per 10,000 miles) is 19% lower than WMATA's. WMATA's system, however, exhibits a higher level of maintainability. WMATA's Labor Rate (maintenance labor hour expenditures per 10,000 miles) is 20% lower than PATCO's. The distribution of Labor (and Maintenance) Rates by major assembly, assembly etc. varies between the two authorities as shown below.





The TRIP Data Bank is best used in the comparison of data on a uniform basis, over time, between authorities. This capability makes possible the highlighting of differences and specific factors such as vehicle utilization, maintenance policies and equipment application which can influence hardware reliability and maintainability. The reasons for differences in the statistics may be investigated further in order to pinpoint specific problem(s); develop strategies, actions to improve equipment reliability, maintainability, and maintenance productivity; and therefore, lower operating and maintenance costs.

SECTION 1 - INTRODUCTION AND OVERVIEW

1.1 INTRODUCTION AND PURPOSE

This analytical report has been produced from data contained in the Transit Reliability Information Program (TRIP) Data Bank (DB) by Dynamics Research Corporation (DRC) under Contract Number DTRS-57-81-C-00084. The TRIP DB is an automated system for the collection, storage, retrieval, analysis and reporting of maintenance/reliability data which is being generated by transit operators in the course of revenue service operation and equipment maintenance of rapid rail vehicles. Its development has been initiated by the U.S. Government to assist the transit industry in satisfying an acknowledged need for transit reliability information on a national basis. TRIP provides this assistance through the operation of a national reliability Data Bank.

Review of TRIP Output Reports since June, 1979 indicate that the propulsion system is the transit car reliability high-driver, (least reliable) system throughout the industry. The propulsion system therefore, is the appropriate system to choose for this analysis which has been performed to help demonstrate analytical capabilities of the TRIP DB. Since the Port Authority Transit Corporation (PATCO) and the Washington Metropolitan Area Transit Authority (WMATA) are the two participating transit authorities for which there is some maintainability data (labor hours by maintenance action) on the data base, this

reliability/productivity analysis is restricted to these two authorities.

* * * NOTICE * * *

The information in this document has been obtained from data voluntarily submitted to the TRIP Data Bank by the Port Authority Transit Corporation and the Washington Metropolitan Area Transit Authority. This data has not been verified for completeness or accuracy.

Operating requirements and environments, maintenance procedures, and other factors contribute to variations in equipment repair and replacement rates. Any comparison of repair or replacement rates for specific types of equipment must consider the effects of these factors on the data reported herein.

This notice should accompany any subsequent use or reproduction of the information contained in this document.

* * * * * * * * * *

1.2 SCOPE

The data used for this report covers a one year period from April 1, 1982 through March 31, 1983. This period was chosen because prior to April 1982, PATCO labor hours associated with duplicate records resulting from different

employee numbers were not captured. Duplicate records arise because a separate record is created by PATCO for each employee who works on a specific job and for each unique date associated with a given job number. Effective in April 1982, the PATCO Data Extraction Program was modified so that while records are automatically being checked for duplicates, a running total of the labor hours expended on each inspection and repair job is kept, with the total being included in the final record that is written for data base input.

Ten separate dynamic data extractions, which are discussed in detail in Section 4, were made for this report. The vehicle fleets from which the statistics in the data extractions are derived are:

- PATCO: All cars - 121 Cars:
  - Singles: 25 Cars;
  - Old Pairs: 50 Cars;
  - New Pairs: 46 Cars.
- WMATA: All ROHR Pairs - 300 Cars.

The ten data extractions are:

(NOTE: See Section 2 for a complete list of definitions and terms used throughout this report.)

1. Maintenance Actions per 100,000 Miles of Revenue Service Operation:

For each authority, quarterly statistics and the four quarterly period total statistics are given for:

- Mileage
- Maintenance Actions at the third (of four) level of Generic Part Number (GPN) Indenture
- Maintenance Rate at the third level of GPN Indenture.

2. Labor Hours per 100,000 Miles of Revenue Service Operation:

For each authority, quarterly statistics and the four quarter periods total statistics are given for:

- Mileage
- Labor Hours at the third level of GPN Indenture
- Labor Rates at the third level of GPN Indenture.

3. Reliability Statistics for the Four Quarter Period Based on 10,000 Miles of Revenue Service Operation:

For the reliability and maintainability (R&M) high-drivers identified via data extraction numbers 2 & 3, the following reliability statistics are given for each authority by the full GPN (fourth level of indenture), and Universal Component Code (UCC) associated with each GPN:

- Maintenance Actions
- Maintenance Rates
- Mean Miles Between Maintenance Actions (MMBMA).

4. Maintainability Statistics for the Four Quarter Period Based on 10,000 Miles of Revenue Service Operation:

For the R&M high-drivers identified via data extraction nos. 2 & 3 (same as in no. 4), the following maintainability statistics (indicies of productivity) are given for each authority by the full GPN, and UCC associated with each GPN:

- Labor Hours
- Labor Rates
- Mean Labor Hours to Repair (MLHTR)
- Labor Hour Repair Rate (1/MLHTR).

5. Maintainability High-Driver by Defect Code:

For the Major Assembly identified as the least maintainable for both PATCO and WMATA (Traction Motor Assembly), the following R&M statistics are given for the four quarter period for each authority by the full GPN, UCC and Generic Defect Code associated with each GPN/UCC combination.

- Maintenance Actions
- Maintenance Rates
- Labor Hours
- Labor Rates
- Mean Labor Hours to Repair.

6. Maintainability High Driver By Repair Code:

   Same as data extraction no. 6 except the Generic Repair Code replaces the Generic Defect Code as the tertiary search key.

7. PATCO Maintenance High-Driver By Defect Code:

   Same as data extraction no. 5 except the statistics are presented for the Power Regulation Major Assembly.

8. PATCO Maintenance High-Driver By Repair Code:

   Same as data extraction no. 6 except the statistics are presented for the Power Regulation Major Assembly.

9. WMATA Maintenance High-Driver By Defect Code:

   Same as data extraction nos. 5 & 7 except for WMATA's instead of PATCO's Major Assembly R&M high-driver (Logic and Low Voltage).

10. WMATA Maintenance High-Driver By Repair Code:

    Same as data extraction nos. 6 & 8 except for WMATA's instead of PATCO's Major Assembly R&M high-driver (Logic and Low Voltage).

One additional data extraction was anticipated during the analysis description formulation for the Contract Statement of Work. This was the identification of labor expenditures on unscheduled versus scheduled maintenance. Because TRIP is not presently monitoring all vehicle

systems, the Data Bank does not contain total vehicle unscheduled maintenance labor hours. A comparison of labor hour expenditures for scheduled maintenance versus a subset of the total unscheduled maintenance labor hours would not be meaningful. In addition, TRIP monitors only the fact that a scheduled maintenance function was performed and captures the total labor hours for the inspection (PATCO & WMATA). The capability does not exist to extract scheduled maintenance labor hour expenditures for any given vehicle system separately. A comparison of labor expenditures on unscheduled versus scheduled maintenance for just the propulsion system is therefore not possible. For these reasons this data extraction was not performed. All the above described data extractions are presented and discussed in Section 4 of this report.

Section 2 contains a complete list of definitions and terms used throughout the report. Section 3 presents a description of the propulsion system being analyzed at each authority and the environment in which the cars are operated. Section 5 presents conclusions that may be drawn from the data analyses.

SECTION 2 - DEFINITIONS AND DATA PRESENTATION CONVENTIONS

The following is a summary of definitions, terms and data presentation conventions used throughout this report.

2.1 DEFINITIONS AND TERMS

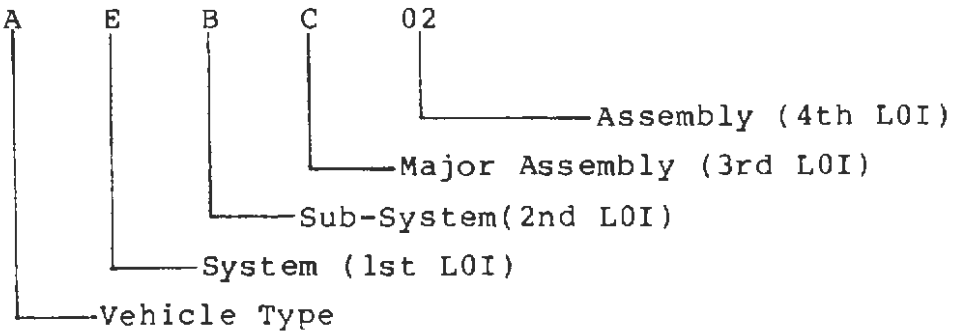
The terms are presented in order alphabetically in the following subsections.

2.1.1 Generic Defect Code

The Generic Defect Code is a standard 4-character "number" used in the TRIP Data Bank to represent transit authority defect codes of equivalent definition. Defect codes describe equipment failures or defects. They are presented as Appendix M.

2.1.2 Generic Part Number

The Generic Part Number (GPN) is a standard, 6-character "number" used in the TRIP Data Bank to represent components of equivalent function, regardless of the specific part number used by the transit authority to identify a component. The GPN contains four levels of indenture (LOI) as follows:



In the above example,

AØØØØØ = Rapid Rail Vehicle
AEØØØØ = Propulsion System
AEBØØØ = Tractive Effort Controller
AEBCØØ = High Voltage Switchgear
AEBCØ2 = Field (Contactor)

The complete GPN hierarchical listing for the propulsion system is shown in Appendix K.

2.1.3 Generic Repair Code

The Generic Repair Code is a standard, 4-character "number" used in the TRIP Data Bank to represent transit authority repair codes of equivalent definition. Repair codes describe the actions taken to correct known defects or to treat observed symptoms. They are presented as Appendix N.

2.1.4 Labor Hour Repair Rate

The Labor Hour Repair Rate (LHRR) is a number expressing how many vehicle Maintenance Actions attributed to a given item are completed in an hour. If the LHRR is 2.0 for a given item, then the Mean Labor Hours to Repair (MLHTR - see 2.1.8) is 0.5. These two terms are the reciprocals of each other.

2.1.5 Labor Rate

The Labor Rate (LRATE) is a number expressing how many maintenance labor hours are expended over a given amount of revenue service miles. Labor Rates are computed on different bases within this report. The first grouping is "Labor Hours per 100,000 Miles of Revenue Service Operation", by quarter and 4 quarter period or

$$\frac{\text{Total Labor Hours per Given Time Period}}{\text{Mileage for the given time period.}} \times 100{,}000$$

The second grouping is "Labor Hours per 10,000 Miles of Revenue Service Operation", by 4 quarter period, or

$$\frac{\text{Total Labor Hours per 4 Quarter Period}}{\text{4 Quarter Period Mileage}} \times 10{,}000$$

Quarterly mileages used in the calculations are shown below. These figures were obtained from the utilization data submitted to the TRIP Data Bank by PATCO and WMATA. The quarterly average number of cars

operated in revenue service by each authority is also given.

QUARTER	MILEAGE		AVE. NO. OF CARS OPERATED	
	PATCO	WMATA	PATCO	WMATA
2Q82	1,001,157	4,165,366	120	299
3Q82	964,911	4,165,638	118	297
4Q82	1,014,728	4,206,663	109	299
1Q83	1,007,152	3,997,136	109	294
TOTAL PERIOD	3,987,948	16,534,803	114	297

When labor hours, instead of elapsed time, is used as the basis for expressions of maintainability the following three indicies of productivity are equivalent measures: Labor Rate; Maintenance Support Index (MSI); and Maintenance Load Factor (MLF). The MSI is a measure of the average maintenance support required to maintain a system expressed in terms of labor hours per 10,000 miles/hours of revenue service operation. Its equivalency to the labor rate, defined above, is self evident. The classical definition of a MLF is a measure reflecting the repair load experienced in maintaining a vehicle/component and is determined by multiplying the vehicle/component's failure rate and Mean Time To Repair (MTTR). In this report failure rates are expressed as MRATE (see Sec. 2.1.7). The labor rate equivalent to MTTR is the MLHTR (see Sec. 2.1.8). A Maintenance Labor Hour Load Factor (MLHLF) is therefore expressed as:

$$MLHLF = MRATE \times MLHTR$$

$$= \frac{MACT}{MILES} \times \frac{LHRS}{MACT}$$

$$= \frac{LHRS}{MILES} = LRATE = MSI.$$

2.1.6 Maintenance Action

TRIP monitors primary (vehicular) maintenance i.e., maintenance on the vehicle to return it to revenue service. TRIP does not monitor secondary maintenance, i.e, off-the-vehicle shop maintenance to repair failed components.

A Maintenance Action (MACT), in its first definition, is the number of times that a vehicle is brought into a shop for maintenance (over a specified period) as determined by a physical count of the number of unique maintenance dates contained in the set of maintenance records for each vehicle. Since this Special Report pertains to only the Propulsion System, the set of maintenance records used to estimate the number of maintenance actions contains only those records whose Generic Part Number (GPN) begins with "AE".

A second definition of "maintenance action" is used herein to describe the unique combination of Car Number, Maintenance Date, GPN (or any of its four levels of indenture), Universal Component Code (UCC), and/or Generic Repair or Defect Code. As the number or detail of elements is increased, the number of unique combinations of elements within the set of maintenance records also increases. For example, the four quarter period data for PATCO contains 328

unique combinations of Car Number and Maintenance Data for GPN = "AEBB00". Adding UCC to the search for unique combinations raises the count to 332, and adding Generic Defect Code raises the count to 333. For this period there are 335 PATCO maintenance records.

2.1.7 Maintenance Rate

The Maintenance Rate (MRATE) is a number expressing how many Maintenance Actions occur during a given amount of revenue service miles. As with the Labor Rates, Maintenance Rates are computed on different bases within this report. The first grouping is "Maintenance Actions per 100,000 Miles of Revenue Service Operation", by quarter and 4 quarter period, or

$$\frac{\text{No. Maintenance Actions per Quarter Period}}{\text{Mileage per Period}} \times 100{,}000$$

The second grouping is "Maintenance Actions per 10,000 Miles of Revenue service Operations", by 4 quarter period, or

$$\frac{\text{No. Maintenance Actions per 4 Quarter Period}}{\text{4 Quarter Period Mileage}} \times 10{,}000$$

2.1.8 Mean Labor Hours to Repair

The Mean Labor Hours to Repair (MLHTR) is a number expressing the mean number of labor hours experienced in effecting a given vehicle repair (maintenance) action.

MLHTR is computed by dividing Labor Hours by Maintenance Actions. It is the reciprocal of the Labor Hour Repair Rate (see Sec. 2.1.4). So, if the MLHTR is 2.0 (2 labor hours to accomplish the vehicle repair), then the LHRR is 0.5.

2.1.9 Mean Miles Between Maintenance Actions

Mean Miles Between Maintenance Actions (MMBMA) is the reciprocal of the MRATE, expressing the utilization of a vehicle, component, etc., in terms of revenue service miles (10,000 or 100,000 in this report) between Maintenance Actions on the vehicle, component.

2.1.10 Universal Component Code

The Universal Component Code (UCC) is a standard, 2-character "number" used in the TRIP Data Bank to identify the specific component or assembly which has been functionally identified by the GPN. For example, the UCC "6S" means "contactor". Combining this UCC with the example GPN (see Section 2.1.2) thus identifies the "Field [Shunt] Contactor". Other components of the contactor are identified by different UCCs in combination with the same GPN. The UCCs are presented as Appendix L.

2.2 DATA PRESENTATION CONVENTIONS

The following data presentation conventions are used for the data extraction exhibits (Appendix A through J).

- "--": value exactly equals zero

- "Ø.Ø": for data extraction nos. 1 & 2 and 5 through 8, where the data is presented to one decimal place,

  zero < "Ø.Ø" < Ø.Ø1.

- "Ø.ØØ": for data extraction nos. 3 & 4, where the data is presented to two decimal places,

  zero <"Ø.ØØ" <Ø.ØØ1

- "*******": MMBMA value exceeds 999.99. Since this appears where the mileage basis is 10,000 miles it actually means the value exceeds 9,999,900.

- "----": value is not applicable or indeterminate. For example where MACT, and therefore MRATE and LRATE, equals zero, MLHTR is not applicable, and MMBMA and LHRR is indeterminate.

SECTION 3 - EQUIPMENT DESCRIPTION

This section provides background information on the equipment being analyzed and the environment in which it is operated. The propulsion equipment operated at each authority is presented separately in the following sections. Table 3.1 contains static reference data on PATCO's and WMATA's propulsion equipment and on the environment in which it is operated. This data can be useful in interpreting any conclusions drawn from the dynamic data analyses.

3.1 PATCO

The PATCO fleet from which the data contained in this report is derived consists of three series of cars (see Section 1.2). The 25 single unit cars and 50 married pairs ("old pairs") were built by the BUDD Co. They were put into revenue service in 1969. The single unit cars carry an APTA Type-of-Car Code of N signifying double-ended powered MU connections. The 50 married pairs are Type H - single-ended; powered; one unit of a semi-permanently coupled "married pair". The third series of 46 cars ("new pairs"), built by Vickers Canada Inc., are also Type H and were put into service in 1980. These "new pairs" are of the same basic design as the "old pairs".

All cars are equipped with General Electric Company's Static Cam Magnetic (SCM) IV switched resistor control, utilizing the model 17KM52A1 controller. The KM52

TABLE 3-1. STATIC REFERENCE DATA

	PATCO	WMATA
Average Passenger Station Spacing[3]	1.18 miles	0.94 miles
Maximum Line Voltage[1]	780 VDC	860 VDC
Minimum Line Voltage[1]	650 VDC	430 VDC
Nominal Line Voltage[1]	750 VDC	700 VDC
Maximum Consist Length[1]	6	8
Minimum Consist Length[1]	1	2
Average Daily Passenger Volume (1983)[1]	40,000	317,276
Annual Passenger Volume (1983)[1]	10,671,000	270,000,000
Maximum Operating Speed[4]	75 mph	75 mph
Balancing Speed[4]	87 mph	72 mph
Average Running Speed[5]	39 mph	35 mph
Acceleration Rate[4]	3.0 mphps	3.0 mphps
Braking rate - Service Min./Max.[4]	1.0/3.0 mphps	0.75/3.0 mphps
Maximum Braking Rate - Emergency[4]	>3.0 mphps	3.2 mphps
Maximum Jerk Rate	3.0 mph/s^2	1.84 mph/s^2
AW_0 Car Weight (Empty)[4]	79,500 lbs[6] 74,800 lbs[7]	73,500 lbs
AW_1 Car Weight (Seated)[1]	91,900 lbs[6] 87,200 lbs[7]	85,650 lbs
AW_2 Car Weight (Seated & Standing)[1]	98,875 lbs[6] 94,175 lbs[7]	99,750 lbs
AW_3 Car Weight (Crush)[1]	104,725 lbs[6] 105,025 lbs[7]	106,550 lbs
Starting Current Draw per Car[1]	1200 amps	940 amps
Current at Full Speed per Car[1]	1000 amps	600 amps
Motor Rating[4]	140hp (300v, 1850 rpm)	175hp (325v, 2450 rpm)
Maximum Motor Speed	4600 rpm	5400 rpm
Maintenance Employees per Vehicle[3]	0.92	1.13

1 Provided by each respective Authority

2 Does not include newly opened yellow line

3 From Urban Rail in America, Pushkarev, 1982.

4 From Roster of North American Rail Transit Cards, APTA, July 1980.

5 From Railway Age, September 28, 1982 p. 49.

6 Single (double-ended) Cars

7 Married Pair Cars

controller is a pilot motor-driven, revolving-cam, electrical switching device which responds to the Automatic Train Control (ATC) System or the train operator via the master controller to control train acceleration, braking and direction. The KM52 controller has twenty-five switch positions to control motor power switching for series, series-parallel, coast and braking operations. The principal parts of the controller include a low voltage operated pilot motor, a reduction gear case, three camshafts, notch interlock, modular reverser and circuit breaker and modular contact units for power and control.

In operation, the pilot motor rotates the three camshafts through the gear case. The two smaller camshafts operate low voltage contact units. The larger camshaft operates high voltage contact units. As the camshafts revolve, the contact units open and close the low and high voltage circuits in a preset sequence. The controller has a notch interlock which assures that the controller, once started by a run signal, will run to the next notch. The interlock does not start or stop the pilot motor.

The circuit breaker is a modular contact unit incorporated on the main cam controller, unlike many other control systems where it is a separate unit. The breaker is operated by the motion of the camshaft in normal operation. It is equipped with an overload trip device.

Reversing direction is performed by a modular unit, mounted on the camshaft frame and actuated by a combination of camshaft and contact movement. The contacts reverse the motor fields to achieve a change in direction of the car.

Additional contactors handle portions of functions such as dynamic brake set-up and series-parallel change over.

The master controller is a two-handle unit consisting of a power handle incorporating a "dead man" feature, and a reversing handle. Each handle operates a small camshaft with a number of roller operated, normally closed, modular switches along its shaft. The power camshaft also operates two potentiometers which give rate requested commands to the vehicle's main cam controller.

PATCO cars are equipped with GE1255A1 and A2 motors which are rated at 140 HP with 300 volts at 1850 RPM with a maximum of 4600 RPM. The general classification of the motor is a four pole, series-wound, commutating-pole, self-ventilated, direct current motor. The motor is equipped with grease-lubricated ball bearings at the commutator end and grease-lubricated roller bearings at the pinion end. The leads are connected to the car body by G.E. modular motor lead couplers. Each motor drives the adjacent axle through a GE type GA56 double reduction parallel drive gear unit with helical gears with a 6.21 to 1 gear ratio.

3.2 WMATA

The fleet from which the WMATA data contained in this report is derived, is the 300 "married pairs" (Car Type H), built by Rohr. The cars went into revenue service operation in 1976. They are equipped with Westinghouse Electric Corporation's switched resistor air-operated cam type control. The cam controller responds to both traction and dynamic braking commands from the ATC System or from the

train operator via the master controller. These commands are carried on trainline wires to the Package Unit (motor control unit) which controls the amount of current fed to the traction motors through the main power and braking resistors.

The Package Unit consists of two air operated double-ended cam controllers. One is the power cam controller (PCC) and the other for dynamic braking is the brake cam controller (BKCC). Each consists of an air cylinder assembly which drives a camshaft through a rack and pinion to operate the high voltage cam switches and their low voltage interlocks. The air cylinders which operate the cam controllers are operated by magnet valves, which are, in turn controlled by the limit relay system and logic circuits.

The limit relay system is the heart of the acceleration and dynamic brake control function, the decision-making part of which is the logic cradle. The basic function of the limit relay system is to maintain the desired car acceleration and braking currents in response to request signals from the master controller or the ATC system. In addition to controlling the PCC and BKCC, the limit relay system also controls the field shunt contactors through the logic cradle.

The limit relay system receives commands in the form of four-bit binary coded logic trainline wire signals from the master controller or ATC system. It decodes these commands into propulsion system current levels. These signals are processed by the logic cradle and connected to either the propulsion or braking systems. Traction motor currents are

controlled by the operation of the PCC and BKCC switches. Motor current values from the transducers (current sensing transformers) are compared with the trainline rate value requested at the master controller or ATC and a difference signal is developed which then drives the PCC, BKCC and field contactors.

The Package Unit also contains a number of magnetically operated contactors which control series and paralleled changing, field shunting, dynamic braking and other features. In addition to the two cam controllers in the Package Unit, each car contains an air-operated line switch unit with two air piston operated line contactors. Each contactor is closed by air pressure controlled by a magnet valve, and rapidly opened by spring pressure.

Reversing is accomplished by an air cylinder operated reverser cylinder controlled by two magnet valves, one to turn the cylinder to the forward position and one to reverse the direction of travel. Series-parallel switching and power-brake circuit changeover are performed by air operated single-ended rocker-cam switches with sliding cam interlocks.

The master controller consists of a single handle unit incorporating a "dead man" feature. Reversing is controlled by a 12 position rotary switch called a mode selection switch. The power handle operates a camshaft with two rows of normally closed, roller operated cam switches along its shaft.

WMATA's cars are equipped with Westinghouse type 1462B motors which are rated at 175 HP with 325 volts at 2450 RPM,

with a maximum of 5400 RPM. The basic design is similar to PATCO's GE motors. The general motor classification is also a four pole, series-wound, commutating-pole, self-ventilating, direct current motor. As with PATCO, each motor is equipped with grease-lubricated bearings, with ball bearings at the commutator end and roller bearings at the pinion end. WMATA's leads, however, are connected to the carbody by bolted leads protected by insulated cleat blocks and neoprene tubes. Each motor drives the adjacent axle through a Westinghouse WR500 double reduction drive gear unit with helical gears with a 5.54 to 1 gear ratio.

3.3 COMPARISON

The major difference between the PATCO and WMATA propulsion systems is the design and method of operation of the cam control system. The WMATA camshafts are operated by separate rack and pinion air engines controlled by magnet valves. The PATCO camshafts are turned by a pilot motor turning three camshafts through a gearbox. WMATA has a separate air operated reverser and a separate air operated line switch while the PATCO circuit breaker and reverser are incorporated into the cam controller.

SECTION 4 - DYNAMIC DATA ANALYSIS

As stated in Section 1.2, ten separate dynamic data extractions were made for this report. They are discussed in the following sections.

4.1 MAINTENANCE ACTIONS PER 100,000 MILES OF REVENUE SERVICE OPERATION.

4.1.1 Data Extraction Description

This data extraction (No. 1), displayed as Appendix A, was made to determine the reliability high-drivers for each authority. Quarterly statistics and four quarter period total statistics for each authority are given for:

- Utilization (period revenue service mileage);
- Maintenance Actions (counts);
- Maintenance Rates (MACTS/100,000 miles).

The extraction was made at the 3rd LOI (Major Assembly) of the GPN. The complete GPN hierarchical listing for the propulsion system is shown in Appendix K. For this data extraction, only those GPNs are displayed for which there are MACT counts for PATCO or WMATA or both. If there were no counts against a particular GPN for both authorities, the GPN is not displayed. Propulsion System total statistics are also provided as are verbal descriptions of the GPNs.

4.1.2 Analysis

The system total MRATEs show that, using this statistic as a measure of reliability, PATCO's Propulsion System is slightly more reliable than WMATA's. PATCO's Propulsion System, for all cars for the four quarter period investigated, has an MRATE of 31.7 (MACTs per 100,000 miles), while WMATA's (ROHR cars), is 39.3. This ranking is true for three of the four quarters investigated. The fourth quarter 1983 (Oct., Nov., Dec.) is the only quarter where WMATA has a lower MRATE.

The statistics for the individual GPNs clearly shows the reliability high-driver Major Assemblies of the Propulsion System. They are discussed in the following subsections.

4.1.2.1 PATCO Analysis

For PATCO, three of the four high-driver Major Assemblies are within the Subsystem - Tractive Effort Controller (GPN - AEB). The fourth is within the Subsystem - Traction Motor Assembly (GPN - AED). PATCO's reliability high-driver Major Assemblies, measured by maintenance action counts and maintenance rates, are (in descending order):

- AEBD - Power Regulation
- AEBB - Logic and Low Voltage
- AED0 - Traction Motor Assembly
- AEBC - High Voltage Switch Gear

This ranking holds for the four quarter total and for three of the four quarters. Only during the second quarter 1982 does AEBC slightly outrank AED0. There is, therefore, no seasonal variation as to what the reliability high-drivers are and virtually no variation as to their relative ranking by season. Figure 4.1 displays the Four Quarter Period distribution of Maintenance Rates by Major Assembly for PATCO. The Power Regulation Major Assembly within the Tractive Effort Controller Subsystem is the reliability high-driver of PATCO's Propulsion System, accounting for 52.8% of all Major Assembly MACTs.

4.1.2.2 WMATA Analysis

In addition to the above four Major Assemblies, GPN AEB0 - Tractive Effort Controller appears as a reliability high-driver for WMATA. The five WMATA reliability high-driver Major Assemblies, displayed in the data extraction presented as Appendix A, are essentially equivalent to the four displayed for PATCO. PATCO does not show any MACT counts against GPN AEB0-Tractive Effort Controller. This is due to the relative complexities of PATCO's and WMATA's part number schemes. PATCO has 515 part numbers identifying the parts of their propulsion system versus 91 part numbers for WMATA. (The Generic Part Lists, cross-referencing Property Part Numbers to TRIP Generic Part Numbers are presented as Appendices O and P for PATCO and WMATA respectively). PATCO's part numbering system is, therefore, more detailed i.e., there is a lower degree of parts grouping. Because of PATCO's higher level of specificity in identifying parts, the MACTs against GPN AEB0 showing for WMATA are actually included in the other AEB GPNs for PATCO i.e., in other

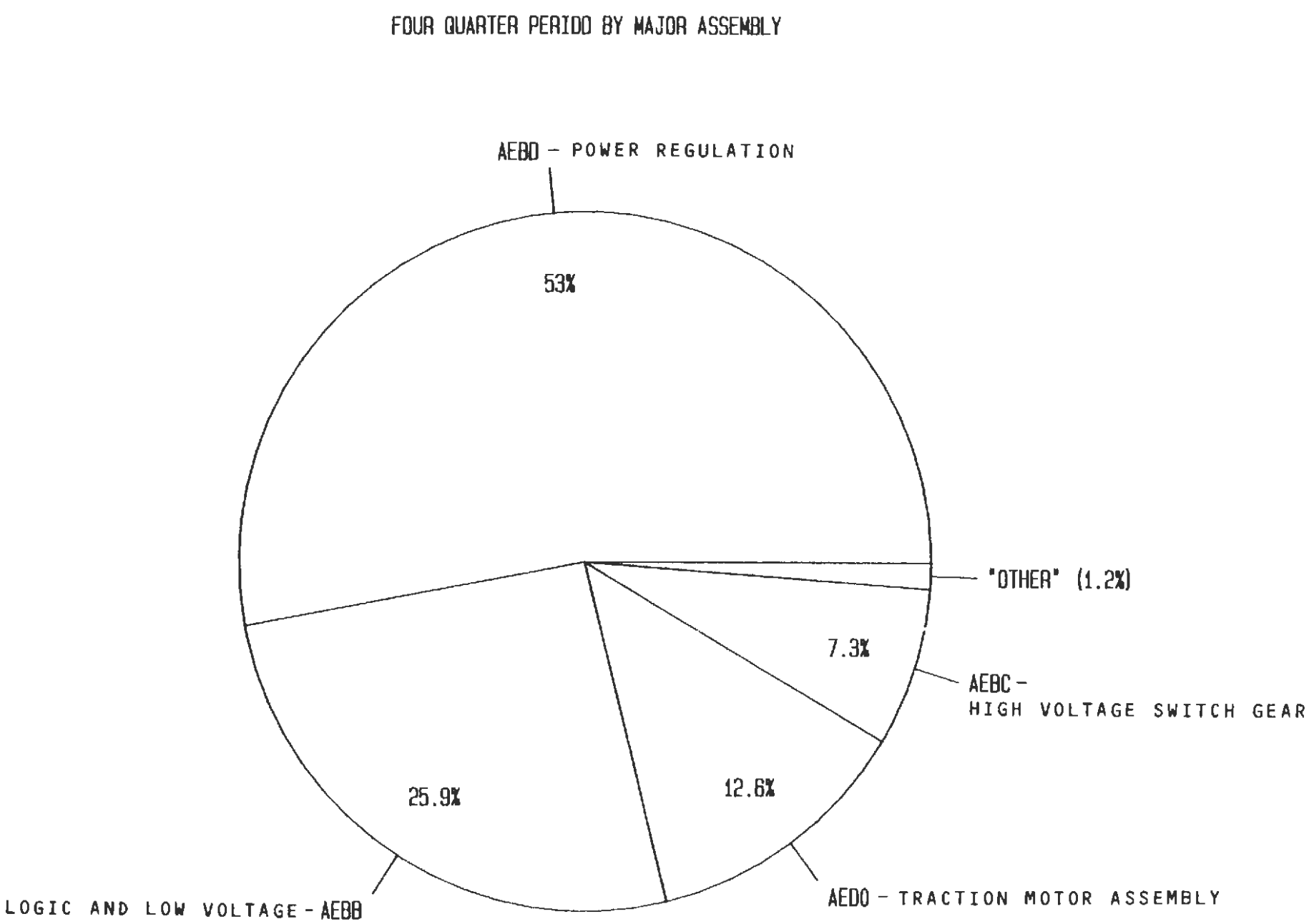


FIGURE 4-1. DISTRIBUTION OF PATCO MAINTENANCE RATES

Major Assembly designations of the Tractive Effort Controller instead of against the Tractive Effort Controller itself. This phenomenon does not hamper the validity of this overall analysis because data extraction nos. 3 through 8 (see Section 1.2) include the UCC as an additional data extraction search key, so actual components are addressed.

As with PATCO, the only Major Assembly reliability high-driver not in the Tractive Effort Controller Subsystem is the Traction Motor Assembly. Although the same Major Assemblies appear for both authorities as the reliability high-drivers, the ranking of the Major Assemblies by Maintenance Rates differ between WMATA and PATCO. For WMATA the ranking is as follows (in descending order):

- AEBB - Logic and Low Voltage (2nd for PATCO)
- AEBC - High Voltage Switch Gear (4th for PATCO)
- AEB0 - Tractive Effort Controller (not displayed for PATCO)
- AED0 - Traction Motor Assembly (3rd for PATCO)
- AEBD - Power Regulation (1st for PATCO)

This ranking holds for the four quarter total and for three of the four quarters. Only during the first quarter 1983 does AED0 slightly outrank AEB0. As with PATCO there is no seasonal variation as to what the reliability high-drivers are and virtually no variation as to their relative ranking by season. Figure 4.2 displays the Four Quarter Period distribution of Maintenance Rates by Major Assembly for WMATA. The Logic and Low Voltage Major Assembly within the Tractive Effort Controller Subsystem is the reliability high-driver of WMATA's Propulsion System, accounting for 31.5% of all Major Assembly MACTs.

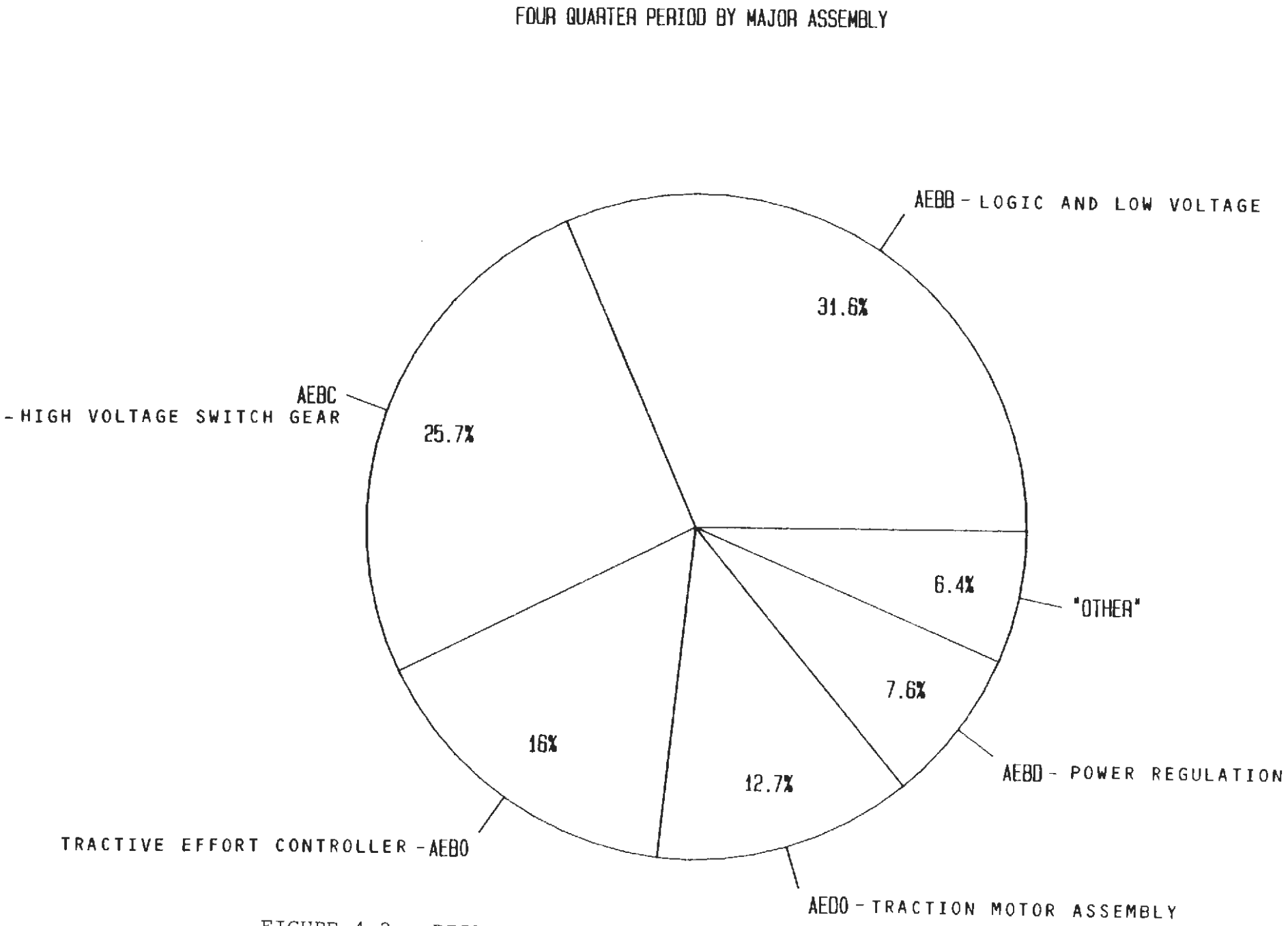


FIGURE 4-2. DISTRIBUTION OF WMATA MAINTENANCE RATES

4.2 LABOR HOURS PER 100,000 MILES OF REVENUE SERVICE OPERATION

4.2.1 Data Extraction Description

This data extraction (No. 2), displayed as Appendix B, is the companion to data extraction no. 1. It was made to determine the Labor Hour high-drivers for each authority. Quarterly statistics and four quarter period total statistics for each authority are given for:

- Utilization
- Labor Hours (counts)
- Labor Rates (Labor Hours/100,000 miles).

As with data extraction No. 1, this data extraction was made at the 3rd LOI (Major Assembly) of the GPN for the same GPNs displayed in data extraction No. 1. Propulsion System total statistics are also provided in this data extraction as are verbal descriptions of the GPNs.

4.2.2 Analysis

The system total LRATES indicate that, using this statistic as a measure of maintainability, WMATA's Propulsion System exhibits a slightly higher level of maintainability than PATCO's. WMATA's Propulsion System for the four quarter period has an LRATE of 150.4 (Labor Hours per 100,000 miles) while PATCO's is 188.8. This is true for three of the four quarters investigated. The second quarter 1982 (Apr., May, June) is the only quarter where PATCO has a lower LRATE.

WMATA's overall lower LRATE, when taken with its overall higher MRATE (see Section 4.1.2) would seem to indicate a higher level of equipment maintainability and/or maintenance personnel productivity for WMATA. It must be noted however, that although the statistics indicate such a conclusion, caution should be exercised in drawing concrete conclusions because no information is presented regarding vehicle design, the maintenance policies and practices, and repair facilities and equipment of each authority, which could influence the LRATEs.

The statistics for the individual GPNs clearly show the Labor Hour high-driver Major Assemblies of the Propulsion System for each authority, within which the maintenance policies and practices would be a constant.

4.2.2.1 PATCO Analysis

As expected, the same Major Assemblies are the maintenance Labor Hour high-drivers as are the reliability high-drivers. The rankings, however, differ. In descending order by LRATE, the Major Assemblies are:

- AEBD - Power Regulation
- AED0 - Traction Motor Assembly
- AEBB - Logic and Low Voltage
- AEBC - High Voltage Switch Gear

This ranking holds for all four quarters. There is therefore, no seasonal variation as to the Labor Hour high-drivers, and also as to their relative ranking by season. Figure 4.3 displays the Four Quarter Period distribution of

Labor Rates by Major Assembly for PATCO. The Power Regulation Major Assembly is the Labor Hour high-driver of PATCO's Propulsion System, accounting for 50.9% of all Major Assembly Labor Hours.

The following is a summary of data extraction nos. 1 & 2 for PATCO:

- Power Regulation ranks first in both Labor Hour expenditures and Maintenance Actions, accounting for 50.9% of Labor Hours and 52.8% of Maintenance Actions .

- The Traction Motor Assembly ranks second in Labor expenditures and third in Maintenance Actions, accounting for 24.8% of Labor Hours and 12.5% of Maintenance Actions.

- Logic and Low Voltage ranks third in Labor Hour expenditures and second in Maintenance Actions, accounting for 19.4% of Labor Hours and 25.9% of Maintenance Actions.

- High Voltage Switch Gear ranks last (of the high-drivers) in both, accounting for 3.6% of Labor Hours and 7.1% of Maintenance Actions.

- Other Major Assemblies, in total, account for 1.3% of Labor Hours and 1.7% of Maintenance Actions.

The above statistics indicate that, of the Major Assembly high-drivers, Logic and Low Voltage is the most

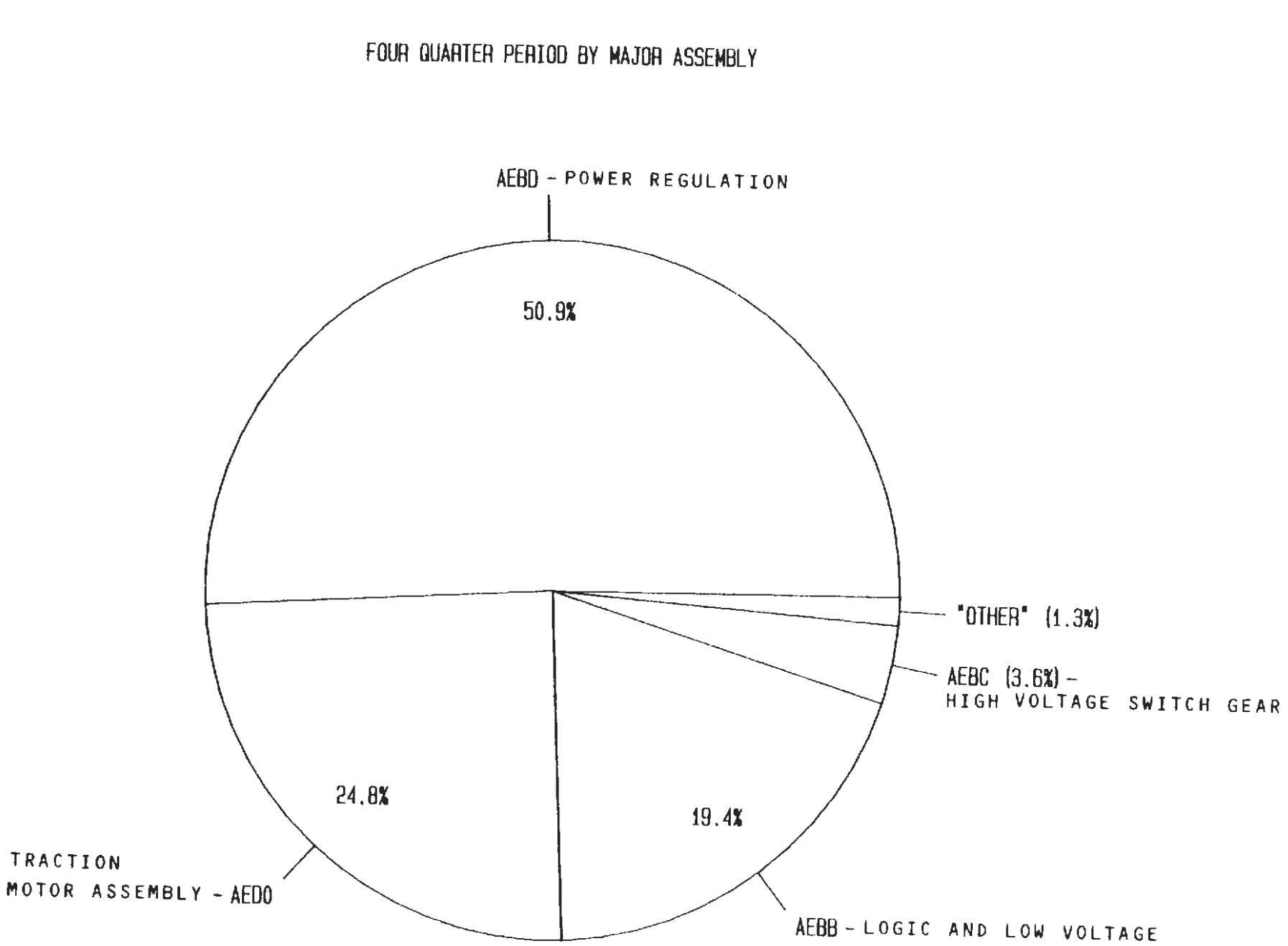


FIGURE 4-3. DISTRIBUTION OF PATCO LABOR RATES

maintainable, while the Traction Motor Assembly is the least. This conclusion is drawn from the lower Labor Hour ranking coupled with the higher Maintenance Action ranking for Logic and Low Voltage (vice versa for Traction Motor Assembly).

Power Regulation, which demonstrated the highest MRATE and LRATE, is the maintenance high-driver Major Assembly for PATCO.

4.2.2.2 WMATA Analysis

As the PATCO analysis revealed, the same Major Assemblies are both the maintenance Labor Hour and the reliability high-drivers. As with PATCO, the rankings differ. The Four Quarter Period ranking of the maintainability high-driver Major Assemblies are (in descending order by LRATE):

- AEBB - Logic and Low Voltage (3rd for PATCO)
- AEBC - High Voltage Switch Gear (4th for PATCO)
- AED0 - Traction Motor Assembly (2nd for PATCO)
- AEB0 - Tractive Effort Controller (not displayed for PATCO)
- AEBD - Power Regulation (1st for PATCO)

In contrast to PATCO, WMATA's ranking is not the same for any of the four quarters. Labor Hour expenditures, by Major Assembly, for WMATA are, therefore, slightly more variable than those for PATCO. However, there is a high level of consistency for WMATA showing little seasonal

variations. AEBB and AEBC for instance, rank first for all four quarters. The other Major Assemblies exhibit some seasonal variation regarding Labor Hour expenditures while there was almost no seasonal variation regarding Maintenance Actions. Analysis of the statistics by themselves cannot account for the slight seasonal variation in Labor Hour expenditures by Major Assembly for WMATA. An investigation of the maintenance function (policies and practices) would be needed to explain the variation.

Figure 4.4 displays the Four Quarter Period distribution of Labor Rates by Major Assembly for WMATA. The Logic and Low Voltage Major Assembly is the Labor Hour high-driver of WMATA's Propulsion System, accounting for 31.0% of all Major Assembly Labor Hours.

The following is a summary of data extraction nos. 1 & 2 for WMATA:

- Logic and Low Voltage ranks first in both Labor Hour expenditures and Maintenance Actions, accounting for 31.0% of Labor Hours and 31.5% of Maintenance Actions,

- High Voltage Switch Gear ranks second in both, accounting for 27.4% of Labor Hours and 25.8% of Maintenance Actions,

- The Traction Motor Assembly ranks third in Labor Hour expenditures and fourth in Maintenance Actions, accounting for 13.8% of Labor Hours and 12.8% of Maintenance Actions.

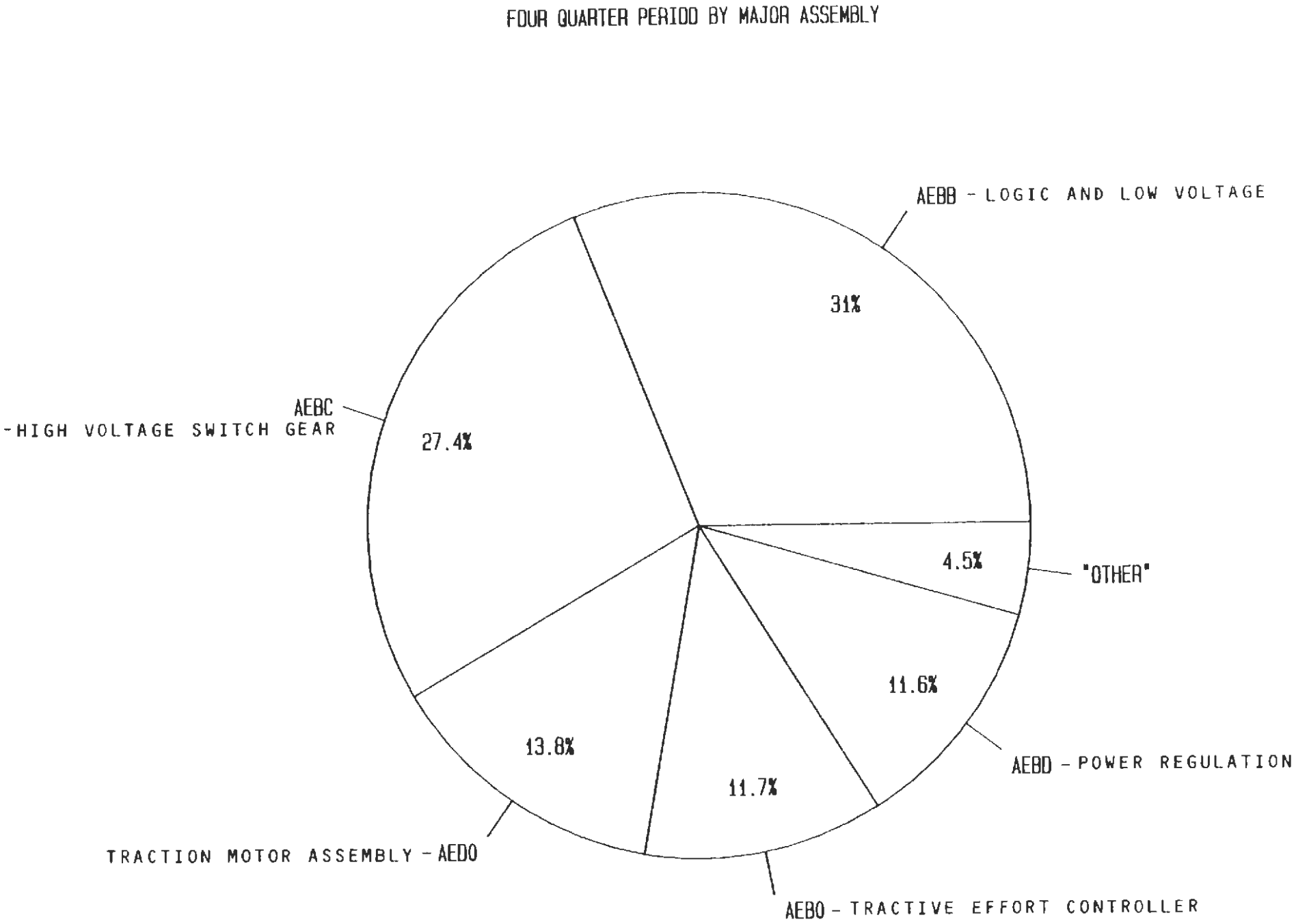


FIGURE 4-4. DISTRIBUTION OF WMATA LABOR RATES

- The Tractive Effort Controller ranks fourth in Labor Hour expenditures and third in Maintenance Actions, accounting for 11.7% of Labor Hours and 15.9% of Maintenance Actions

- Power Regulation ranks last (of the high-drivers) in both, accounting for 11.6% of Labor Hours and 7.7% of Maintenance Actions

- Other Major Assemblies in total account for 4.5% of Labor Hours and 6.3% of Maintenance Actions.

Although the percentage differences are not as extreme in comparison with PATCO, the Traction Motor Assembly appears to be the least maintainable Major Assembly for WMATA as it is for PATCO. This conclusion is drawn from the higher Labor Hour ranking over the Maintenance Action ranking.

Logic and Low Voltage, which demonstrated the highest MRATE and LRATE, is the maintenance high-driver Major Assembly for WMATA.

4.3 RELIABILITY STATISTICS FOR FOUR QUARTER PERIOD AND MAINTAINABILITY STATISTICS FOR FOUR QUARTER PERIOD

4.3.1 Data Extraction Descriptions

These data extractions (nos. 3 & 4), displayed as Appendices C & D, were made to provide greater detailed statistics on the high-driver Major Assemblies identified

via data extraction nos. 1 & 2. Because the statistics of these two extractions exhibit virtually no seasonal variation, extractions 3 & 4 (and all subsequent extractions) are made for the four quarter period only.

Data extraction no. 3 presents four quarter period total statistics for:

- Utilization (period revenue service mileage)
- Maintenance Actions (counts)
- Maintenance Rates (MACTs/10,000 miles)
- Mean Miles Between Maintenance Actions (10,000 mile basis)

Data extraction no. 4 presents four quarter period total statistics for:

- Utilization
- Labor Hours (counts)
- Labor Rate (Labor Hours/ 10,000 miles)
- Mean Labor Hours to Repair
- Labor Hour Repair Rate

Where data extraction nos. 1 & 2 are based on 100,000 miles of revenue service operation, extractions 3 through 8 are based on 10,000 miles of revenue service operation. 100,000 miles was used for the first two extractions to make certain that the high-driver Major Assemblies would clearly stand out. The remainder of the data extractions use the same revenue service mileage base (10,000 miles) as the periodic TRIP Output Reports.

Data extraction nos. 3 and 4 present the above statistics for each authority by the full GPN (fourth level of indenture) and UCC associated with each GPN, thereby providing the data by equipment function, via the GPN, and for actual components, via the UCC.

The data provided for the GPN-UCC combinations represents the breakdown by UCC of the data provided on each line where the UCC column contains "--". These lines precede the GPN-UCC combinations associated with them. Statistical totals, for the presented data, are provided as are narrative descriptions of the GPNs and UCCs.

4.3.2 Analysis

No attempt is made here, or in subsequent data extractions, to exhaustively analyze all of the data. The analysis of these two extractions (nos. 3 and 4) pertains to only the following Major Assemblies:

- Traction Motor Assembly (Major Assembly identified as the least maintainable for both PATCO and WMATA)
- Power Regulation (PATCO's Major Assembly high-driver)
- Logic and Low Voltage (WMATA's Major Assembly high-driver)

Within the framework, only data points of significance will be highlighted to demonstrate the kinds of findings that can be derived from the TRIP Data Bank.

4.3.2.1 Traction Motor Assembly: GPN AED000

The Traction Motor Assembly has been identified as the least maintainable Major Assembly for both PATCO and WMATA. This conclusion was drawn from the fact that this Major Assembly exhibited a Labor Hour ranking higher than its Maintenance Action ranking.

Data extraction nos. 3 and 4 show that the motor itself (UCC=MR) is the component high-driver within the Traction Motor Assembly. For PATCO, the motor accounts for 96.2% (154/160) of the MACTs attributed to the Traction Motor Assembly, and 93.9% (1752.5/1865.5) of the Labor Hour expenditures. For WMATA, the corresponding percentages are 87.6% of the MACTs and 92% of the Labor Hours.

The reliability of the motors is comparable, with PATCO's exhibiting a slightly higher level, i.e., slightly more reliable. This is demonstrated by their relative MRATEs and MMBMAs. PATCO's traction motor MRATE is 0.39 versus 0.46 for WMATA. MMBMAs are 25,900 miles for PATCO versus 22,000 for WMATA.

Although the traction motors being used on the vehicle fleets monitored by TRIP for each authority exhibit comparable reliability levels, the maintainability levels differ by a significant amount. For the traction motor, PATCO expends 4.39 Labor Hours per 10,000 miles of revenue service

operation where WMATA expands 1.92 Labor Hours. PATCO's MLHTR is 11.38 versus WMATA's 4.21. Therefore, it takes PATCO 2.7 times as many labor hours to repair a vehicle with a traction motor failure (not to repair the motor itself) in comparison with WMATA.

Again, it should be noted that these statistics do not take into account vehicle design, maintenance policies and practices, repair facilities and equipment etc., which could be influencing the indicies of productivity.

4.3.2.2 Power Regulation - CAM: GPN AEBD01

Power Regulation has been identified as the MACT and Labor Hour high-driver Major Assembly for PATCO. It ranks last, however, of the Major Assembly high-drivers identified for WMATA. Data extraction nos. 3 and 4 show how the MACTS attributed to the Assembly are distributed among its components. 95.5% of the PATCO MACTs against AEBD01 is attributed to the "shaft" (UCC=SM). This is the cam shaft. The next ranking contributing component is the "cam switch" (UCC-CF), accounting for only 2.2% of the MACTs.

WMATA's data shows no MACTs against these components. The components which contribute to the WMATA MACTs against this Assembly are as follows:

- Controller (power and/or brake, CAM controller)- 54.7%
- Hardware - 23.2%
- Resistor - 16.1%

- Insulator - 5.4%
- Rod - 0.6%

The maintainability statistics (extraction no. 4) show that Power Regulation has a greater effect on PATCO's labor force than on WMATA's. This is expected given the reliability levels for each authority. PATCO expends 9.61 maintenance Labor Hours per 10,000 miles of revenue service operation versus 1.74 for WMATA. (This was also shown in extraction nos. 1 and 2). The indice of productivity given in extraction no. 4 shows that although Power Regulation impacts PATCO more than WMATA, the Labor Hour productivity for each authority as measured by MLHTR, is comparable. PATCO's overall MLHTR for Power Regulation failures is 5.71 versus 5.59 for WMATA.

4.3.2.3 Logic and Low Voltage: GPN AEBB

Logic and Low Voltage has been identified as the MACT and Labor Hour high-driver Major Assembly for WMATA. For PATCO, it ranks as the second and third high-driver for MACTs and Labor Hours respectively.

Figures 4.5 and 4.6 display the distribution of MRATEs by Assembly for this Major Assembly for PATCO and WMATA respectively. For PATCO, Logic and Low Voltage Control (AEBB00) accounts for 58%, with Performance Modification (AEBB05) and Annunciator (AEBB01) contributing 22% and 12% respectively. Other Assemblies, in total, account for the remaining 7% of maintenance activities against the Logic and

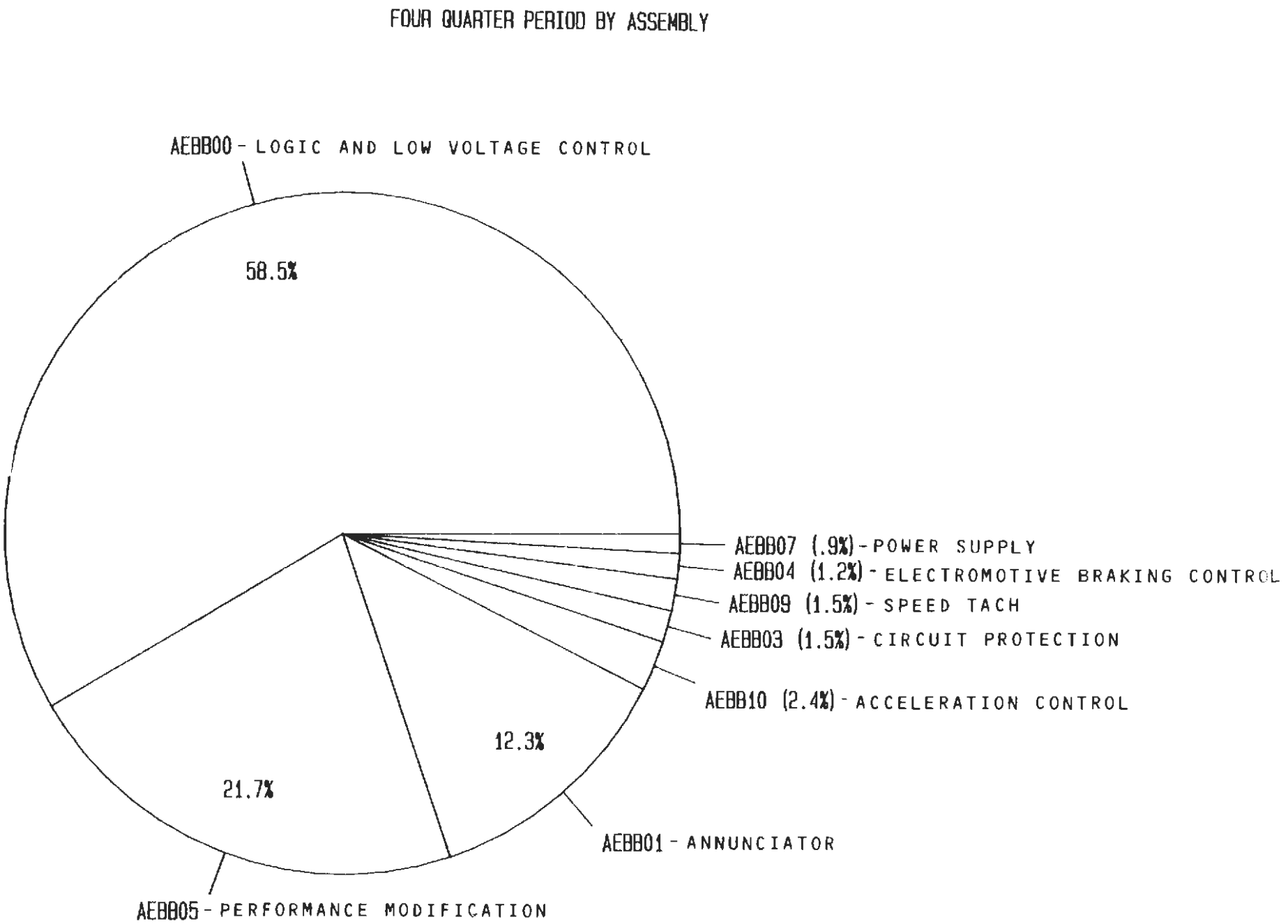


FIGURE 4-5. DISTRIBUTION OF PATCO LOGIC AND LOW-V MAINTENANCE RATES

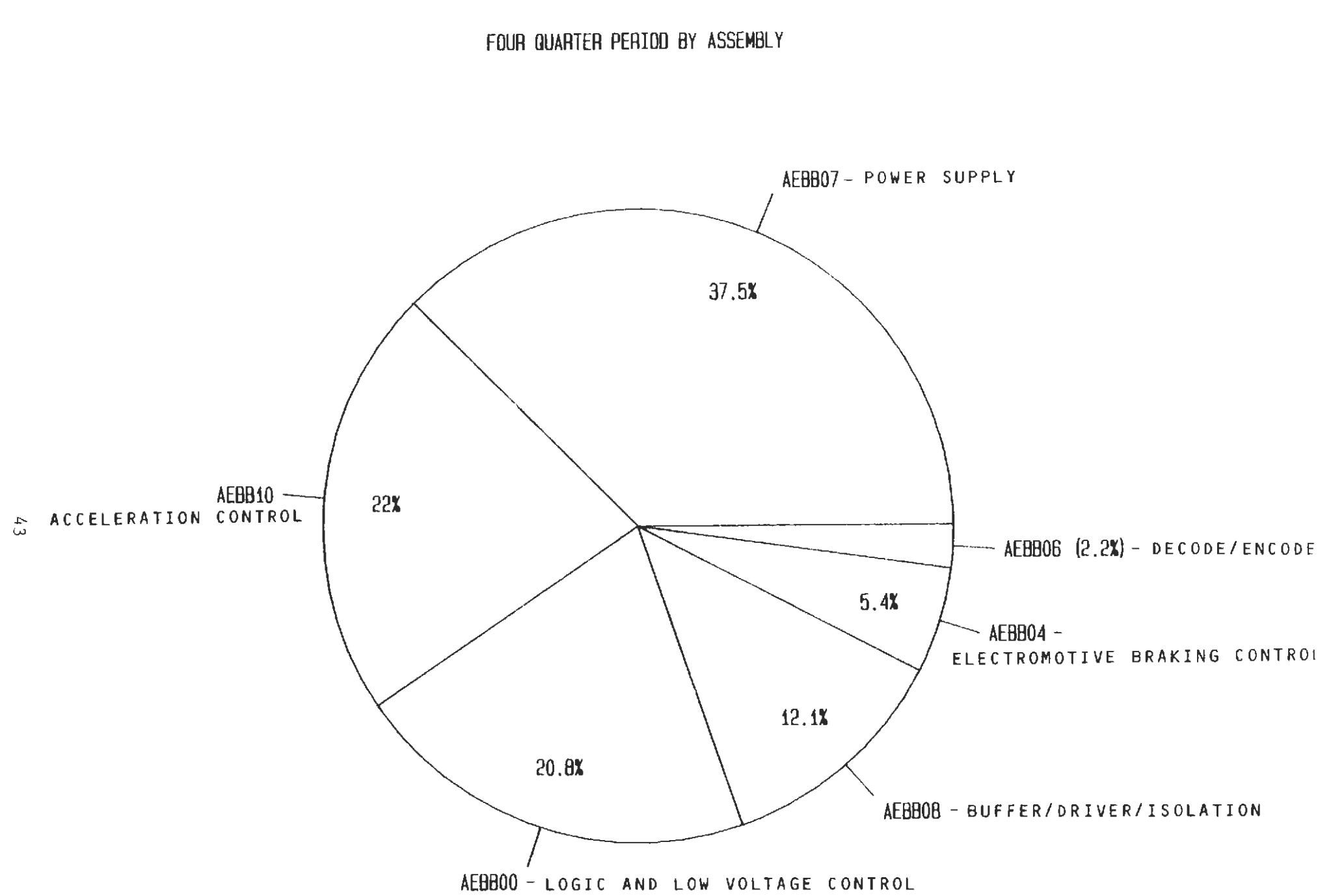


FIGURE 4-6. DISTRIBUTION OF WMATA LOGIC AND LOW-V MAINTENANCE RATES

Low Voltage Major Assembly. These Assembly high-drivers remain constant when looking at LRATEs.

For WMATA, the Assembly high-driver within this Major Assembly is Power Supply (AEBB07) accounting for 38%, with Acceleration Control (AEBB10), Logic and Low Voltage Control (AEBB00), and Buffer/Driver/Isolation (AEBB08) contributing 22%, 21%, and 12% respectively. Other Assemblies, in total, account for the remaining 7%. As with PATCO these Assembly high-drivers remain constant when looking at LRATES.

The Assembly high-driver common to both PATCO and WMATA is Logic and Low Voltage Control (AEBB00). This assembly exhibits a lower reliability level at PATCO than at WMATA. PATCO's MRATE is 0.49 versus 0.26 for WMATA. MMBMAs are 20,600 miles for PATCO versus 38,700 for WMATA. This lower reliability level results in a greater Labor Hour expenditure level for PATCO. PATCO's LRATE for this Assembly is 21,500 Labor Hours per 10,000 miles of revenue service operation versus 13,200 for WMATA. Although this Assembly impacts PATCO more than WMATA, PATCO's Labor Hour productivity is slightly higher as demonstrated by a lower MLHTR statistic. PATCO's MLHTR is 4.42 versus 5.11 for WMATA.

The significant components which account for the MACTs and Labor Hour expenditures against this Assembly are as follows: For PATCO, 92% of the MACTs and 89% of the Labor Hours are attributed to two components; for WMATA, three components account for 91% of the MACTs and 92% of the Labor Hours; for PATCO, the "Panel" (UCC=PE) accounts for 81% of the MACTs and 76% of the Labor Hours, while "Relays" (UCC=RU) accounts for 11% (MACT) and 13% (LHRS). Because the

Labor Hour percentage is lower than the MACT percentage for the "Panel" and vice versa for "Relay", the "Panel" exhibits a higher level of maintainability. This conclusion, that the "Panel" exhibits a higher Labor Hour productivity rating than "Relays", is specifically shown by the MLHTR statistics. The MLHTR for "Panel" is 4.17 versus 5.38 for "Relay".

For WMATA, "Hardware" (UCC=HE) accounts for 76% of the MACTs and 77% of the Labor Hours. The "Cradle" (UCC=64) accounts for 9% of the MACTs and Labor Hours, while "PC Board" (UCC=PJ) accounts for 6% of each. Because the MACT percentages and Labor Hour percentages are essentially equal for all three components, the initial conclusion is that they exhibit approximately the same level of maintainability. This is supported by the MLHTR statistics. They are: 5.18 for "Hardware", 5.28 for "Cradle", and 5.34 for "PC Board (card)".

4.3.3 Analysis Summary

This section summarizes the significant findings of data extraction nos. 3 & 4.

The Traction Motor exhibits comparable reliability levels for PATCO and WMATA, but significantly lower maintainability and labor hour productivity levels for PATCO versus WMATA.

Of the identified Major Assembly high-drivers (from data extraction nos. 1 & 2), Power Regulation is the top ranking reliability and maintainability high-driver for PATCO and the least ranking high-driver for WMATA. Although Power Regulation has a greater impact on PATCO's maintenance

function than on WMATA's, the Labor Hour productivity level, as measured by MLHTR, is comparable for both transit authorities. For each authority, different components account for Power Regulation MACTs and Labor Hour expenditures with the Cam-shaft being the high-driver component for PATCO in comparison with the Controller at WMATA.

The Logic and Low Voltage Major Assembly exhibits higher reliability and maintainability levels for PATCO versus WMATA. PATCO's MRATEs and LRATEs are 0.83 and 3.65 respectively versus 1.25 and 4.66 respectively for WMATA. Different Assemblies within this Major Assembly account for the maintenance activity at each authority with one exception. Logic and Low Voltage Control, at the fourth level of GPN indenture (Assembly), exhibits lower reliability and maintainability levels for PATCO versus WMATA. PATCO's MRATEs and LRATEs are 0.49 and 2.15 respectively versus 0.26 and 1.32 respectively for WMATA. Therefore, this Assembly impacts PATCO's maintenance function more than WMATA's, but PATCO's labor hour productivity is higher. PATCO's MLHTR is 4.42 versus 5.11 for WMATA. Different components at each authority account for the majority of the vehicle maintenance activity on the Assembly. For PATCO they are the Panel and Relays. For WMATA they are Hardware, the Cradle, and PC Boards. The following components, although not reliability/maintainability high-drivers, exhibit the lowest labor hour productivity levels within this Assembly. For PATCO: "Support" (UCC=5N) has a MLHTR of 16; and "Shunt" (UCC=SU) has a MLHTR of 13.25. For WMATA: "Resistors" (UCC-RY) has a MLHTR of 6.13; and "Inductor" (UCC=1C) has a MLHTR of 5.64.

The other Assemblies within the Logic and Low Voltage Major Assembly for which there are MACTs for both authorities are:

- Electromotive Braking Control - GPN AEBB04
- Power Supply - GPN AEBB07
- Acceleration Control - GPN AEBB10

Power Supply and Acceleration Control are two of the Assembly high-drivers for WMATA. None of the above assemblies are PATCO high-drivers.

Data extraction no. 4 shows that the productivity levels for PATCO and WMATA are comparable for the Electromotive Braking Control Assembly. PATCO's MLHTR is 2.25 versus 2.29 for WMATA. Two components within this assembly account for the MACTs for each authority. For PATCO they are the "Switch" (UCC=SR) and "PC Board" (UCC=PJ). For WMATA they are "PC Board" and "Relay" (UCC-RU). For the common component, "PC Board", WMATA exhibits a higher level of productivity. WMATA's MLHTR is 2.2 versus 3.0 for PATCO.

"PC Boards" account for all MACTs for both authorities against Power Supply. WMATA exhibits a substantially higher productivity level with a MLHTR of 3.02 versus 7.0 for PATCO.

"PC Boards" also account for the PATCO MACTs against Acceleration Control. "PC Boards", "Relays", and "Transformer" are the three components within this assembly which account for the WMATA MACTs. WMATA's overall productivity level is lower with a MLHTR of 4.26 versus 3.38 for PATCO. WMATA's productivity level for MACATs involving "PC Boards" is lower than PATCO's at 4.38 MLHTR.

4.4 MAINTAINABILITY HIGH-DRIVER BY DEFECT AND REPAIR CODES

4.4.1 Data Extraction Descriptions

These data extractions (nos. 5 & 6), displayed as Appendices E & F, were made to provide additional defect and repair code information on the traction motor assembly (GPN AED000) for each authority. This major assembly has been identified as the least maintainable major assembly for both PATCO and WMATA. Previous analysis has shown that although the motors at each authority exhibit comparable reliability levels, the maintainability levels differ significantly.

Data extraction no. 5 presents four quarter period total statistics for:

- Maintenance Actions (counts)
- Maintenance Rates (MACTS/10,000 miles)
- Labor Hours (counts)
- Labor Rates (Labor Hours/10,000 miles)
- Mean Labor Hours to Repair

The above statistics are presented for each authority by the full GPN (fourth level of indenture), UCC, and Generic Defect Code associated with each GPN/UCC combination.

Data extraction no. 6 presents the same statistics but the Generic Repair Code replaces the Generic Defect Code as the tertiary search key.

4.4.2 Analysis

These data extractions also show that the motor itself (UCC=MR) is the component high-driver within the Traction Motor Assembly. Extraction no. 5 shows that 28% of PATCO's and 30% of WMATA's MACTs against the motor have defect codes in various categories of "No Defect", eg. Component Removed, Programmed Maintenance, Scheduled Modification.

The defect code most prevalent among those which appear for both authorities is "Flashed/Arcing" (D-CODE=DE2A). It accounts for 14.1% of PATCO's and 8.7% of WMATA's MACTs against the motor. The productivity level of PATCO, for MACTs involving this defect code, is significantly lower than WMATA. PATCO's MLHTR is 24.0 versus 4.9 for WMATA. PATCO's LRATE of 1.3 for this defect code is the highest for all D-CODES against the motor, with the exception of "Not Designated" (D-CODE=[]), indicating that this defect accounts for PATCO's greatest maintenance workload concerning the motor.

Data extraction no. 6, which presents the statistics by repair codes, further demonstrates WMATA's higher productivity level in this area. "Removed and Replaced" is the repair code, for the motor of the Traction Motor Assembly, which is most prevalent among those codes which appear for both authorities. It accounts for 73.4% of PATCO's and 20% for WMATA's MACTs against the motor. For these MACTs, WMATA's productivity level is higher with a MLHTR of 4.2 versus 23.8 for PATCO. Although there are other PATCO repair actions with high MLHTR statistics, "Removed and Replaced", with an LRATE of 3.2, accounts for the greatest maintenance workload concerning the motor.

Data extraction nos. 1 & 2 indicate that the Traction Motor Assembly appears to be the least maintainable Major Assembly for WMATA and PATCO. This conclusion is drawn from the higher Labor Hour ranking over the MACT ranking. The above analysis, and the information presented in discussing data extraction nos. 3 & 4 (see Section 4.3.2.1), support extraction nos. 1 & 2 where PATCO's relative LRATE/MACT rankings strongly suggested the traction motor as the least maintainable Major Assembly, while WMATA's relative LRATE/MACT rankings only marginally suggested so.

4.5 MAINTENANCE HIGH-DRIVERS BY DEFECT AND REPAIR CODES

4.5.1 Data Extractions Descriptions

These data extractions (nos. 7, 8, 9 & 10), displayed as Appendices G, H, I & J, were made to provide the same information as data extraction nos. 5 & 6, but for the major assemblies previously identified as the maintenance high-drivers for PATCO and WMATA. Data extraction nos. 7 & 8 present the defect code and repair code break downs for both authorities for the Power Regulation Major Assembly, which has been identified as the PATCO maintenance high- driver. Data extraction nos. 9 & 10 present this information for the Logic and Low Voltage Major Assembly, the WMATA maintenance high-driver.

4.5.2 Analysis

4.5.2.1 Power Regulation

Previous analysis of the Power Regulation Major Assembly (see Section 4.3.2.2) showed that within this Major Assembly, different components comprise the maintenance high-drivers for each authority. This fact is clearly shown in data extraction nos. 7 & 8. When data is presented for one authority, none is presented for the other. These extractions, therefore, are not very useful for a comparative analysis. Such information would be useful to the Maintenance and Engineering Departments of the Authorities to discuss the differences which could lead to improved R&M at both authorities, and for an in-depth authority-specific analysis.

Separate in-depth analyses for each authority are beyond the scope of this report. These data extractions are presented for completeness of this report.

4.5.2.2 Logic and Low Voltage Control

Data extraction nos. 9 & 10 exhibit the same pattern as in extraction nos. 7 & 8, with few exceptions, i.e., where there is data present for one authority, there is none presented for the other. Previous analysis of the Logic and Low Voltage Major Assembly (see Section 4.3.2.3) showed that the assembly high-driver common to both PATCO and WMATA is Logic and Low Voltage Control (AEBB00), and that within this assembly, different components are the high-drivers for each authority. The PATCO component high-drivers within Logic

and Low Voltage Control are the "Panel" and "Relays", while those for WMATA are "Hardware", the "Cradle" and "PC Boards". The components which appear for both authorities are "Switch" (UCC=SR) and "Panel" (UCC=PE).

Data extraction nos. 9 & 10 show that PATCO has a higher overall productivity rating for MACTs involving the "Switch". PATCO's MLHTR is 1.7 versus 3.8 for WMATA. Extraction no. 9 shows no commonality between PATCO and WMATA with respect to Defect Codes for the "Switch". Extraction no. 10, however, shows that most repairs involving this component (all of PATCO's and 50% of WMATA's) is "Removed & Replaced" (R-CODE=RN03). For the specific repair action, "Removed & Replaced", PATCO again has a higher productivity rating with a MLHTR of 1.7 versus 4.4 for WMATA.

For MACTs involving the "Panel", extraction nos. 9 & 10 show that WMATA has a higher productivity rating (MLHTR=1.3) than PATCO (MLHTR=4.2). The only Defect Codes common to both authorities are "Tripped Circuit Breaker" (D-CODE= DE2L) and "Improper Adjustment" (D-CODE=DZ42). For both of these defects, WMATA exhibits higher productivity ratings. The Repair Codes common to both authorities are "Trouble Shooting" (R-CODE=RJ07) and "Removed & Replaced". As with MACTs involving the "Panel" overall and with the above common defects, WMATA's data exhibits a higher productivity rating with regard to these common repair codes. For "Trouble Shooting" WMATA's MLHTR is 1.5 versus 7.6 for PATCO. For "Removed & Replaced" WMATA's MLHTR is 1.1 versus 11.4 for PATCO (PATCO has a higher rating for this repair for the "Switch").

The above discussion highlights some statistics for those components within the Logic and Low Voltage Control Assembly (AEBB00) which appeared for both authorities. Data extraction nos. 9 & 10 also present the statistics for all components, within the Logic and Low Voltage Major Assembly (AEBB--), against which there are MACTs for either authority. As stated in Section 4.5.2.1 this information would be useful, as areas of discussion between the Engineering and Maintenance Departments of the authorities.

SECTION 5 - SUMMARY AND CONCLUSIONS

This section provides a final summary of the various analyses in Section 4, and a discussion of possible reasons for the differences in the statistics.

5.1 GENERAL DISCUSSION

The greatest value of using the TRIP Data Bank in performing such an analysis is in highlighting problem areas and differences between authorities. The reasons for the differences in the statistics should be further investigated in order to pinpoint the specific problem(s) and develop strategies and actions to improve equipment reliability and maintenance productivity.

The reasons for the findings of this analysis may fall into the following areas:

- Equipment:
  - design
  - quality control
  - materials
  - accessibility
  - protection (electrical, mechanical; environmental)

- Maintenance Methods:
  - policies and procedures
  - method of repair
  - personnel assignment - engineering, maintenance
  - training
  - reference material availability - prints, manuals, catalogs

- Resources - logistics of parts and repair equipment

- Facilities:
  - facilities management
  - physical plant - features and layout
  - equipment - type and layout

- Personnel:
  - management
  - supervision
  - qualifications and training
  - contract provisions
  - attitude and morale
  - communications

5.2 DATA ANALYSIS SUMMARY

The Propulsion System total MRATES show that PATCO's is more reliable. PATCO's MRATE is 19% lower than WMATA's. Even though the statistics for PATCO's Propulsion System exhibit a higher level of reliability, PATCO's labor hour expenditures in maintaining the system is relatively higher

than WMATA's. WMATA's LRATE is 20% lower than PATCO's, indicating that WMATA's Propulsion system exhibits a higher level of maintainability and/or WMATA's maintenance program operates at a higher level of productivity. The TRIP Data Bank does not contain the necessary information on maintenance policies and practices to determine the reasons for these statistical findings.

The Major Assemblies, within the Propulsion System, which are the MRATE and LRATE high-drivers for PATCO are:

- Power Regulation: ranks first in both
- Traction Motor Assembly: ranks second in labor hour expenditures and third in MACTs
- Logic and Low Voltage: ranks third in labor hour expenditures and second in MACTs
- High Voltage Switch Gear: ranks last in both

The ranking of these Major Assemblies for WMATA are:

- Logic and Low Voltage: ranks first in both labor hour expenditures and MACTs
- High Voltage Switch Gear: ranks second in both
- Traction Motor Assembly: ranks third in both
- Power Regulation: ranks last in both

The Traction Motor Assembly is the least maintainable of these Major Assemblies, although marginally so for WMATA. PATCO's is more reliable with an MMBMA 30% higher than WMATA's. WMATA'a productivity level, however, is higher with a LHRR that is 178% higher than PATCO's. The high-driver component for both authorities is the motor itself within this Major Assembly. PATCO's is more reliable with an MMBMA 18% higher than WMATA's. WMATA's productivity level for the motor, however, is again higher with a LHRR that is 167% higher than PATCO's. For the motor, the defect code which is most prevalent among the codes which appear for both authorities is "Flashed/Arcing". WMATA's productivity level in correcting this defect is higher with a MLHTR that is 80% lower than PATCO's. The repair that is most prevalent, for those which appear for both, is "Removed and Replaced". WMATA's productivity level in accomplishing this repair action on the motor is higher with a MLHTR that is 82% lower than PATCO's.

Power Regulation is the high-driver Major Assembly for PATCO and ranks last for WMATA. Therefore, this Major Assembly creates a greater maintenance load for PATCO than for WMATA. WMATA's MRATE and LRATE are both 82% lower than PATCO's. PATCO's overall productivity level for this Major Assembly is the same as WMATA's. Both authorities exhibit a LHRR of 0.18. Different components account for the Power Regulation MACTs of each authority with the "camshaft" and "camswitch" being the high-driver components for PATCO versus the "cam-controller", "hardware" and "resistors" for WMATA.

The Logic and Low Voltage Major Assembly is the high-driver Major Assembly for WMATA, creating a greater

maintenance load for WMATA than for PATCO. The common Assembly high-driver is Logic and Low Voltage Control. This Assembly exhibits a higher reliability level for WMATA with an MMBMA that is 88% higher than PATCO's. PATCO's productivity level, however, is higher with a LHRR that is 15% higher than WMATA's. Within Logic and Low Voltage Control different components are the high-drivers for each authority. For PATCO they are the "panel" and "relays". For WMATA they are "hardware", the "cradle" and "PC Boards". The contributing components common to both authorities are the "switch" and "panel". For the "switch", PATCO's overall productivity level is higher with a MLHTR that is 55% lower than WMATA's. For the common repair code involving the "switch", "Removed and Replaced", PATCO's productivity level is again higher with a MLHTR that is 61% lower than WMATA's. For the "panel", WMATA's overall productivity level is higher with a MLHTR that is 69% lower than PATCO's. For the common repair codes involving the "panel", "Trouble Shooting", and "Removed and Replaced", WMATA's productivity levels are higher. For "Trouble Shooting" WMATA's MLHTR is 80% lower than PATCO's. For "Removed and Replaced" WMATA's MLHTR is 90% lower than PATCO's.

5.3 EQUIPMENT SUMMARY

An in-depth investigation of the areas listed in Section 5.1 would be necessary to determine the exact reasons for the statistical findings of this analysis. The following sections briefly highlighting some equipment related factors.

5.3.1 Traction Motor

The Traction Motor Assembly has been identified as the least maintainable among the Major Assembly high-drivers. This may be due to the relative inaccessibility of the motor as opposed to other vehicle components. In order to remove a motor, the trucks must first be disconnected and removed from the carbody which involves disconnecting wiring, hoses, truck fastenings and suspension connections between the truck and carbody. Once the truck is removed from the carbody, motor suspension assemblies and gearbox connections must be disconnected to remove the motor from the truck. The same work must then be performed in reverse to re-install the motor into the truck and the truck under the carbody.

PATCO's greater labor expenditure and lower productivity level regarding the traction motor may be attributable to differences in motor and gear box mounting, and truck and suspension connections to the carbody. Due to the nature of the work in removing and replacing a traction motor, tools and equipment, such as hoists, are major factors which could be affecting the productivity levels.

5.3.2 Power Regulation

The maintenance high-driver at PATCO is the pilot motor driven camshaft control. However, WMATA's air piston operated camshaft controller ranks last among its identified Major Assembly high-drivers. This may reflect the fact that PATCO's pilot motor rotates three camshafts through a gearbox while WMATA's Power Regulation consists of two

separate camshafts each driven by an air piston with magnet values and a rack and pinion gear. It should be noted that 96% of the MACTs against PATCO's Power Regulator are attributed to the camshafts. On PATCO's pilot motor camshafts, the notching interlocks are very critical to the proper operation of this type of control.

5.3.3 Logic and Low Voltage

To determine the reasons why this Major Assembly is WMATA's MACT and Labor Hour high-driver would require an in-depth study. Contributing factors might include the overall design of the equipment; quality of components; location of the logic package which could result in the intrusion of conductive dust, or dirt or humidity into the logic compartment; mounting and electrical connector problems; improper heat dissipation; or adjustment problems with interlocks.

APPENDIX A

Data Extraction No. 1

Maintenance Actions

MAINTENANCE ACTIONS PER 100,000 MILES OF REVENUE SERVICE OPERATION

PATCO

	2Q82		3Q82		4Q82		1Q83		TOTAL		
MILEAGES:	1001157.0		964911.0		1014728.0		1007152.0		3987948.0		
GPN	MACT	MRATE	MACT	MRATE	MACT	MRATE	MACT	MRATE	MACT	MRATE	GPN DESCRIPTION
AEAO	--	--	--	--	--	--	--	--	--	--	MANUAL CONTROLS, T/L
AEAA	1.0	0.1	8.0	0.8	3.0	0.3	7.0	0.7	19.0	0.5	MASTER CONTROLLER
AEAC	--	--	--	--	--	--	--	--	--	--	T/L PROPULSION/BRAKING
AEBO	--	--	--		--	--	--	--	--	--	TRACTIVE EFFORT CONTROLLER
AEBB	47.0	4.7	92.0	9.5	121.0	11.9	68.0	6.8	328.0	8.2	LOGIC AND LO-V CONTROL
AEBC	16.0	1.6	31.0	3.2	16.0	1.6	27.0	2.7	90.0	2.3	HIGH VOLTAGE SWITCH GEAR
AEBD	99.0	9.9	162.0	16.8	291.0	28.7	117.0	11.6	669.0	16.8	POWER REGULATION
AEDO	13.0	1.3	37.0	3.8	79.0	7.8	29.0	2.9	158.0	4.0	TRACTION MOTOR ASSY
AEDA	--	--	--	--	--	--	--	--	--	--	FIELD
AEDB	--	--	--	--	--	--	--	--	--	--	ARMATURE ASSY
AEDC	1.0	0.1	--	--	--	--	--	--	1.0	0.0	BRUSHHOLDER ASSY
AEDD	1.0	0.1	--	--	--	--	--	--	1.0	0.0	BRUSH
TOTALS	178.0	17.8	330.0	34.2	510.0	50.3	248.0	24.6	1266.0	31.7	

WMATA

	2Q82		3Q82		4Q82		1Q83		TOTAL		
MILEAGES:	4165366.0		4165638.0		4206663.0		3997136.0		16534803.0		
GPN	MACT	MRATE	MACT	MRATE	MACT	MRATE	MACT	MRATE	MACT	MRATE	GPN DESCRIPTION
AEAO	13.0	0.3	9.0	0.2	8.0	0.2	4.0	0.1	34.0	0.2	MANUAL CONTROLS, T/L
AEAA	25.0	0.6	34.0	0.8	31.0	0.7	22.0	0.6	112.0	0.7	MASTER CONTROLLER
AEAC	24.0	0.6	32.0	0.8	22.0	0.5	20.0	0.5	98.0	0.6	T/L PROPULSION/BRAKING
AEBO	328.0	7.9	323.0	7.8	238.0	5.7	146.0	3.7	1035.0	6.3	TRACTIVE EFFORT CONTROLLER
AEBB	683.0	16.4	607.0	14.6	427.0	10.2	328.0	8.2	2045.0	12.4	LOGIC AND LO-V CONTROL
AEBC	504.0	12.1	539.0	12.9	379.0	9.0	254.0	6.4	1676.0	10.1	HIGH VOLTAGE SWITCH GEAR
AEBD	124.0	3.0	186.0	4.5	122.0	2.9	68.0	1.7	500.0	3.0	POWER REGULATION
AEDO	176.0	4.2	229.0	5.5	233.0	5.5	194.0	4.9	832.0	5.0	TRACTION MOTOR ASSY
AEDA	1.0	0.0	2.0	0.0	1.0	0.0	--	--	4.0	0.0	FIELD
AEDB	15.0	0.4	18.0	0.4	22.0	0.5	14.0	0.4	69.0	0.4	ARMATURE ASSY
AEDC	22.0	0.5	14.0	0.3	6.0	0.1	7.0	0.2	49.0	0.3	BRUSHHOLDER ASSY
AEDD	12.0	0.3	9.0	0.2	9.0	0.2	10.0	0.3	40.0	0.2	BRUSH
TOTALS	1927.0	46.3	2002.0	48.1	1498.0	35.6	1067.0	26.7	6494.0	39.3	

APPENDIX B

Data Extraction No. 2

Labor Hours

LABOR HOURS PER 100,000 MILES OF REVENUE SERVICE OPERATION

PATCO

	2Q82		3Q82		4Q82		1Q83		TOTAL		
MILEAGES:	1001157.0		964911.0		1014728.0		1007152.0		3987948.0		
GPN	LABOR	LRATE	LABOR	LRATE	LABOR	LRATE	LABOR	LRATE	LABOR	LRATE	GPN DESCRIPTION
AEA0	--	--	--	--	--	--	--	--	--	--	MANUAL CONTROLS, T/L
AEAA	2.0	0.2	32.0	3.3	5.0	0.5	56.0	5.6	95.0	2.4	MASTER CONTROLLER
AEAC	--	--	--	--	--	--	--	--	--	--	T/L PROPULSION/BRAKING
AEB0	--	--	--	--	--	--	--	--	--	--	TRACTIVE EFFORT CONTROLLER
AEBB	239.5	23.9	469.0	48.6	509.0	50.2	241.0	23.9	1458.5	36.6	LOGIC AND LO-V CONTROL
AEBC	45.0	4.5	109.0	11.3	52.0	5.1	69.0	6.9	275.0	6.9	HIGH VOLTAGE SWITCH GEAR
AEBD	526.5	52.6	1159.0	120.1	1230.0	121.2	915.0	90.9	3830.5	96.1	POWER REGULATION
AED0	250.5	25.0	495.0	51.3	608.0	59.9	512.0	50.8	1865.5	46.8	TRACTION MOTOR ASSY
AEDA	--	--	--	--	--	--	--	--	--	--	FIELD
AEDB	--	--	--	--	--	--	--	--	--	--	ARMATURE ASSY
AEDC	4.0	0.4	--	--	--	--	--	--	4.0	0.1	BRUSHHOLDER ASSY
AEDD	2.0	0.2	--	--	--	--	--	--	2.0	0.0	BRUSH
TOTALS	1069.5	106.8	2264.0	234.6	2404.0	236.9	1793.0	178.0	7530.5	188.8	

WMATA

	2Q82		3Q82		4Q82		1Q83		TOTAL		
MILEAGES:	4165366.0		4165638.0		4306663.0		3997136.0		16534803.0		
GPN	LABOR	LRATE	LABOR	LRATE	LABOR	LRATE	LABOR	LRATE	LABOR	LRATE	GPN DESCRIPTION
AEA0	17.6	0.4	25.3	0.6	12.7	0.3	8.0	0.2	63.6	0.4	MANUAL CONTROLS, T/L
AEAA	58.0	1.4	73.3	1.8	60.9	1.4	31.7	0.8	223.9	1.4	MASTER CONTROLLER
AEAC	35.9	0.9	89.2	2.1	52.8	1.3	37.6	0.9	215.5	1.3	T/L PROPULSION/BRAKING
AEB0	768.8	18.5	1223.6	29.4	481.5	11.4	440.6	11.0	2914.5	17.6	TRACTIVE EFFORT CONTROLLER
AEBB	2114.7	50.8	2492.4	59.8	1765.1	42.0	1337.3	33.5	7709.5	46.6	LOGIC AND LO-V CONTROL
AEBC	1627.9	39.1	2258.4	54.2	1625.3	38.6	1306.7	32.7	6818.3	41.2	HIGH VOLTAGE SWITCH GEAR
AEBD	706.9	17.0	1132.3	27.2	607.0	14.4	426.1	10.7	2872.3	17.4	POWER REGULATION
AED0	757.9	18.2	947.4	22.7	886.0	21.1	852.4	21.3	3443.7	20.8	TRACTION MOTOR ASSY
AEDA	1.0	0.0	6.5	0.2	1.0	0.0	--	--	8.5	0.1	FIELD
AEDB	61.6	1.5	59.4	1.4	89.3	2.1	71.5	1.8	281.8	1.7	ARMATURE ASSY
AEDC	64.6	1.6	65.6	1.6	21.0	0.5	37.8	0.9	189.0	1.1	BRUSHHOLDER ASSY
AEDD	49.4	1.2	23.6	0.6	19.5	0.5	27.7	0.7	120.2	0.7	BRUSH
TOTALS	6264.3	150.4	8397.0	201.6	5622.1	133.6	4577.4	114.5	24860.8	150.4	

APPENDIX C

Data Extraction No. 3

Reliability Statistics

RELIABILITY STATISTICS FOR FOUR QUARTER PERIOD

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

PATCO MILES: 3987948. WMATA MILES: 16534803.

GPN	UCC	MAINTENANCE ACTIONS PATCO	MAINTENANCE ACTIONS WMATA	MAINTENANCE RATE PATCO	MAINTENANCE RATE WMATA	MMBMA PATCO	MMBMA WMATA	DESCRIPTION GPN / UCC
AEB000	--	--	1044.0	--	0.63	----	1.58	TRACTIVE EFFORT CONTROLLR
AEB000	5H	--	72.0	--	0.04	----	22.97	STRAINER
AEB000	6U	--	824.0	--	0.50	----	2.01	CONTROL
AEB000	HE	--	29.0	--	0.02	----	57.02	HARDWARE
AEB000	RT	--	116.0	--	0.07	----	14.25	REGULATOR
AEB000	RX	--	3.0	--	0.00	----	551.16	RESERVOIR
AEBB00	--	194.0	427.0	0.49	0.26	2.06	3.87	LOGIC AND LO-V CONTROL
AEBB00	00	5.0	--	0.01	--	79.76	----	NOT DESIGNATED
AEBB00	1C	--	7.0	--	0.00	----	236.21	INDUCTOR
AEBB00	5N	1.0	--	0.00	--	398.79	----	SUPPORT
AEBB00	5R	3.0	18.0	0.01	0.01	132.93	91.86	SWITCH
AEBB00	64	--	39.0	--	0.02	----	42.40	CRADLE
AEBB00	6R	3.0	--	0.01	--	132.93	----	CONTACT
AEBB00	HE	--	323.0	--	0.20	----	5.12	HARDWARE
AEBB00	PE	157.0	5.0	0.39	0.00	2.54	330.70	PANEL
AEBB00	PJ	--	26.0	--	0.02	----	63.60	PC BOARD (CARD)
AEBB00	RU	21.0	--	0.05	--	18.99	----	RELAY
AEBB00	RY	--	8.0	--	0.00	----	206.69	RESISTOR
AEBB00	SU	4.0	--	0.01	--	99.70	----	SHUNT
AEBB00	TX	--	1.0	--	0.00	----	******	TRANSDUCTOR
AEBB01	--	41.0	--	0.10	--	9.73	----	ANNUNCIATOR
AEBB01	DF	41.0	--	0.10	--	9.73	----	DETECTOR
AEBB03	--	5.0	--	0.01	--	79.76	----	CIRCUIT PROTECTION
AEBB03	PJ	5.0	--	0.01	--	79.76	----	PC BOARD (CARD)
AEBB04	--	4.0	110.0	0.01	0.07	99.70	15.03	ELECTROMOTIVE BRAKING CONTROL
AEBB04	5R	3.0	--	0.01	--	132.93	----	SWITCH
AEBB04	PJ	1.0	106.0	0.00	0.06	398.79	15.60	PC BOARD (CARD)
AEBB04	RU	--	4.0	--	0.00	----	413.37	RELAY
AEBB05	--	72.0	--	0.18	--	5.54	----	PERFORMANCE MODIFICATION
AEBB05	HT	2.0	--	0.01	--	199.40	----	HOSE
AEBB05	PE	17.0	--	0.04	--	23.46	----	PANEL
AEBB05	PJ	35.0	--	0.09	--	11.39	----	PC BOARD (CARD)
AEBB05	RB	4.0	--	0.01	--	99.70	----	RACK
AEBB05	RU	2.0	--	0.01	--	199.40	----	RELAY
AEBB05	TW	3.0	--	0.01	--	132.93	----	TRANSDUCER
AEBB05	WE	9.0	--	0.02	--	44.31	----	WHEEL
AEBB06	--	--	46.0	--	0.03	----	35.95	DECODE/ENCODE
AEBB06	PJ	--	46.0	--	0.03	----	35.95	PC BOARD (CARD)
AEBB07	--	3.0	770.0	0.01	0.47	132.93	2.15	POWER SUPPLY
AEBB07	PJ	3.0	770.0	0.01	0.47	132.93	2.15	PC BOARD (CARD)
AEBB08	--	--	248.0	--	0.15	----	6.67	BUFFER/DRIVER/ISOLATION
AEBB08	PJ	--	248.0	--	0.15	----	6.67	PC BOARD (CARD)
AEBB09	--	5.0	--	0.01	--	79.76	----	SPEED/TACH

RELIABILITY STATISTICS FOR FOUR QUARTER PERIOD

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

PATCO MILES: 3987948. WMATA MILES: 16534803.

GPN	UCC	MAINTENANCE ACTIONS PATCO	MAINTENANCE ACTIONS WMATA	MAINTENANCE RATE PATCO	MAINTENANCE RATE WMATA	MMBMA PATCO	MMBMA WMATA	DESCRIPTION GPN / UCC
AEBB09	PJ	5.0	--	0.01	--	79.76	----	PC BOARD (CARD)
AEBB10	--	8.0	452.0	0.02	0.27	49.85	3.66	ACCELERATION CONTROL
AEBB10	PJ	8.0	300.0	0.02	0.18	49.85	5.51	PC BOARD (CARD)
AEBB10	RU	--	144.0	--	0.09	----	11.48	RELAY
AEBB10	TY	--	8.0	--	0.00	----	206.69	TRANSFORMER
AEBC00	--	36.0	1237.0	0.09	0.75	11.08	1.34	HIGH VOLTAGE SWITCH GEAR
AEBC00	1J	5.0	--	0.01	--	79.76	----	INTERLOCK
AEBC00	5R	--	2.0	--	0.00	----	826.74	SWITCH
AEBC00	6N	--	2.0	--	0.00	----	826.74	CONNECTOR
AEBC00	6R	9.0	--	0.02	--	44.31	----	CONTACT
AEBC00	6S	21.0	66.0	0.05	0.04	18.99	25.05	CONTACTOR
AEBC00	6U	--	1130.0	--	0.68	----	1.46	CONTROL
AEBC00	B2	--	3.0	--	0.00	----	551.16	BOX
AEBC00	HB	1.0	--	0.00	--	398.79	----	HANDLE
AEBC00	HE	--	34.0	--	0.02	----	48.63	HARDWARE
AEBC01	--	18.0	--	0.05	--	22.16	----	BRAKE
AEBC01	4B	1.0	--	0.00	--	398.79	----	COIL
AEBC01	6R	5.0	--	0.01	--	79.76	----	CONTACT
AEBC01	6S	12.0	--	0.03	--	33.23	----	CONTACTOR
AEBC02	--	9.0	72.0	0.02	0.04	44.31	22.97	FIELD
AEBC02	1J	1.0	--	0.00	--	398.79	----	INTERLOCK
AEBC02	6S	7.0	64.0	0.02	0.04	56.97	25.84	CONTACTOR
AEBC02	MM	1.0	--	0.00	--	398.79	----	MODULE
AEBC02	RY	--	8.0	--	0.00	----	206.69	RESISTOR
AEBC03	--	1.0	--	0.00	--	398.79	----	GROUND
AEBC03	6S	1.0	--	0.00	--	398.79	----	CONTACTOR
AEBC04	--	10.0	97.0	0.03	0.06	39.88	17.05	LINE
AEBC04	6R	2.0	--	0.01	--	199.40	----	CONTACT
AEBC04	6S	7.0	45.0	0.02	0.03	56.97	36.74	CONTACTOR
AEBC04	AT	1.0	--	0.00	--	398.79	----	ARM
AEBC04	RU	--	52.0	--	0.03	----	31.80	RELAY
AEBC07	--	11.0	--	0.03	--	36.25	----	PARALLEL
AEBC07	4B	1.0	--	0.00	--	398.79	----	COIL
AEBC07	6R	1.0	--	0.00	--	398.79	----	CONTACT
AEBC07	6S	8.0	--	0.02	--	49.85	----	CONTACTOR
AEBC07	S7	1.0	--	0.00	--	398.79	----	SPRING
AEBC08	--	--	40.0	--	0.02	----	41.34	POWER BRAKE
AEBC08	6V	--	40.0	--	0.02	----	41.34	CONTROLLER
AEBC09	--	2.0	83.0	0.01	0.05	199.40	19.92	REVERSER
AEBC09	6S	2.0	--	0.01	--	199.40	----	CONTACTOR
AEBC09	R2	--	83.0	--	0.05	----	19.92	REVERSER
AEBC10	--	4.0	38.0	0.01	0.02	99.70	43.51	SERIES
AEBC10	4B	1.0	--	0.00	--	398.79	----	COIL

RELIABILITY STATISTICS FOR FOUR QUARTER PERIOD

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

PATCO MILES: 3987948. WMATA MILES: 16534803.

GPN	UCC	MAINTENANCE ACTIONS PATCO	MAINTENANCE ACTIONS WMATA	MAINTENANCE RATE PATCO	MAINTENANCE RATE WMATA	MMBMA PATCO	MMBMA WMATA	DESCRIPTION GPN / UCC
AEBC10	6S	3.0	38.0	0.01	0.02	132.93	43.51	CONTACTOR
AEBC11	--	--	113.0	--	0.07	----	14.63	CIRCUIT PROTECTION
AEBC11	6V	--	96.0	--	0.06	----	17.22	CONTROLLER
AEBC11	FV	--	7.0	--	0.00	----	236.21	FUSE
AEBC11	HE	--	10.0	--	0.01	----	165.35	HARDWARE
AEBD01	--	671.0	514.0	1.68	0.31	0.59	3.22	CAM
AEBD01	1F	--	28.0	--	0.02	----	59.05	INSULATOR
AEBD01	5N	1.0	--	0.00	--	398.79	----	SUPPORT
AEBD01	5R	2.0	--	0.01	--	199.40	----	SWITCH
AEBD01	6R	6.0	--	0.02	--	66.47	----	CONTACT
AEBD01	6V	--	281.0	--	0.17	----	5.88	CONTROLLER
AEBD01	9C	2.0	--	0.01	--	199.40	----	GEAR
AEBD01	9D	1.0	--	0.00	--	398.79	----	GEARBOX
AEBD01	BV	2.0	--	0.01	--	199.40	----	BLOCK
AEBD01	CF	15.0	--	0.04	--	26.59	----	CAM SWITCH
AEBD01	HE	--	119.0	--	0.07	----	13.89	HARDWARE
AEBD01	PJ	1.0	--	0.00	--	398.79	----	PC BOARD (CARD)
AEBD01	R9	--	3.0	--	0.00	----	551.16	ROD
AEBD01	RY	--	83.0	--	0.05	----	19.92	RESISTOR
AEBD01	SM	641.0	--	1.61	--	0.62	----	SHAFT
AED000	--	160.0	860.0	0.40	0.52	2.49	1.92	TRACTION MOTOR ASSY
AED000	62	--	17.0	--	0.01	----	97.26	COUPLING
AED000	FT	--	5.0	--	0.00	----	330.70	FRAME
AED000	HE	--	85.0	--	0.05	----	19.45	HARDWARE
AED000	HV	6.0	--	0.02	--	66.47	----	HUB
AED000	MR	154.0	753.0	0.39	0.46	2.59	2.20	MOTOR
TOTALS	--	1254.0	6151.0	3.14	3.72	0.32	0.27	* * * * * * * * * *

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APPENDIX D

Data Extraction No. 4

Maintainability Statistics

MAINTAINABILITY STATISTICS FOR FOUR QUARTER PERIOD
(INDICIES OF PRODUCTIVITY)
BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

PATCO MILES: 3987948. WMATA MILES: 16534803.

GPN	UCC	LABOR HOURS		LABOR RATE		MLHTR		LABOR HOUR REPAIR RATE (1/MLHTR)		DESCRIPTION GPN / UCC
		PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	
AEB000	--	--	2914.5	--	1.76	----	2.79	----	0.36	TRACTIVE EFFORT CONTROLLR
AEB000	5H	--	51.6	--	0.03	----	0.72	----	1.40	STRAINER
AEB000	6U	--	1926.5	--	1.17	----	2.34	----	0.43	CONTROL
AEB000	HE	--	41.9	--	0.03	----	1.44	----	0.69	HARDWARE
AEB000	RT	--	890.3	--	0.54	----	7.68	----	0.13	REGULATOR
AEB000	RX	--	4.2	--	0.00	----	1.40	----	0.71	RESERVOIR
AEBB00	--	858.0	2181.8	2.15	1.32	4.42	5.11	0.23	0.20	LOGIC AND LO-V CONTROL
AEBB00	00	9.0	--	0.02	--	1.80	----	0.56	----	NOT DESIGNATED
AEBB00	1C	--	39.5	--	0.02	----	5.64	----	0.18	INDUCTOR
AEBB00	5N	16.0	--	0.04	--	16.00	----	0.06	----	SUPPORT
AEBB00	5R	5.0	67.6	0.01	0.04	1.67	3.76	0.60	0.27	SWITCH
AEBB00	64	--	206.1	--	0.12	----	5.28	----	0.19	CRADLE
AEBB00	6R	8.0	--	0.02	--	2.67	----	0.38	----	CONTACT
AEBB00	HE	--	1673.0	--	1.01	----	5.18	----	0.19	HARDWARE
AEBB00	PE	654.0	6.3	1.64	0.00	4.17	1.26	0.24	0.79	PANEL
AEBB00	PJ	--	138.8	--	0.08	----	5.34	----	0.19	PC BOARD (CARD)
AEBB00	RU	113.0	--	0.28	--	5.38	----	0.19	----	RELAY
AEBB00	RY	--	49.0	--	0.03	----	6.13	----	0.16	RESISTOR
AEBB00	SU	53.0	--	0.13	--	13.25	----	0.08	----	SHUNT
AEBB00	TX	--	1.5	--	0.00	----	1.50	----	0.67	TRANSDUCTOR
AEBB01	--	101.0	--	0.25	--	2.46	----	0.41	----	ANNUNCIATOR
AEBB01	DF	101.0	--	0.25	--	2.46	----	0.41	----	DETECTOR
AEBB03	--	4.0	--	0.01	--	0.80	----	1.25	----	CIRCUIT PROTECTION
AEBB03	PJ	4.0	--	0.01	--	0.80	----	1.25	----	PC BOARD (CARD)
AEBB04	--	9.0	251.7	0.02	0.15	2.25	2.29	0.44	0.44	ELECTROMOTIVE BRAKING CONTROL
AEBB04	5R	6.0	--	0.02	--	2.00	----	0.50	----	SWITCH
AEBB04	PJ	3.0	233.0	0.01	0.14	3.00	2.20	0.33	0.45	PC BOARD (CARD)
AEBB04	RU	--	18.7	--	0.01	----	4.68	----	0.21	RELAY
AEBB05	--	409.5	--	1.03	--	5.69	----	0.18	----	PERFORMANCE MODIFICATION
AEBB05	HT	18.0	--	0.05	--	9.00	----	0.11	----	HOSE
AEBB05	PE	78.0	--	0.20	--	4.59	----	0.22	----	PANEL
AEBB05	PJ	151.5	--	0.38	--	4.33	----	0.23	----	PC BOARD (CARD)
AEBB05	RB	61.0	--	0.15	--	15.25	----	0.07	----	RACK
AEBB05	RU	8.0	--	0.02	--	4.00	----	0.25	----	RELAY
AEBB05	TW	20.0	--	0.05	--	6.67	----	0.15	----	TRANSDUCER
AEBB05	WE	73.0	--	0.18	--	8.11	----	0.12	----	WHEEL
AEBB06	--	--	149.9	--	0.09	----	3.26	----	0.31	DECODE/ENCODE
AEBB06	PJ	--	149.9	--	0.09	----	3.26	----	0.31	PC BOARD (CARD)
AEBB07	--	21.0	2323.5	0.05	1.41	7.00	3.02	0.14	0.33	POWER SUPPLY
AEBB07	PJ	21.0	2323.5	0.05	1.41	7.00	3.02	0.14	0.33	PC BOARD (CARD)
AEBB08	--	--	877.5	--	0.53	----	3.54	----	0.28	BUFFER/DRIVER/ISOLATION
AEBB08	PJ	--	877.5	--	0.53	----	3.54	----	0.28	PC BOARD (CARD)
AEBB09	--	29.0	--	0.07	--	5.80	----	0.17	----	SPEED/TACH

MAINTAINABILITY STATISTICS FOR FOUR QUARTER PERIOD
(INDICIES OF PRODUCTIVITY)
BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

PATCO MILES: 3987948. WMATA MILES: 16534803.

GPN	UCC	LABOR HOURS PATCO	LABOR HOURS WMATA	LABOR RATE PATCO	LABOR RATE WMATA	MLHTR PATCO	MLHTR WMATA	LABOR HOUR REPAIR RATE (1/MLHTR) PATCO	LABOR HOUR REPAIR RATE (1/MLHTR) WMATA	DESCRIPTION GPN / UCC
AEBB09	PJ	29.0	--	0.07	--	5.80	----	0.17	----	PC BOARD (CARD)
AEBB10	--	27.0	1925.1	0.07	1.16	3.38	4.26	0.30	0.23	ACCELERATION CONTROL
AEBB10	PJ	27.0	1313.4	0.07	0.79	3.38	4.38	0.30	0.23	PC BOARD (CARD)
AEBB10	RU	--	546.2	--	0.33	----	3.79	----	0.26	RELAY
AEBB10	TY	--	65.5	--	0.04	----	8.19	----	0.12	TRANSFORMER
AEBC00	--	112.0	4729.7	0.28	2.86	3.11	3.82	0.32	0.26	HIGH VOLTAGE SWITCH GEAR
AEBC00	1J	17.0	--	0.04	--	3.40	----	0.29	----	INTERLOCK
AEBC00	5R	--	3.2	--	0.00	----	1.60	----	0.63	SWITCH
AEBC00	6N	--	0.4	--	0.00	----	0.20	----	5.00	CONNECTOR
AEBC00	6R	16.0	--	0.04	--	1.78	----	0.56	----	CONTACT
AEBC00	6S	78.0	212.0	0.20	0.13	3.71	3.21	0.27	0.31	CONTACTOR
AEBC00	6U	--	4462.4	--	2.70	----	3.95	----	0.25	CONTROL
AEBC00	B2	--	7.8	--	0.00	----	2.60	----	0.38	BOX
AEBC00	HB	1.0	--	0.00	--	1.00	----	1.00	----	HANDLE
AEBC00	HE	--	43.9	--	0.03	----	1.29	----	0.77	HARDWARE
AEBC01	--	37.0	--	0.09	--	2.06	----	0.49	----	BRAKE
AEBC01	4B	3.0	--	0.01	--	3.00	----	0.33	----	COIL
AEBC01	6R	4.0	--	0.01	--	0.80	----	1.25	----	CONTACT
AEBC01	6S	30.0	--	0.08	--	2.50	----	0.40	----	CONTACTOR
AEBC02	--	43.0	288.7	0.11	0.17	4.78	4.01	0.21	0.25	FIELD
AEBC02	1J	3.0	--	0.01	--	3.00	----	0.33	----	INTERLOCK
AEBC02	6S	36.0	261.9	0.09	0.16	5.14	4.09	0.19	0.24	CONTACTOR
AEBC02	MM	4.0	--	0.01	--	4.00	----	0.25	----	MODULE
AEBC02	RY	--	26.8	--	0.02	----	3.35	----	0.30	RESISTOR
AEBC03	--	1.0	--	0.00	--	1.00	----	1.00	----	GROUND
AEBC03	6S	1.0	--	0.00	--	1.00	----	1.00	----	CONTACTOR
AEBC04	--	27.0	309.3	0.07	0.19	2.70	3.19	0.37	0.31	LINE
AEBC04	6R	4.0	--	0.01	--	2.00	----	0.50	----	CONTACT
AEBC04	6S	19.0	171.7	0.05	0.10	2.71	3.82	0.37	0.26	CONTACTOR
AEBC04	AT	4.0	--	0.01	--	4.00	----	0.25	----	ARM
AEBC04	RU	--	137.6	--	0.08	----	2.65	----	0.38	RELAY
AEBC07	--	39.0	--	0.10	--	3.55	----	0.28	----	PARALLEL
AEBC07	4B	8.0	--	0.02	--	8.00	----	0.13	----	COIL
AEBC07	6R	2.0	--	0.01	--	2.00	----	0.50	----	CONTACT
AEBC07	6S	21.0	--	0.05	--	2.63	----	0.38	----	CONTACTOR
AEBC07	S7	8.0	--	0.02	--	8.00	----	0.13	----	SPRING
AEBC08	--	--	178.4	--	0.11	----	4.46	----	0.22	POWER BRAKE
AEBC08	6V	--	178.4	--	0.11	----	4.46	----	0.22	CONTROLLER
AEBC09	--	4.0	412.9	0.01	0.25	2.00	4.97	0.50	0.20	REVERSER
AEBC09	6S	4.0	--	0.01	--	2.00	----	0.50	----	CONTACTOR
AEBC09	R2	--	412.9	--	0.25	----	4.97	----	0.20	REVERSER
AEBC10	--	12.0	220.7	0.03	0.13	3.00	5.81	0.33	0.17	SERIES
AEBC10	4B	1.0	--	0.00	--	1.00	----	1.00	----	COIL

MAINTAINABILITY STATISTICS FOR FOUR QUARTER PERIOD
(INDICIES OF PRODUCTIVITY)
BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

PATCO MILES: 3987948. WMATA MILES: 16534803.

GPN	UCC	LABOR HOURS		LABOR RATE		MLHTR		LABOR HOUR REPAIR RATE (1/MLHTR)		DESCRIPTION
		PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN / UCC
AEBC10	6S	11.0	220.7	0.03	0.13	3.67	5.81	0.27	0.17	CONTACTOR
AEBC11	--	--	678.6	--	0.41	----	6.01	----	0.17	CIRCUIT PROTECTION
AEBC11	6V	--	647.3	--	0.39	----	6.74	----	0.15	CONTROLLER
AEBC11	FV	--	20.3	--	0.01	----	2.90	----	0.34	FUSE
AEBC11	HE	--	11.0	--	0.01	----	1.10	----	0.91	HARDWARE
AEBD01	--	3830.5	2872.3	9.61	1.74	5.71	5.59	0.18	0.18	CAM
AEBD01	1F	--	130.8	--	0.08	----	4.67	----	0.21	INSULATOR
AEBD01	5N	16.0	--	0.04	--	16.00	----	0.06	----	SUPPORT
AEBD01	5R	30.0	--	0.08	--	15.00	----	0.07	----	SWITCH
AEBD01	6R	28.0	--	0.07	--	4.67	----	0.21	----	CONTACT
AEBD01	6V	--	1403.9	--	0.85	----	5.00	----	0.20	CONTROLLER
AEBD01	9C	14.0	--	0.04	--	7.00	----	0.14	----	GEAR
AEBD01	9D	--	--	--	--	--	----	----	----	GEARBOX
AEBD01	BV	17.0	--	0.04	--	8.50	----	0.12	----	BLOCK
AEBD01	CF	108.0	--	0.27	--	7.20	----	0.14	----	CAM SWITCH
AEBD01	HE	--	787.9	--	0.48	----	6.62	----	0.15	HARDWARE
AEBD01	PJ	22.0	--	0.06	--	22.00	----	0.05	----	PC BOARD (CARD)
AEBD01	R9	--	16.2	--	0.01	----	5.40	----	0.19	ROD
AEBD01	RY	--	533.5	--	0.32	----	6.43	----	0.16	RESISTOR
AEBD01	SM	3595.5	--	9.02	--	5.61	----	0.18	----	SHAFT
AED000	--	1865.5	3443.7	4.68	2.08	11.66	4.00	0.09	0.25	TRACTION MOTOR ASSY
AED000	62	--	35.0	--	0.02	----	2.06	----	0.49	COUPLING
AED000	FT	--	21.2	--	0.01	----	4.24	----	0.24	FRAME
AED000	HE	--	218.4	--	0.13	----	2.57	----	0.39	HARDWARE
AED000	HV	113.0	--	0.28	--	18.83	----	0.05	----	HUB
AED000	MR	1752.5	3169.1	4.39	1.92	11.38	4.21	0.09	0.24	MOTOR
TOTALS	--	7429.5	23758.3	18.63	14.37	5.92	3.86	0.17	0.26	* * * * * * * * * *

APPENDIX E

Data Extraction No. 5

Traction Motor Assembly By Defect Code

MAINTAINABILITY HIGH-DRIVER BY DEFECT CODE

TRACTION MOTDR ASSEMBLY
(AED000)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AED000	--	----	162.0	1079.0	0.4	0.7	1865.5	3443.7	4.7	2.1	11.5	3.2	TRACTION MOTOR ASSY
AED000	62	----	--	18.0	--	0.0	--	35.0	--	0.0	----	1.9	COUPLING
AED000	62	DM13	--	2.0	--	0.0	--	4.0	--	0.0	----	2.0	BROKEN/SHEARED
AED000	62	DM23	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	DIRTY
AED000	62	DM5B	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	WORN
AED000	62	DN33	--	5.0	--	0.0	--	12.5	--	0.0	----	2.5	NO DEFECT, SCHED MOD
AED000	62	DZ19	--	9.0	--	0.0	--	14.5	--	0.0	----	1.6	REM FOR OTHER MAINT A
AED000	FT	----	--	5.0	--	0.0	--	21.2	--	0.0	----	4.2	FRAME
AED000	FT	DD28	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	LEAKING
AED000	FT	DE67	--	1.0	--	0.0	--	15.0	--	0.0	----	15.0	INCORRECT CURRENT
AED000	FT	DE73	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	SHORTED
AED000	FT	DS26	--	1.0	--	0.0	--	0.2	--	0.0	----	0.2	FAILS TO OPERATE
AED000	FT	DZ19	--	1.0	--	0.0	--	2.5	--	0.0	----	2.5	REM FOR OTHER MAINT A
AED000	HE	----	--	90.0	--	0.1	--	218.4	--	0.1	----	2.4	HARDWARE
AED000	HE	DD28	--	4.0	--	0.0	--	2.2	--	0.0	----	0.5	LEAKING
AED000	HE	DD2A	--	1.0	--	0.0	--	0.3	--	0.0	----	0.3	PUNCTURED
AED000	HE	DD2B	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	TORN
AED000	HE	DE21	--	1.0	--	0.0	--	0.3	--	0.0	----	0.3	BURNED,CONTACT
AED000	HE	DE2A	--	6.0	--	0.0	--	18.5	--	0.0	----	3.1	FLASHED/ARCING
AED000	HE	DE46	--	1.0	--	0.0	--	7.5	--	0.0	----	7.5	OUT OF ROUND
AED000	HE	DE48	--	1.0	--	0.0	--	10.5	--	0.0	----	10.5	OVERLOADED MOTOR
AED000	HE	DE51	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	BLOWN FUSE
AED000	HE	DE54	--	6.0	--	0.0	--	18.7	--	0.0	----	3.1	OPEN CIRCUIT
AED000	HE	DE69	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	INCORRECT SIGNAL
AED000	HE	DE71	--	1.0	--	0.0	--	2.5	--	0.0	----	2.5	CHANGE OF VALUE
AED000	HE	DE73	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	SHORTED
AED000	HE	DM13	--	17.0	--	0.0	--	56.1	--	0.0	----	3.3	BROKEN/SHEARED
AED000	HE	DM14	--	3.0	--	0.0	--	3.0	--	0.0	----	1.0	CRACKED
AED000	HE	DM23	--	1.0	--	0.0	--	0.2	--	0.0	----	0.2	DIRTY
AED000	HE	DM32	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	DEFECTIVE BEARING
AED000	HE	DM3A	--	1.0	--	0.0	--	16.0	--	0.0	----	16.0	ROUGH/SCORED
AED000	HE	DM41	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	BENT/BUCKLED/DENTED
AED000	HE	DM53	--	3.0	--	0.0	--	1.6	--	0.0	----	0.5	LOOSE
AED000	HE	DM55	--	15.0	--	0.0	--	7.9	--	0.0	----	0.5	LOST/MISSING
AED000	HE	DM59	--	2.0	--	0.0	--	2.0	--	0.0	----	1.0	WORN HOLES/OVERSIZED
AED000	HE	DM5B	--	4.0	--	0.0	--	8.5	--	0.0	----	2.1	WORN
AED000	HE	DM5C	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	WORN BEYOND LIMITS
AED000	HE	DM72	--	5.0	--	0.0	--	34.2	--	0.0	----	6.8	BURNED
AED000	HE	DN12	--	1.0	--	0.0	--	--	--	--	----	--	NO DEFECT NOTED
AED000	HE	DN32	--	4.0	--	0.0	--	3.3	--	0.0	----	0.8	NO DEFECT, PROG MAINT
AED000	HE	DN33	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	NO DEFECT, SCHED MOD
AED000	HE	DZ19	--	3.0	--	0.0	--	9.5	--	0.0	----	3.2	REM FOR OTHER MAINT A

MAINTAINABILITY HIGH-DRIVER BY DEFECT CODE

TRACTION MOTOR ASSEMBLY
(AED000)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLRTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AED000	HE	D242	--	2.0	--	0.0	--	2.1	--	0.0	----	1.0	IMPROPER ADJUSTMENT
AED000	HV	----	6.0	--	0.0	--	113.0	--	0.3	--	18.8	----	HUB
AED000	HV	DM5B	5.0	--	0.0	--	105.0	--	0.3	--	21.0	----	WORN
AED000	HV	[ ]	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	NOT DESIGNATED
AED000	MR	----	156.0	966.0	0.4	0.6	1752.5	3169.1	4.4	1.9	11.2	3.3	MOTOR
AED000	MR	DC12	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	MOISTURE PRESENT
AED000	MR	DC22	--	2.0	--	0.0	--	4.0	--	0.0	----	2.0	FROZEN
AED000	MR	DC23	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	PITTED
AED000	MR	DD21	1.0	--	0.0	--	6.0	--	0.0	--	6.0	----	CUT
AED000	MR	DD24	--	3.0	--	0.0	--	10.2	--	0.0	----	3.4	DESTROYED
AED000	MR	DD26	--	1.0	--	0.0	--	0.2	--	0.0	----	0.2	FOREIGN OBJECT DAMAGE
AED000	MR	DD28	--	4.0	--	0.0	--	7.1	--	0.0	----	1.8	LEAKING
AED000	MR	DE14	--	2.0	--	0.0	--	5.5	--	0.0	----	2.8	LOOSE CONNECTION
AED000	MR	DE2A	22.0	84.0	0.1	0.1	527.0	409.1	1.3	0.2	24.0	4.9	FLASHED/ARCING
AED000	MR	DE2B	--	5.0	--	0.0	--	15.0	--	0.0	----	3.0	INSULLATION BREAKDOWN
AED000	MR	DE2F	7.0	--	0.0	--	171.0	--	0.4	--	24.4	----	MISC ELECT TROUBLE
AED000	MR	DE2K	1.0	--	0.0	--	1.0	--	0.0	--	1.0	----	TRIPPED
AED000	MR	DE2L	16.0	1.0	0.0	0.0	25.0	5.0	0.1	0.0	1.6	5.0	TRIPPED CKT BREAKER
AED000	MR	DE41	--	16.0	--	0.0	--	40.3	--	0.0	----	2.5	DAMAGED ARMATURE
AED000	MR	DE42	--	10.0	--	0.0	--	26.9	--	0.0	----	2.7	DAMMAGED COMMUTATOR
AED000	MR	DE44	--	1.0	--	0.0	--	13.0	--	0.0	----	13.0	LOW MICA
AED000	MR	DE46	--	212.0	--	0.1	--	850.5	--	0.5	----	4.0	OUT OF ROUND
AED000	MR	DE48	--	25.0	--	0.0	--	93.8	--	0.1	----	3.8	OVERLOADED MOTOR
AED000	MR	DE49	--	2.0	--	0.0	--	1.5	--	0.0	----	0.8	WORN BRUSHES
AED000	MR	DE51	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	BLOWN FUSE
AED000	MR	DE54	--	5.0	--	0.0	--	16.7	--	0.0	----	3.3	OPEN CIRCUIT
AED000	MR	DE71	--	1.0	--	0.0	--	3.3	--	0.0	----	3.3	CHANGE OF VALUE
AED000	MR	DE72	2.0	8.0	0.0	0.0	16.0	54.5	0.0	0.0	8.0	6.8	GROUNDED
AED000	MR	DE73	--	25.0	--	0.0	--	80.3	--	0.0	----	3.2	SHORTED
AED000	MR	DM13	2.0	14.0	0.0	0.0	23.0	35.3	0.1	0.0	11.5	2.5	BROKEN/SHEARED
AED000	MR	DM14	--	6.0	--	0.0	--	9.5	--	0.0	----	1.6	CRACKED
AED000	MR	DM23	2.0	4.0	0.0	0.0	8.0	18.0	0.0	0.0	4.0	4.5	DIRTY
AED000	MR	DM32	3.0	30.0	0.0	0.0	56.0	82.2	0.1	0.0	18.7	2.7	DEFECTIVE BEARING
AED000	MR	DM37	--	2.0	--	0.0	--	6.0	--	0.0	----	3.0	DELAMINATED
AED000	MR	DM38	--	9.0	--	0.0	--	31.2	--	0.0	----	3.5	DETERIORATED
AED000	MR	DM39	1.0	--	0.0	--	3.0	--	0.0	--	3.0	----	PULLED APART
AED000	MR	DM3A	--	2.0	--	0.0	--	5.5	--	0.0	----	2.8	ROUGH/SCORED
AED000	MR	DM41	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	BENT/BUCKLED/DENTED
AED000	MR	DM44	4.0	2.0	0.0	0.0	40.0	6.0	0.1	0.0	10.0	3.0	OUT OF BAL/TOL
AED000	MR	DM51	--	17.0	--	0.0	--	44.3	--	0.0	----	2.6	CHIPPED/PEELING
AED000	MR	DM53	--	6.0	--	0.0	--	14.7	--	0.0	----	2.5	LOOSE
AED000	MR	DM55	--	4.0	--	0.0	--	1.5	--	0.0	----	0.4	LOST/MISSING

MAINTAINABILITY HIGH-DRIVER BY DEFECT CODE

TRACTION MOTOR ASSEMBLY
(AED000)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AED000	MR	DM56	2.0	--	0.0	--	9.0	--	0.0	--	4.5	----	MISSING MINOR HDWRE
AED000	MR	DM5B	3.0	4.0	0.0	0.0	65.0	12.5	0.2	0.0	21.7	3.1	WORN
AED000	MR	DM65	--	4.0	--	0.0	--	17.0	--	0.0	----	4.3	JAM/BINDING/LOCKED
AED000	MR	DM72	--	4.0	--	0.0	--	5.1	--	0.0	----	1.3	BURNED
AED000	MR	DM75	--	3.0	--	0.0	--	5.5	--	0.0	----	1.8	HOT/OVERHEATED
AED000	MR	DN11	--	2.0	--	0.0	--	2.0	--	0.0	----	1.0	FAILURE, CANNOT DUP
AED000	MR	DN12	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	NO DEFECT NOTED
AED000	MR	DN13	--	1.0	--	0.0	--	0.1	--	0.0	----	0.1	NO DEFECT, OPER ERROR
AED000	MR	DN22	43.0	--	0.1	--	69.0	--	0.2	--	1.6	----	NO DEFECT,COMP REM
AED000	MR	DN32	1.0	243.0	0.0	0.1	15.0	627.5	0.0	0.4	15.0	2.6	NO DEFECT, PROG MAINT
AED000	MR	DN33	--	45.0	--	0.0	--	203.8	--	0.1	----	4.5	NO DEFECT, SCHED MOD
AED000	MR	DP42	--	2.0	--	0.0	--	2.5	--	0.0	----	1.3	LOW LUBRICANT
AED000	MR	DS12	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	ERRATIC OPERATION
AED000	MR	DS16	1.0	37.0	0.0	0.0	8.0	83.3	0.0	0.1	8.0	2.3	NOISY
AED000	MR	DS23	5.0	--	0.0	--	12.0	--	0.0	--	2.4	----	DEAD CAR
AED000	MR	DS26	--	6.0	--	0.0	--	26.0	--	0.0	----	4.3	FAILS TO OPERATE
AED000	MR	DS2C	--	32.0	--	0.0	--	100.9	--	0.1	----	3.2	FAILURE, INTERNAL
AED000	MR	DS2E	2.0	--	0.0	--	2.0	--	0.0	--	1.0	----	NO DYNAMIC BRAKE
AED000	MR	DS2F	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	NO GO INDICATION
AED000	MR	DS43	--	1.0	--	0.0	--	5.0	--	0.0	----	5.0	ERROR, DISPLAY READOU
AED000	MR	DS4C	3.0	--	0.0	--	10.0	--	0.0	--	3.3	----	SLOW ACCELERATION
AED000	MR	DZ19	--	62.0	--	0.0	--	132.8	--	0.1	----	2.1	REM FOR OTHER MAINT A
AED000	MR	DZ22	1.0	--	0.0	--	33.0	--	0.1	--	33.0	----	DEFECTIVE, COUPLER
AED000	MR	DZ25	--	2.0	--	0.0	--	8.5	--	0.0	----	4.3	FAILS DIAGNOSTIC TEST
AED000	MR	DZ33	3.0	--	0.0	--	70.0	--	0.2	--	23.3	----	MISCELLANEOUS DEFECTS
AED000	MR	DZ43	--	2.0	--	0.0	--	3.0	--	0.0	----	1.5	IMPROPER SPACING/CLEA
AED000	MR	[ ]	31.0	6.0	0.1	0.0	583.5	28.0	1.5	0.0	18.8	4.7	NOT DESIGNATED

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APPENDIX F

Data Extraction No. 6

Traction Motor Assembly By Repair Code

MAINTAINABILITY HIGH-DRIVER BY REPAIR CODE

TRACTION MOTOR ASSEMBLY
(GPN AED000)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	R-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,R-CODE
AED000	--	----	162.0	1079.0	0.4	0.7	1865.5	3443.7	4.7	2.1	11.5	3.2	TRACTION MOTOR ASSY
AED000	52	----	--	18.0	--	0.0	--	35.0	--	0.0	----	1.9	COUPLING
AED000	62	RB01	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	ADJUSTED
AED000	62	RJ07	--	2.0	--	0.0	--	4.0	--	0.0	----	2.0	TROUBLE SHOOTING
AED000	62	RN03	--	4.0	--	0.0	--	8.5	--	0.0	----	2.1	REMOVED & REPLACED
AED000	62	RN04	--	1.0	--	0.0	--	3.0	--	0.0	----	1.0	REMOVED TO REPAIR
AED000	62	RN05	--	7.0	--	0.0	--	13.5	--	0.0	----	1.9	REPLACED
AED000	62	RR18	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	SERVICED
AED000	FT	----	--	5.0	--	0.0	--	21.2	--	0.0	----	4.2	FRAME
AED000	FT	RJ02	--	1.0	--	0.0	--	0.2	--	0.0	----	0.2	INSP & FOUND OK
AED000	FT	RN03	--	2.0	--	0.0	--	15.5	--	0.0	----	7.8	REMOVED & REPLACED
AED000	FT	RN04	--	1.0	--	0.0	--	2.5	--	0.0	----	2.5	REMOVED TO REPAIR
AED000	FT	RR10	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	REMOVE/REPAIR/REPLACE
AED000	HE	----	--	90.0	--	0.1	--	218.4	--	0.1	----	2.4	HARDWARE
AED000	HE	RB01	--	2.0	--	0.0	--	2.1	--	0.0	----	1.0	ADJUSTED
AED000	HE	RC03	--	1.0	--	0.0	--	--	--	--	----	--	COMPLETED PREVIOUSLY
AED000	HE	RJ02	--	10.0	--	0.0	--	17.5	--	0.0	----	1.8	INSP & FOUND OK
AED000	HE	RJ07	--	13.0	--	0.0	--	13.3	--	0.0	----	1.0	TROUBLE SHOOTING
AED000	HE	RN03	--	37.0	--	0.0	--	87.9	--	0.1	----	2.4	REMOVED & REPLACED
AED000	HE	RN04	--	2.0	--	0.0	--	29.0	--	0.0	----	14.5	REMOVED TO REPAIR
AED000	HE	RN05	--	15.0	--	0.0	--	27.6	--	0.0	----	1.8	REPLACED
AED000	HE	RN09	--	6.0	--	0.0	--	22.3	--	0.0	----	3.7	REPLACED MINOR HDWRE
AED000	HE	RR10	--	2.0	--	0.0	--	1.7	--	0.0	----	0.9	REMOVE/REPAIR/REPLACE
AED000	HE	RS06	--	1.0	--	0.0	--	16.0	--	0.0	----	16.0	MACHINED
AED000	HE	[ ]	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	NOT DESIGNATED
AED000	HV	----	6.0	--	0.0	--	113.0	--	0.3	--	18.8	----	HUB
AED000	HV	RN03	2.0	--	0.0	--	24.0	--	0.1	--	12.0	----	REMOVED & REPLACED
AED000	HV	RR28	3.0	--	0.0	--	66.0	--	0.2	--	22.0	----	DISASSEMBLE/BREAKDOWN
AED000	HV	[ ]	1.0	--	0.0	--	23.0	--	0.1	--	23.0	----	NOT DESIGNATED
AED000	MR	----	156.0	966.0	0.4	0.6	1752.5	3169.1	4.4	1.9	11.2	3.3	MOTOR
AED000	MR	RB01	--	10.0	--	0.0	--	35.0	--	0.0	----	3.5	ADJUSTED
AED000	MR	RC03	--	2.0	--	0.0	--	0.5	--	0.0	----	0.3	COMPLETED PREVIOUSLY
AED000	MR	RC06	1.0	--	0.0	--	6.0	--	0.0	--	6.0	----	DEFERRED REPAIR
AED000	MR	RC15	--	4.0	--	0.0	--	10.0	--	0.0	----	2.5	SCRAPPED
AED000	MR	RE02	--	2.0	--	0.0	--	4.0	--	0.0	----	2.0	MODIFIED
AED000	MR	RE05	1.0	--	0.0	--	22.0	--	0.1	--	22.0	----	REBUILT
AED000	MR	RJ02	32.0	246.0	0.1	0.1	50.0	795.8	0.1	0.5	1.6	3.2	INSP & FOUND OK
AED000	MR	RJ05	43.0	--	0.1	--	74.0	--	0.2	--	1.7	----	TESTED
AED000	MR	RJ06	2.0	--	0.0	--	58.0	--	0.1	--	29.0	----	TRACK TEST
AED000	MR	RJ07	4.0	191.0	0.0	0.1	26.0	623.7	0.1	0.4	6.5	3.3	TROUBLE SHOOTING
AED000	MR	RN03	54.0	152.0	0.1	0.1	1286.5	634.4	3.2	0.4	23.8	4.2	REMOVED & REPLACED
AED000	MR	RN04	1.0	141.9	0.0	0.1	33.0	278.4	0.1	0.2	33.0	2.0	REMOVED TO REPAIR
AED000	MR	RN05	2.0	125.0	0.0	0.1	25.0	298.7	0.1	0.2	12.5	2.4	REPLACED

MAINTAINABILITY HIGH-DRIVER BY REPAIR CODE

TRACTION MOTOR ASSEMBLY
(GPN AED000)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	R-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,R-CODE
AED000	MR	RR09	2.0	26.0	0.0	0.0	9.0	150.1	0.0	0.1	4.5	5.8	REPLACED MINOR HDWRE
AED000	MR	RR01	3.0	--	0.0	--	39.0	--	0.1	--	13.0	----	CONNECTED
AED000	MR	RR03	5.0	--	0.0	--	80.0	--	0.2	--	16.0	----	DISCONNECTED
AED000	MR	RR10	--	5.0	--	0.0	--	31.5	--	0.0	----	6.3	REMOVE/REPAIR/REPLACE
AED000	MR	RR18	--	17.0	--	0.0	--	54.7	--	0.0	----	3.2	SERVICED
AED000	MR	RR24	1.0	--	0.0	--	1.0	--	0.0	--	1.0	----	TEST & REPAIR
AED000	MR	RR26	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	WELDED
AED000	MR	RS02	2.0	--	0.0	--	8.0	--	0.0	--	4.0	----	CLEANED
AED000	MR	RS06	--	43.0	--	0.0	--	247.8	--	0.1	----	5.8	MACHINED

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APPENDIX G

Data Extraction No. 7

Power Regulator By Defect Code

PATCO MAINTENANCE HIGH-DRIVER BY DEFECT CODE

POWER REGULATOR - CAM
(GPN AEBD01)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBD01	--	----	673.0	547.0	1.7	0.3	3830.5	2872.3	9.6	1.7	5.7	5.3	CAM
AEBD01	1F	----	--	30.0	--	0.0	--	130.8	--	0.1	----	4.4	INSULATOR
AEBD01	1F	DE2C	--	1.0	--	0.0	--	14.0	--	0.0	----	14.0	INTERLOCK MALFUNCTION
AEBD01	1F	DM13	--	2.0	--	0.0	--	2.0	--	0.0	----	1.0	BROKEN/SHEARED
AEBD01	1F	DM14	--	22.0	--	0.0	--	88.3	--	0.1	----	4.0	CRACKED
AEBD01	1F	DM15	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	CRACKS, THERMAL
AEBD01	1F	DM23	--	1.0	--	0.0	--	5.0	--	0.0	----	5.0	DIRTY
AEBD01	1F	DM53	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	LOOSE
AEBD01	1F	DM75	--	1.0	--	0.0	--	14.0	--	0.0	----	14.0	HOT/OVERHEATED
AEBD01	1F	DN32	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	NO DEFECT, PROG MAINT
AEBD01	5N	----	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	SUPPORT
AEBD01	5N	DE2N	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	DEFECTIVE SWITCH
AEBD01	5R	----	2.0	--	0.0	--	30.0	--	0.1	--	15.0	----	SWITCH
AEBD01	5R	DE2N	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	DEFECTIVE SWITCH
AEBD01	5R	DM42	1.0	--	0.0	--	14.0	--	0.0	--	14.0	----	CRUSHED/CRIMPED
AEBD01	6R	----	6.0	--	0.0	--	28.0	--	0.1	--	4.7	----	CONTACT
AEBD01	6R	DE2P	4.0	--	0.0	--	18.0	--	0.0	--	4.5	----	DEFECTIVE CONTACT TIP
AEBD01	6R	DE72	1.0	--	0.0	--	6.0	--	0.0	--	6.0	----	GROUNDED
AEBD01	6R	DZ42	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	IMPROPER ADJUSTMENT
AEBD01	6V	----	--	301.0	--	0.2	--	1403.9	--	0.8	----	4.7	CONTROLLER
AEBD01	6V	DC23	--	1.0	--	0.0	--	0.1	--	0.0	----	0.1	PITTED
AEBD01	6V	DD28	--	81.0	--	0.0	--	246.5	--	0.1	----	3.0	LEAKING
AEBD01	6V	DE14	--	3.0	--	0.0	--	11.0	--	0.0	----	3.7	LOOSE CONNECTION
AEBD01	6V	DE21	--	2.0	--	0.0	--	5.6	--	0.0	----	2.8	BURNED CONTACT
AEBD01	6V	DE29	--	3.0	--	0.0	--	8.1	--	0.0	----	2.7	DIRTY CONTACTS
AEBD01	6V	DE2A	--	16.0	--	0.0	--	119.8	--	0.1	----	7.5	FLASHED/ARCING
AEBD01	6V	DE2C	--	1.0	--	0.0	--	5.5	--	0.0	----	5.5	INTERLOCK MALFUNCTION
AEBD01	6V	DE2E	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	RELAY COIL MALFUNCTIO
AEBD01	6V	DE2L	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	TRIPPED CKT BREAKER
AEBD01	6V	DE48	--	18.0	--	0.0	--	96.3	--	0.1	----	5.4	OVERLOADED MOTOR
AEBD01	6V	DE54	--	4.0	--	0.0	--	13.0	--	0.0	----	3.3	OPEN CIRCUIT
AEBD01	6V	DE67	--	4.0	--	0.0	--	21.0	--	0.0	----	5.3	INCORRECT CURRENT
AEBD01	6V	DE6F	--	1.0	--	0.0	--	6.0	--	0.0	----	6.0	LOW VOLTAGE
AEBD01	6V	DE73	--	2.0	--	0.0	--	16.3	--	0.0	----	8.1	SHORTED
AEBD01	6V	DE74	--	5.0	--	0.0	--	16.8	--	0.0	----	3.4	WELDED CONTACT
AEBD01	6V	DM13	--	3.0	--	0.0	--	7.5	--	0.0	----	2.5	BROKEN/SHEARED
AEBD01	6V	DM14	--	9.0	--	0.0	--	47.8	--	0.0	----	5.3	CRACKED
AEBD01	6V	DM23	--	2.0	--	0.0	--	17.0	--	0.0	----	8.5	DIRTY
AEBD01	6V	DM24	--	1.0	--	0.0	--	0.7	--	0.0	----	0.7	STICKY/GUMMY
AEBD01	6V	DM38	--	5.0	--	0.0	--	17.1	--	0.0	----	3.4	DETERIORATED
AEBD01	6V	DM3C	--	4.0	--	0.0	--	8.9	--	0.0	----	2.2	STRIPPED
AEBD01	6V	DM43	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	DEFORMED/DISTORTED

PATCO MAINTENANCE HIGH-DRIVER BY DEFECT CODE

POWER REGULATOR - CAM
(GPN AEBD01)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBD01	6V	DM51	--	1.0	--	0.0	--	8.0	--	0.0	----	8.0	CHIPPED/PEELING
AEBD01	6V	DM53	--	5.0	--	0.0	--	37.8	--	0.0	----	7.6	LOOSE
AEBD01	6V	DM55	--	3.0	--	0.0	--	30.0	--	0.0	----	10.0	LOST/MISSING
AEBD01	6V	DM5B	--	3.0	--	0.0	--	15.5	--	0.0	----	5.2	WORN
AEBD01	6V	DM65	--	7.0	--	0.0	--	19.9	--	0.0	----	2.8	JAM/BINDING/LOCKED
AEBD01	6V	DM67	--	12.0	--	0.0	--	24.1	--	0.0	----	2.0	STICKING
AEBD01	6V	DM72	--	10.0	--	0.0	--	157.0	--	0.1	----	15.7	BURNED
AEBD01	6V	DM75	--	2.0	--	0.0	--	29.0	--	0.0	----	14.5	HOT/OVERHEATED
AEBD01	6V	DN11	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	FAILURE, CANNOT DUP
AEBD01	6V	DN32	--	7.0	--	0.0	--	26.6	--	0.0	----	3.8	NO DEFECT, PROG MAINT
AEBD01	6V	DP23	--	1.0	--	0.0	--	10.0	--	0.0	----	10.0	DRY
AEBD01	6V	DP42	--	2.0	--	0.0	--	11.0	--	0.0	----	5.5	LOW LUBRICANT
AEBD01	6V	DS12	--	16.0	--	0.0	--	80.1	--	0.0	----	5.0	ERRATIC OPERATION
AEBD01	6V	DS13	--	2.0	--	0.0	--	11.5	--	0.0	----	5.8	INTERMITTENT OPER
AEBD01	6V	DS26	--	4.0	--	0.0	--	13.3	--	0.0	----	3.3	FAILS TO OPERATE
AEBD01	6V	DS2C	--	20.0	--	0.0	--	116.3	--	0.1	----	5.8	FAILURE, INTERNAL
AEBD01	6V	DS2K	--	1.0	--	0.0	--	12.0	--	0.0	----	12.0	OPEN, WILL NOT
AEBD01	6V	DS2L	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	OPERATE, WILL NOT
AEBD01	6V	DS45	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	HIGH TEMPERATURE
AEBD01	6V	DS4E	--	9.0	--	0.0	--	24.9	--	0.0	----	2.8	SLUGGISH
AEBD01	6V	DZ42	--	15.0	--	0.0	--	53.3	--	0.0	----	3.6	IMPROPER ADJUSTMENT
AEBD01	6V	DZ44	--	9.0	--	0.0	--	45.6	--	0.0	----	5.1	INCORRECTLY ASSEMBLED
AEBD01	6V	[ ]	--	1.0	--	0.0	--	--	--	--	----	--	NOT DESIGNATED
AEBD01	9C	----	2.0	--	0.0	--	14.0	--	0.0	--	7.0	----	GEAR
AEBD01	9C	DM53	2.0	--	0.0	--	14.0	--	0.0	--	7.0	----	LOOSE
AEBD01	9D	----	1.0	--	0.0	--	--	--	--	--	--	----	GEARBOX
AEBD01	9D	DN33	1.0	--	0.0	--	--	--	--	--	--	----	NO DEFECT, SCHED MOD
AEBD01	BV	----	2.0	--	0.0	--	17.0	--	0.0	--	8.5	----	BLOCK
AEBD01	BV	DM53	1.0	--	0.0	--	1.0	--	0.0	--	1.0	----	LOOSE
AEBD01	BV	DS23	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	DEAD CAR
AEBD01	CF	----	15.0	--	0.0	--	108.0	--	0.3	--	7.2	----	CAM SWITCH
AEBD01	CF	DE2A	2.0	--	0.0	--	11.0	--	0.0	--	5.5	----	FLASHED/ARCING
AEBD01	CF	DE2N	1.0	--	0.0	--	14.0	--	0.0	--	14.0	----	DEFECTIVE SWITCH
AEBD01	CF	DE2P	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	DEFECTIVE CONTACT TIP
AEBD01	CF	DM13	1.0	--	0.0	--	2.0	--	0.0	--	2.0	----	BROKEN/SHEARED
AEBD01	CF	DM65	3.0	--	0.0	--	21.0	--	0.1	--	7.0	----	JAM/BINDING/LOCKED
AEBD01	CF	DM77	1.0	--	0.0	--	7.0	--	0.0	--	7.0	----	DEFECTIVE INTERLOCK
AEBD01	CF	DS13	3.0	--	0.0	--	33.0	--	0.1	--	11.0	----	INTERMITTENT OPER
AEBD01	CF	DS2L	2.0	--	0.0	--	12.0	--	0.0	--	6.0	----	OPERATE, WILL NOT
AEBD01	CF	[ ]	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	NOT DESIGNATED
AEBD01	HE	----	--	126.0	--	0.1	--	787.9	--	0.5	----	6.3	HARDWARE
AEBD01	HE	DC12	--	1.0	--	0.0	--	3.1	--	0.0	----	3.1	MOISTURE PRESENT

PATCO MAINTENANCE HIGH-DRIVER BY DEFECT CODE

POWER REGULATOR - CAM
(GPN AEBD01)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBD01	HE	DC21	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	CORRODED
AEBD01	HE	DD21	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	CUT
AEBD01	HE	DD24	--	2.0	--	0.0	--	9.0	--	0.0	----	4.5	DESTROYED
AEBD01	HE	DD26	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	FOREIGN OBJECT DAMAGE
AEBD01	HE	DE14	--	1.0	--	0.0	--	5.5	--	0.0	----	5.5	LOOSE CONNECTION
AEBD01	HE	DE2A	--	5.0	--	0.0	--	48.7	--	0.0	----	9.7	FLASHED/ARCING
AEBD01	HE	DE2B	--	1.0	--	0.0	--	6.0	--	0.0	----	6.0	INSULLATION BREAKDOWN
AEBD01	HE	DE2L	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	TRIPPED CKT BREAKER
AEBD01	HE	DE31	--	1.0	--	0.0	--	6.0	--	0.0	----	6.0	CROSSED LEADS
AEBD01	HE	DE48	--	2.0	--	0.0	--	7.0	--	0.0	----	3.5	OVERLOADED MOTOR
AEBD01	HE	DE49	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	WORN BRUSHES
AEBD01	HE	DE52	--	1.0	--	0.0	--	7.0	--	0.0	----	7.0	BROKEN LEAD
AEBD01	HE	DE54	--	1.0	--	0.0	--	16.0	--	0.0	----	16.0	OPEN CIRCUIT
AEBD01	HE	DE73	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	SHORTED
AEBD01	HE	DM13	--	5.0	--	0.0	--	9.6	--	0.0	----	1.9	BROKEN/SHEARED
AEBD01	HE	DM14	--	4.0	--	0.0	--	11.3	--	0.0	----	2.8	CRACKED
AEBD01	HE	DM37	--	1.0	--	0.0	--	10.0	--	0.0	----	10.0	DELAMINATED
AEBD01	HE	DM38	--	22.0	--	0.0	--	196.6	--	0.1	----	8.9	DETERIORATED
AEBD01	HE	DM3B	--	2.0	--	0.0	--	3.1	--	0.0	----	1.5	SEPARATED
AEBD01	HE	DM43	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	DEFORMED/DISTORTED
AEBD01	HE	DM53	--	2.0	--	0.0	--	2.0	--	0.0	----	1.0	LOOSE
AEBD01	HE	DM59	--	1.0	--	0.0	--	10.0	--	0.0	----	10.0	WORN HOLES/OVERSIZED
AEBD01	HE	DM5B	--	2.0	--	0.0	--	4.0	--	0.0	----	2.0	WORN
AEBD01	HE	DM72	--	18.0	--	0.0	--	129.6	--	0.1	----	7.2	BURNED
AEBD01	HE	DM74	--	11.0	--	0.0	--	52.5	--	0.0	----	4.8	CRYSTALIZED
AEBD01	HE	DM75	--	26.0	--	0.0	--	170.2	--	0.1	----	6.5	HOT/OVERHEATED
AEBD01	HE	DN32	--	2.0	--	0.0	--	0.7	--	0.0	----	0.4	NO DEFECT, PROG MAINT
AEBD01	HE	DN33	--	7.0	--	0.0	--	66.0	--	0.0	----	9.4	NO DEFECT, SCHED MOD
AEBD01	HE	DS45	--	1.0	--	0.0	--	1.5	--	0.0	----	1.5	HIGH TEMPERATURE
AEBD01	PJ	----	1.0	--	0.0	--	22.0	--	0.1	--	22.0	----	PC BOARD (CARD)
AEBD01	PJ	DS2L	1.0	--	0.0	--	22.0	--	0.1	--	22.0	----	OPERATE, WILL NOT
AEBD01	R9	----	--	3.0	--	0.0	--	16.2	--	0.0	----	5.4	ROD
AEBD01	R9	DE2A	--	1.0	--	0.0	--	8.0	--	0.0	----	8.0	FLASHED/ARCING
AEBD01	R9	DM72	--	2.0	--	0.0	--	8.2	--	0.0	----	4.1	BURNED
AEBD01	RY	----	--	87.0	--	0.1	--	533.5	--	0.3	----	6.1	RESISTOR
AEBD01	RY	DC12	--	1.0	--	0.0	--	11.0	--	0.0	----	11.0	MOISTURE PRESENT
AEBD01	RY	DD26	--	1.0	--	0.0	--	15.0	--	0.0	----	15.0	FOREIGN OBJECT DAMAGE
AEBD01	RY	DD28	--	2.0	--	0.0	--	23.5	--	0.0	----	11.8	LEAKING
AEBD01	RY	DE2A	--	23.0	--	0.0	--	165.6	--	0.1	----	7.2	FLASHED/ARCING
AEBD01	RY	DE48	--	3.0	--	0.0	--	5.0	--	0.0	----	1.7	OVERLOADED MOTOR
AEBD01	RY	DE54	--	3.0	--	0.0	--	14.0	--	0.0	----	4.7	OPEN CIRCUIT
AEBD01	RY	DE67	--	1.0	--	0.0	--	6.5	--	0.0	----	6.5	INCORRECT CURRENT

PATCO MAINTENANCE HIGH-DRIVER BY DEFECT CODE

POWER REGULATOR - CAM
(GPN AEBD01)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBD01	RY	DE69	--	2.0	--	0.0	--	5.5	--	0.0	----	2.8	INCORRECT SIGNAL
AEBD01	RY	DE73	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	SHORTED
AEBD01	RY	DM13	--	2.0	--	0.0	--	6.0	--	0.0	----	3.0	BROKEN/SHEARED
AEBD01	RY	DM14	--	4.0	--	0.0	--	3.6	--	0.0	----	0.9	CRACKED
AEBD01	RY	DM23	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	DIRTY
AEBD01	RY	DM38	--	5.0	--	0.0	--	15.7	--	0.0	----	3.1	DETERIORATED
AEBD01	RY	DM41	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	BENT/BUCKLED/DENTED
AEBD01	RY	DM72	--	13.0	--	0.0	--	157.5	--	0.1	----	12.1	BURNED
AEBD01	RY	DM74	--	1.0	--	0.0	--	0.3	--	0.0	----	0.3	CRYSTALIZED
AEBD01	RY	DM75	--	13.0	--	0.0	--	39.4	--	0.0	----	3.0	HOT/OVERHEATED
AEBD01	RY	DN32	--	3.0	--	0.0	--	1.4	--	0.0	----	0.5	NO DEFECT, PROG MAINT
AEBD01	RY	DN33	--	2.0	--	0.0	--	15.0	--	0.0	----	7.5	NO DEFECT, SCHED MOD
AEBD01	RY	DS13	--	1.0	--	0.0	--	16.0	--	0.0	----	16.0	INTERMITTENT OPER
AEBD01	RY	DS2L	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	OPERATE, WILL NOT
AEBD01	RY	DZ25	--	1.0	--	0.0	--	14.0	--	0.0	----	14.0	FAILS DIAGNOSTIC TEST
AEBD01	RY	DZ37	--	2.0	--	0.0	--	4.5	--	0.0	----	2.3	UNABLE TO ADJUST
AEBD01	SM	----	643.0	--	1.6	--	3595.5	--	9.0	--	5.6	----	SHAFT
AEBD01	SM	DC21	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	CORRODED
AEBD01	SM	DE13	29.0	--	0.1	--	473.0	--	1.2	--	16.3	----	DEFECTIVE WIRING
AEBD01	SM	DE25	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	DEFECTIVE DIODE
AEBD01	SM	DE26	6.0	--	0.0	--	64.0	--	0.2	--	10.7	----	DEFECTIVE RELAY
AEBD01	SM	DE27	2.0	--	0.0	--	21.0	--	0.1	--	10.5	----	DEFECTIVE RESISTOR
AEBD01	SM	DE2A	8.0	--	0.0	--	187.0	--	0.5	--	23.4	----	FLASHED/ARCING
AEBD01	SM	DE2F	2.0	--	0.0	--	18.0	--	0.0	--	9.0	----	MISC ELECT TROUBLE
AEBD01	SM	DE2K	4.0	--	0.0	--	13.0	--	0.0	--	3.3	----	TRIPPED
AEBD01	SM	DE2L	151.0	--	0.4	--	73.0	--	0.2	--	0.5	----	TRIPPED CKT BREAKER
AEBD01	SM	DE2N	4.0	--	0.0	--	21.0	--	0.1	--	5.3	----	DEFECTIVE SWITCH
AEBD01	SM	DE2P	13.0	--	0.0	--	47.0	--	0.1	--	3.6	----	DEFECTIVE CONTACT TIP
AEBD01	SM	DE32	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	MISWIRED/CONNECT INCO
AEBD01	SM	DE72	6.0	--	0.0	--	66.0	--	0.2	--	11.0	----	GROUNDED
AEBD01	SM	DE74	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	WELDED CONTACT
AEBD01	SM	DM44	3.0	--	0.0	--	38.0	--	0.1	--	12.7	----	OUT OF BAL/TOL
AEBD01	SM	DM53	1.0	--	0.0	--	35.0	--	0.1	--	35.0	----	LOOSE
AEBD01	SM	DM5B	1.0	--	0.0	--	21.0	--	0.1	--	21.0	----	WORN
AEBD01	SM	DN22	44.0	--	0.1	--	388.0	--	1.0	--	8.8	----	NO DEFECT,COMP REM
AEBD01	SM	DN33	2.0	--	0.0	--	2.0	--	0.0	--	1.0	----	NO DEFECT, SCHED MOD
AEBD01	SM	DS13	5.0	--	0.0	--	54.0	--	0.1	--	10.8	----	INTERMITTENT OPER
AEBD01	SM	DS23	79.0	--	0.2	--	421.0	--	1.1	--	5.3	----	DEAD CAR
AEBD01	SM	DS24	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	FAILED, BRAKE CHARGE
AEBD01	SM	DS2E	102.0	--	0.3	--	459.0	--	1.2	--	4.5	----	NO DYNAMIC BRAKE
AEBD01	SM	DS4A	1.0	--	0.0	--	5.0	--	0.0	--	5.0	----	POR BRAKING
AEBD01	SM	DS4C	11.0	--	0.0	--	157.0	--	0.4	--	14.3	----	SLOW ACCELERATION

PATCO MAINTENANCE HIGH-DRIVER BY DEFECT CODE

POWER REGULATOR - CAM
(GPN AEBD01)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-COUE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBD01	SM	DW22	2.0	--	0.0	--	4.0	--	0.0	--	2.0	----	FLAT SPOT
AEBD01	SM	DW42	2.0	--	0.0	--	14.0	--	0.0	--	7.0	----	DEFECTIVE WHEEL TREAD
AEBD01	SM	DZ33	3.0	--	0.0	--	17.5	--	0.0	--	5.8	----	MISCELLANEOUS DEFECTS
AEBD01	SM	DZ42	8.0	--	0.0	--	77.0	--	0.2	--	9.6	----	IMPROPER ADJUSTMENT
AEBD01	SM	DZ55	7.0	--	0.0	--	13.0	--	0.0	--	1.9	----	MISC INDICATORS
AEBD01	SM	[ ]	142.0	--	0.4	--	879.0	--	2.2	--	6.2	----	NOT DESIGNATED

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APPENDIX H

Data Extraction No. 8

Power Regulator By Repair Code

PATCO MAINTENANCE HIGH-DRIVER BY REPAIR CODE

POWER REGULATOR - CAM
(GPN AEBD01)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	R-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,R-CODE
AEBD01	--	----	673.0	547.0	1.7	0.3	3830.5	2872.3	9.6	1.7	5.7	5.3	CAM
AEBD01	1F	----	--	30.0	--	0.0	--	130.8	--	0.1	----	4.4	INSULATOR
AEBD01	1F	RB01	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	ADJUSTED
AEBD01	1F	RJ02	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	INSP & FOUND OK
AEBD01	1F	RJ07	--	2.0	--	0.0	--	7.0	--	0.0	----	3.5	TROUBLE SHOOTING
AEBD01	1F	RN03	--	23.0	--	0.0	--	112.3	--	0.1	----	4.9	REMOVED & REPLACED
AEBD01	1F	RN04	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	REMOVED TO REPAIR
AEBD01	1F	RN09	--	2.0	--	0.0	--	6.0	--	0.0	----	3.0	REPLACED MINOR HDWRE
AEBD01	5N	----	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	SUPPORT
AEBD01	5N	RN03	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	REMOVED & REPLACED
AEBD01	5R	----	2.0	--	0.0	--	30.0	--	0.1	--	15.0	----	SWITCH
AEBD01	5R	RN03	2.0	--	0.0	--	30.0	--	0.1	--	15.0	----	REMOVED & REPLACED
AEBD01	6R	----	6.0	--	0.0	--	28.0	--	0.1	--	4.7	----	CONTACT
AEBD01	6R	RB01	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	ADJUSTED
AEBD01	6R	RJ06	1.0	--	0.0	--	3.0	--	0.0	--	3.0	----	TRACK TEST
AEBD01	6R	RN03	2.0	--	0.0	--	14.0	--	0.0	--	7.0	----	REMOVED & REPLACED
AEBD01	6R	RP05	1.0	--	0.0	--	6.0	--	0.0	--	6.0	----	CLEARED GROUNDS
AEBD01	6R	RS03	1.0	--	0.0	--	1.0	--	0.0	--	1.0	----	DRESSED & FILED
AEBD01	6V	----	--	301.0	--	0.2	--	1403.9	--	0.8	----	4.7	CONTROLLER
AEBD01	6V	RB01	--	25.0	--	0.0	--	75.1	--	0.0	----	3.0	ADJUSTED
AEBD01	6V	RJ02	--	6.0	--	0.0	--	28.6	--	0.0	----	4.8	INSP & FOUND OK
AEBD01	6V	RJ07	--	33.0	--	0.0	--	86.1	--	0.1	----	2.6	TROUBLE SHOOTING
AEBD01	6V	RN03	--	182.0	--	0.1	--	864.5	--	0.5	----	4.8	REMOVED & REPLACED
AEBD01	6V	RN04	--	6.0	--	0.0	--	36.2	--	0.0	----	6.0	REMOVED TO REPAIR
AEBD01	6V	RN05	--	12.0	--	0.0	--	140.1	--	0.1	----	11.7	REPLACED
AEBD01	6V	RN09	--	22.0	--	0.0	--	119.2	--	0.1	----	5.4	REPLACED MINOR HDWRE
AEBD01	6V	RR10	--	5.0	--	0.0	--	30.4	--	0.0	----	6.1	REMOVE/REPAIR/REPLACE
AEBD01	6V	RR18	--	7.0	--	0.0	--	23.7	--	0.0	----	3.4	SERVICED
AEBD01	6V	[ ]	--	3.0	--	0.0	--	--	--	--	----	--	NOT DESIGNATED
AEBD01	9C	----	2.0	--	0.0	--	14.0	--	0.0	--	7.0	----	GEAR
AEBD01	9C	RN03	1.0	--	0.0	--	6.0	--	0.0	--	6.0	----	REMOVED & REPLACED
AEBD01	9C	RN09	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	REPLACED MINOR HDWRE
AEBD01	9D	----	1.0	--	0.0	--	--	--	--	--	--	----	GEARBOX
AEBD01	9D	RE02	1.0	--	0.0	--	--	--	--	--	--	----	MODIFIED
AEBD01	BV	----	2.0	--	0.0	--	17.0	--	0.0	--	8.5	----	BLOCK
AEBD01	BV	RB04	1.0	--	0.0	--	1.0	--	0.0	--	1.0	----	TIGHTENED
AEBD01	BV	RR10	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	REMOVE/REPAIR/REPLACE
AEBD01	CF	----	15.0	--	0.0	--	108.0	--	0.3	--	7.2	----	CAM SWITCH
AEBD01	CF	RN03	12.0	--	0.0	--	99.0	--	0.2	--	8.3	----	REMOVED & REPLACED
AEBD01	CF	RN05	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	REPLACED
AEBD01	CF	RP04	1.0	--	0.0	--	1.0	--	0.0	--	1.0	----	REMOVED FOREIGN OBJEC
AEBD01	CF	RR10	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	REMOVE/REPAIR/REPLACE
AEBD01	HE	----	--	126.0	--	0.1	--	787.9	--	0.5	----	6.3	HARDWARE

PATCO MAINTENANCE HIGH-DRIVER BY REPAIR CODE

POWER REGULATOR - CAM
(GPN AEBD01)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	R-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,R-CODE
AEBD01	HE	RB01	--	2.0	--	0.0	--	5.0	--	0.0	----	2.5	ADJUSTED
AEBD01	HE	RE02	--	5.0	--	0.0	--	57.0	--	0.0	----	11.4	MODIFIED
AEBD01	HE	RJ02	--	3.0	--	0.0	--	13.7	--	0.0	----	4.6	INSP & FOUND OK
AEBD01	HE	RJ07	--	8.0	--	0.0	--	28.2	--	0.0	----	3.5	TROUBLE SHOOTING
AEBD01	HE	RN03	--	46.0	--	0.0	--	316.7	--	0.2	----	6.9	REMOVED & REPLACED
AEBD01	HE	RN04	--	7.0	--	0.0	--	36.7	--	0.0	----	5.2	REMOVED TO REPAIR
AEBD01	HE	RN05	--	10.0	--	0.0	--	107.5	--	0.1	----	10.8	REPLACED
AEBD01	HE	RN09	--	41.0	--	0.0	--	208.4	--	0.1	----	5.1	REPLACED MINOR HDWRE
AEBD01	HE	RR10	--	2.0	--	0.0	--	8.7	--	0.0	----	4.4	REMOVE/REPAIR/REPLACE
AEBD01	HE	RR18	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	SERVICED
AEBD01	PJ	----	1.0	--	0.0	--	22.0	--	0.1	--	22.0	----	PC BOARD (CARD)
AEBD01	PJ	RN03	1.0	--	0.0	--	22.0	--	0.1	--	22.0	----	REMOVED & REPLACED
AEBD01	R9	----	--	3.0	--	0.0	--	16.2	--	0.0	----	5.4	ROD
AEBD01	R9	RJ07	--	1.0	--	0.0	--	0.7	--	0.0	----	0.7	TROUBLE SHOOTING
AEBD01	R9	RN03	--	1.0	--	0.0	--	8.0	--	0.0	----	8.0	REMOVED & REPLACED
AEBD01	R9	RR10	--	1.0	--	0.0	--	7.5	--	0.0	----	7.5	REMOVE/REPAIR/REPLACE
AEBD01	RY	----	--	87.0	--	0.1	--	533.5	--	0.3	----	6.1	RESISTOR
AEBD01	RY	RB01	--	2.0	--	0.0	--	8.0	--	0.0	----	4.0	ADJUSTED
AEBD01	RY	RE02	--	2.0	--	0.0	--	15.0	--	0.0	----	7.5	MODIFIED
AEBD01	RY	RJ02	--	3.0	--	0.0	--	2.2	--	0.0	----	0.7	INSP & FOUND OK
AEBD01	RY	RJ07	--	11.0	--	0.0	--	23.4	--	0.0	----	2.1	TROUBLE SHOOTING
AEBD01	RY	RN03	--	56.0	--	0.0	--	379.7	--	0.2	----	6.8	REMOVED & REPLACED
AEBD01	RY	RN04	--	3.0	--	0.0	--	27.0	--	0.0	----	9.0	REMOVED TO REPAIR
AEBD01	RY	RN05	--	4.0	--	0.0	--	58.5	--	0.0	----	14.6	REPLACED
AEBD01	RY	RN09	--	3.0	--	0.0	--	14.7	--	0.0	----	4.9	REPLACED MINOR HDWRE
AEBD01	RY	RR10	--	1.0	--	0.0	--	0.7	--	0.0	----	0.7	REMOVE/REPAIR/REPLACE
AEBD01	RY	RR18	--	2.0	--	0.0	--	4.3	--	0.0	----	2.2	SERVICED
AEBD01	SM	----	643.0	--	1.6	--	3595.5	--	9.0	--	5.6	----	SHAFT
AEBD01	SM	RB01	13.0	--	0.0	--	110.0	--	0.3	--	8.5	----	ADJUSTED
AEBD01	SM	RB04	1.0	--	0.0	--	35.0	--	0.1	--	35.0	----	TIGHTENED
AEBD01	SM	RC10	11.0	--	0.0	--	37.0	--	0.1	--	3.4	----	NO DEFECT FOUND
AEBD01	SM	RE05	2.0	--	0.0	--	21.5	--	0.1	--	10.8	----	REBUILT
AEBD01	SM	RJ02	251.0	--	0.6	--	392.0	--	1.0	--	1.6	----	INSP & FOUND OK
AEBD01	SM	RJ03	1.0	--	0.0	--	--	--	--	--	--	----	ORIFICE TEST
AEBD01	SM	RJ05	64.0	--	0.2	--	696.0	--	1.7	--	10.9	----	TESTED
AEBD01	SM	RJ06	80.0	--	0.2	--	552.0	--	1.4	--	6.9	----	TRACK TEST
AEBD01	SM	RJ07	141.0	--	0.4	--	811.0	--	2.0	--	5.8	----	TROUBLE SHOOTING
AEBD01	SM	RM02	3.0	--	0.0	--	36.0	--	0.1	--	12.0	----	MISC REPAIRS
AEBD01	SM	RN03	21.0	--	0.1	--	127.0	--	0.3	--	6.0	----	REMOVED & REPLACED
AEBD01	SM	RN05	3.0	--	0.0	--	44.0	--	0.1	--	14.7	----	REPLACED
AEBD01	SM	RR03	1.0	--	0.0	--	46.0	--	0.1	--	46.0	----	DISCONNECTED
AEBD01	SM	RR04	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	FREED BINDING PARTS
AEBD01	SM	RR14	5.0	--	0.0	--	17.0	--	0.0	--	3.4	----	RESET

PATCO MAINTENANCE HIGH-DRIVER BY REPAIR CODE

POWER REGULATOR - CAM
(GPN AEBD01)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	R-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,R-CODE
AEBD01	SM	RR15	3.0	--	0.0	--	180.0	--	0.5	--	60.0	----	REWIRED
AEBD01	SM	RR24	4.0	--	0.0	--	51.0	--	0.1	--	12.8	----	TEST & REPAIR
AEBD01	SM	RR28	1.0	--	0.0	--	2.0	--	0.0	--	2.0	----	DISASSEMBLE/BREAKDOWN
AEBD01	SM	RS03	2.0	--	0.0	--	4.0	--	0.0	--	2.0	----	DRESSED & FILED

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APPENDIX I

Data Extraction No. 9

Logic And Low Voltage By Defect Code

WMATA MAINTENANCE HIGH-DRIVER BY DEFECT CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBB00	--	----	195.0	452.0	0.5	0.3	858.0	2181.8	2.2	1.3	4.4	4.8	LOGIC AND LO-V CONTROL
AEBB00	00	----	5.0	--	0.0	--	9.0	--	0.0	--	1.8	----	NOT DESIGNATED
AEBB00	00	DE2L	3.0	--	0.0	--	2.0	--	0.0	--	0.7	----	TRIPPED CKT BREAKER
AEBB00	00	DS2E	1.0	--	0.0	--	2.0	--	0.0	--	2.0	----	NO DYNAMIC BRAKE
AEBB00	00	DS4C	1.0	--	0.0	--	5.0	--	0.0	--	5.0	----	SLOW ACCELERATION
AEBB00	1C	----	--	7.0	--	0.0	--	39.5	--	0.0	----	5.6	INDUCTOR
AEBB00	1C	DE2A	--	1.0	--	0.0	--	8.0	--	0.0	----	8.0	FLASHED/ARCING
AEBB00	1C	DE2L	--	3.0	--	0.0	--	9.5	--	0.0	----	3.2	TRIPPED CKT BREAKER
AEBB00	1C	DP43	--	1.0	--	0.0	--	12.0	--	0.0	----	12.0	LOW REFRIGERANT
AEBB00	1C	DS26	--	1.0	--	0.0	--	7.0	--	0.0	----	7.0	FAILS TO OPERATE
AEBB00	1C	DS2F	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	NO GO INDICATION
AEBB00	5N	----	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	SUPPORT
AEBB00	5N	DM32	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	DEFECTIVE BEARING
AEBB00	5R	----	3.0	18.0	0.0	0.0	5.0	67.6	0.0	0.0	1.7	3.8	SWITCH
AEBB00	5R	DE2L	--	1.0	--	0.0	--	19.5	--	0.0	----	19.5	TRIPPED CKT BREAKER
AEBB00	5R	DE48	--	7.0	--	0.0	--	30.1	--	0.0	----	4.3	OVERLOADED MOTOR
AEBB00	5R	DE74	1.0	--	0.0	--	3.0	--	0.0	--	3.0	----	WELDED CONTACT
AEBB00	5R	DS12	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	ERRATIC OPERATION
AEBB00	5R	DS13	2.0	--	0.0	--	2.0	--	0.0	--	1.0	----	INTERMITTENT OPER
AEBB00	5R	DS26	--	5.0	--	0.0	--	9.5	--	0.0	----	1.9	FAILS TO OPERATE
AEBB00	5R	DS2C	--	1.0	--	0.0	--	2.5	--	0.0	----	2.5	FAILURE, INTERNAL
AEBB00	5R	DS43	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	ERROR, DISPLAY READOU
AEBB00	5R	DZ34	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	OPEN
AEBB00	5R	DZ42	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	IMPROPER ADJUSTMENT
AEBB00	64	----	--	42.0	--	0.0	--	206.1	--	0.1	----	4.9	CRADLE
AEBB00	64	DE12	--	1.0	--	0.0	--	7.0	--	0.0	----	7.0	DEFECTIVE PLUG
AEBB00	64	DE14	--	2.0	--	0.0	--	11.5	--	0.0	----	5.8	LOOSE CONNECTION
AEBB00	64	DE2L	--	2.0	--	0.0	--	2.0	--	0.0	----	1.0	TRIPPED CKT BREAKER
AEBB00	64	DE32	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	MISWIRED/CONNECT INCO
AEBB00	64	DE48	--	6.0	--	0.0	--	26.2	--	0.0	----	4.4	OVERLOADED MOTOR
AEBB00	64	DE54	--	2.0	--	0.0	--	10.5	--	0.0	----	5.3	OPEN CIRCUIT
AEBB00	64	DE69	--	1.0	--	0.0	--	12.0	--	0.0	----	12.0	INCORRECT SIGNAL
AEBB00	64	DE6L	--	1.0	--	0.0	--	15.0	--	0.0	----	15.0	NO OUTPUT
AEBB00	64	DM13	--	3.0	--	0.0	--	21.0	--	0.0	----	7.0	BROKEN/SHEARED
AEBB00	64	DM55	--	1.0	--	0.0	--	4.5	--	0.0	----	4.5	LOST/MISSING
AEBB00	64	DM56	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	MISSING MINOR HDWRE
AEBB00	64	DM65	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	JAM/BINDING/LOCKED
AEBB00	64	DN32	--	2.0	--	0.0	--	3.3	--	0.0	----	1.7	NO DEFECT, PROG MAINT
AEBB00	64	DN33	--	9.0	--	0.0	--	35.9	--	0.0	----	4.0	NO DEFECT, SCHED MOD
AEBB00	64	DS13	--	3.0	--	0.0	--	5.5	--	0.0	----	1.8	INTERMITTENT OPER
AEBB00	64	DS26	--	3.0	--	0.0	--	28.2	--	0.0	----	9.4	FAILS TO OPERATE
AEBB00	64	DS2C	--	2.0	--	0.0	--	9.5	--	0.0	----	4.8	FAILURE, INTERNAL

WMATA MAINTENANCE HIGH-DRIVER BY DEFECT CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBB00	64	DZ25	--	1.0	--	0.0	--	6.0	--	0.0	----	6.0	FAILS DIAGNOSTIC TEST
AEBB00	6R	----	3.0	--	0.0	--	8.0	--	0.0	--	2.7	----	CONTACT
AEBB00	6R	DE2P	2.0	--	0.0	--	--	--	--	--	--	----	DEFECTIVE CONTACT TIP
AEBB00	6R	DM3D	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	DEFECTIVE SHUNT
AEBB00	HE	----	--	344.0	--	0.2	--	1673.0	--	1.0	----	4.9	HARDWARE
AEBB00	HE	DC22	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	FROZEN
AEBB00	HE	DD26	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	FOREIGN OBJECT DAMAGE
AEBB00	HE	DD28	--	25.0	--	0.0	--	83.0	--	0.1	----	3.3	LEAKING
AEBB00	HE	DE12	--	1.0	--	0.0	--	2.3	--	0.0	----	2.3	DEFECTIVE PLUG
AEBB00	HE	DE14	--	12.0	--	0.0	--	44.3	--	0.0	----	3.7	LOOSE CONNECTION
AEBB00	HE	DE21	--	2.0	--	0.0	--	4.0	--	0.0	----	2.0	BURNED CONTACT
AEBB00	HE	DE29	--	2.0	--	0.0	--	6.0	--	0.0	----	3.0	DIRTY CONTACTS
AEBB00	HE	DE2A	--	15.0	--	0.0	--	145.5	--	0.1	----	9.7	FLASHED/ARCING
AEBB00	HE	DE2C	--	1.0	--	0.0	--	6.5	--	0.0	----	6.5	INTERLOCK MALFUNCTION
AEBB00	HE	DE2L	--	5.0	--	0.0	--	23.5	--	0.0	----	4.7	TRIPPED CKT BREAKER
AEBB00	HE	DE32	--	5.0	--	0.0	--	14.7	--	0.0	----	2.9	MISWIRED/CONNECT INCO
AEBB00	HE	DE48	--	29.0	--	0.0	--	136.3	--	0.1	----	4.7	OVERLOADED MOTOR
AEBB00	HE	DE51	--	2.0	--	0.0	--	2.5	--	0.0	----	1.3	BLOWN FUSE
AEBB00	HE	DE52	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	BROKEN LEAD
AEBB00	HE	DE53	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	BURNED OUT BULB
AEBB00	HE	DE54	--	23.0	--	0.0	--	89.8	--	0.1	----	3.9	OPEN CIRCUIT
AEBB00	HE	DE67	--	3.0	--	0.0	--	22.8	--	0.0	----	7.6	INCORRECT CURRENT
AEBB00	HE	DE71	--	1.0	--	0.0	--	5.0	--	0.0	----	5.0	CHANGE OF VALUE
AEBB00	HE	DE72	--	1.0	--	0.0	--	7.0	--	0.0	----	7.0	GROUNDED
AEBB00	HE	DE73	--	6.0	--	0.0	--	23.5	--	0.0	----	3.9	SHORTED
AEBB00	HE	DE74	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	WELDED CONTACT
AEBB00	HE	DM13	--	13.0	--	0.0	--	34.9	--	0.0	----	2.7	BROKEN/SHEARED
AEBB00	HE	DM14	--	10.0	--	0.0	--	39.2	--	0.0	----	3.9	CRACKED
AEBB00	HE	DM38	--	5.0	--	0.0	--	47.5	--	0.0	----	9.5	DETERIORATED
AEBB00	HE	DM3C	--	6.0	--	0.0	--	5.7	--	0.0	----	0.9	STRIPPED
AEBB00	HE	DM41	--	1.0	--	0.0	--	5.0	--	0.0	----	5.0	BENT/BUCKLED/DENTED
AEBB00	HE	DM51	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	CHIPPED/PEELING
AEBB00	HE	DM53	--	2.0	--	0.0	--	1.7	--	0.0	----	0.9	LOOSE
AEBB00	HE	DM54	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	LOOSE/DAMAGED COMM HD
AEBB00	HE	DM55	--	9.0	--	0.0	--	20.3	--	0.0	----	2.3	LOST/MISSING
AEBB00	HE	DM5B	--	3.0	--	0.0	--	14.0	--	0.0	----	4.7	WORN
AEBB00	HE	DM5C	--	5.0	--	0.0	--	18.2	--	0.0	----	3.6	WORN BEYOND LIMITS
AEBB00	HE	DM65	--	2.0	--	0.0	--	1.1	--	0.0	----	0.5	JAM/BINDING/LOCKED
AEBB00	HE	DM67	--	1.0	--	0.0	--	0.7	--	0.0	----	0.7	STICKING
AEBB00	HE	DM72	--	34.0	--	0.0	--	386.9	--	0.2	----	11.4	BURNED
AEBB00	HE	DM74	--	1.0	--	0.0	--	15.0	--	0.0	----	15.0	CRYSTALIZED
AEBB00	HE	DM75	--	23.0	--	0.0	--	122.5	--	0.1	----	5.3	HOT/OVERHEATED

WMATA MAINTENANCE HIGH-DRIVER BY DEFECT CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBB00	HE	DN11	--	2.0	--	0.0	--	1.7	--	0.0	----	0.9	FAILURE, CANNOT DUP
AEBB00	HE	DN13	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	NO DEFECT, OPER ERROR
AEBB00	HE	DN32	--	24.0	--	0.0	--	57.2	--	0.0	----	2.4	NO DEFECT, PROG MAINT
AEBB00	HE	DN33	--	6.0	--	0.0	--	33.5	--	0.0	----	5.6	NO DEFECT, SCHED MOD
AEBB00	HE	DS12	--	5.0	--	0.0	--	8.2	--	0.0	----	1.6	ERRATIC OPERATION
AEBB00	HE	DS13	--	5.0	--	0.0	--	32.6	--	0.0	----	6.5	INTERMITTENT OPER
AEBB00	HE	DS26	--	8.0	--	0.0	--	33.5	--	0.0	----	4.2	FAILS TO OPERATE
AEBB00	HE	DS2C	--	14.0	--	0.0	--	74.8	--	0.0	----	5.3	FAILURE, INTERNAL
AEBB00	HE	DS2V	--	1.0	--	0.0	--	0.3	--	0.0	----	0.3	TURN OFF, WILL NOT
AEBB00	HE	DS48	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	LOW PRESSURE
AEBB00	HE	DS4E	--	2.0	--	0.0	--	9.0	--	0.0	----	4.5	SLUGGISH
AEBB00	HE	DZ25	--	3.0	--	0.0	--	24.0	--	0.0	----	8.0	FAILS DIAGNOSTIC TEST
AEBB00	HE	DZ34	--	2.0	--	0.0	--	3.5	--	0.0	----	1.8	OPEN
AEBB00	HE	DZ42	--	13.0	--	0.0	--	39.0	--	0.0	----	3.0	IMPROPER ADJUSTMENT
AEBB00	HE	DZ44	--	2.0	--	0.0	--	8.3	--	0.0	----	4.1	INCORRECTLY ASSEMBLED
AEBB00	PE	----	157.0	5.0	0.4	0.0	654.0	6.3	1.6	0.0	4.2	1.3	PANEL
AEBB00	PE	DD25	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	FIRE DAMAGE/SMOKE
AEBB00	PE	DE13	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	DEFECTIVE WIRING
AEBB00	PE	DE26	4.0	--	0.0	--	42.0	--	0.1	--	10.5	----	DEFECTIVE RELAY
AEBB00	PE	DE2K	1.0	--	0.0	--	10.0	--	0.0	--	10.0	----	TRIPPED
AEBB00	PE	DE2L	13.0	2.0	0.0	0.0	15.0	1.3	0.0	0.0	1.2	0.6	TRIPPED CKT BREAKER
AEBB00	PE	DE48	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	OVERLOADED MOTOR
AEBB00	PE	DE72	1.0	--	0.0	--	22.0	--	0.1	--	22.0	----	GROUNDED
AEBB00	PE	DM44	2.0	--	0.0	--	20.0	--	0.1	--	10.0	----	OUT OF BAL/TOL
AEBB00	PE	DM77	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	DEFECTIVE INTERLOCK
AEBB00	PE	DN22	19.0	--	0.0	--	59.0	--	0.1	--	3.1	----	NO DEFECT,COMP REM
AEBB00	PE	DN32	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	NO DEFECT, PROG MAINT
AEBB00	PE	DN33	36.0	--	0.1	--	95.0	--	0.2	--	2.6	----	NO DEFECT, SCHED MOD
AEBB00	PE	DS13	3.0	--	0.0	--	45.0	--	0.1	--	15.0	----	INTERMITTENT OPER
AEBB00	PE	DS23	11.0	--	0.0	--	52.0	--	0.1	--	4.7	----	DEAD CAR
AEBB00	PE	DS2E	13.0	--	0.0	--	79.0	--	0.2	--	6.1	----	NO DYNAMIC BRAKE
AEBB00	PE	DS2L	2.0	--	0.0	--	14.0	--	0.0	--	7.0	----	OPERATE, WILL NOT
AEBB00	PE	DS4C	2.0	--	0.0	--	21.0	--	0.1	--	10.5	----	SLOW ACCELERATION
AEBB00	PE	DW42	2.0	--	0.0	--	11.0	--	0.0	--	5.5	----	DEFECTIVE WHEEL TREAD
AEBB00	PE	DZ42	5.0	1.0	0.0	0.0	41.0	2.0	0.1	0.0	8.2	2.0	IMPROPER ADJUSTMENT
AEBB00	PE	[ ]	40.0	--	0.1	--	108.0	--	0.3	--	2.7	----	NOT DESIGNATED
AEBB00	PJ	----	--	27.0	--	0.0	--	138.8	--	0.1	----	5.1	PC BOARD (CARD)
AEBB00	PJ	DD28	--	1.0	--	0.0	--	0.1	--	0.0	----	0.1	LEAKING
AEBB00	PJ	DE14	--	1.0	--	0.0	--	0.1	--	0.0	----	0.1	LOOSE CONNECTION
AEBB00	PJ	DE21	--	1.0	--	0.0	--	1.5	--	0.0	----	1.5	BURNED CONTACT
AEBB00	PJ	DE48	--	5.0	--	0.0	--	37.6	--	0.0	----	7.5	OVERLOADED MOTOR
AEBB00	PJ	DE54	--	2.0	--	0.0	--	22.5	--	0.0	----	11.3	OPEN CIRCUIT

WMATA MAINTENANCE HIGH-DRIVER BY DEFECT CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBB00	PJ	DE6A	--	2.0	--	0.0	--	20.5	--	0.0	----	10.3	INCORRECT TIME DELAY
AEBB00	PJ	DM72	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	BURNED
AEBB00	PJ	DM75	--	2.0	--	0.0	--	23.0	--	0.0	----	11.5	HOT/OVERHEATED
AEBB00	PJ	DN11	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	FAILURE, CANNOT DUP
AEBB00	PJ	DS12	--	3.0	--	0.0	--	9.0	--	0.0	----	3.0	ERRATIC OPERATION
AEBB00	PJ	DS13	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	INTERMITTENT OPER
AEBB00	PJ	DS26	--	2.0	--	0.0	--	2.5	--	0.0	----	1.3	FAILS TO OPERATE
AEBB00	PJ	DS2C	--	4.0	--	0.0	--	12.0	--	0.0	----	3.0	FAILURE, INTERNAL
AEBB00	PJ	DZ25	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	FAILS DIAGNOSTIC TEST
AEBB00	RU	----	22.0	--	0.1	--	113.0	--	0.3	--	5.1	----	RELAY
AEBB00	RU	DE26	6.0	--	0.0	--	31.0	--	0.1	--	5.2	----	DEFECTIVE RELAY
AEBB00	RU	DE2K	1.0	--	0.0	--	2.0	--	0.0	--	2.0	----	TRIPPED
AEBB00	RU	DE2L	1.0	--	0.0	--	12.0	--	0.0	--	12.0	----	TRIPPED CKT BREAKER
AEBB00	RU	DE2N	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	DEFECTIVE SWITCH
AEBB00	RU	DM42	1.0	--	0.0	--	--	--	--	--	--	----	CRUSHED/CRIMPED
AEBB00	RU	DM53	2.0	--	0.0	--	6.0	--	0.0	--	3.0	----	LOOSE
AEBB00	RU	DS13	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	INTERMITTENT OPER
AEBB00	RU	DS2E	4.0	--	0.0	--	32.0	--	0.1	--	8.0	----	NO DYNAMIC BRAKE
AEBB00	RU	DZ42	1.0	--	0.0	--	6.0	--	0.0	--	6.0	----	IMPROPER ADJUSTMENT
AEBB00	RU	[ ]	4.0	--	0.0	--	12.0	--	0.0	--	3.0	----	NOT DESIGNATED
AEBB00	RY	----	--	8.0	--	0.0	--	49.0	--	0.0	----	6.1	RESISTOR
AEBB00	RY	DE2A	--	4.0	--	0.0	--	20.0	--	0.0	----	5.0	FLASHED/ARCING
AEBB00	RY	DE54	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	OPEN CIRCUIT
AEBB00	RY	DM72	--	1.0	--	0.0	--	10.5	--	0.0	----	10.5	BURNED
AEBB00	RY	DM74	--	1.0	--	0.0	--	15.0	--	0.0	----	15.0	CRYSTALIZED
AEBB00	RY	DM75	--	1.0	--	0.0	--	1.5	--	0.0	----	1.5	HOT/OVERHEATED
AEBB00	SU	----	4.0	--	0.0	--	53.0	--	0.1	--	13.3	----	SHUNT
AEBB00	SU	DE13	1.0	--	0.0	--	9.0	--	0.0	--	9.0	----	DEFECTIVE WIRING
AEBB00	SU	DE2A	1.0	--	0.0	--	28.0	--	0.1	--	28.0	----	FLASHED/ARCING
AEBB00	SU	DN33	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	NO DEFECT, SCHED MOD
AEBB00	SU	[ ]	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	NOT DESIGNATED
AEBB00	TX	----	--	1.0	--	0.0	--	1.5	--	0.0	----	1.5	TRANSDUCTOR
AEBB00	TX	DE48	--	1.0	--	0.0	--	1.5	--	0.0	----	1.5	OVERLOADED MOTOR
AEBB01	--	----	41.0	--	0.1	--	101.0	--	0.3	--	2.5	----	ANNUNCIATOR
AEBB01	DF	----	41.0	--	0.1	--	101.0	--	0.3	--	2.5	----	DETECTOR
AEBB01	DF	DE26	1.0	--	0.0	--	6.0	--	0.0	--	6.0	----	DEFECTIVE RELAY
AEBB01	DF	DE2K	10.0	--	0.0	--	15.0	--	0.0	--	1.5	----	TRIPPED
AEBB01	DF	DN22	13.0	--	0.0	--	48.0	--	0.1	--	3.7	----	NO DEFECT,COMP REM
AEBB01	DF	DS23	1.0	--	0.0	--	3.0	--	0.0	--	3.0	----	DEAD CAR
AEBB01	DF	DS2L	4.0	--	0.0	--	9.0	--	0.0	--	2.3	----	OPERATE, WILL NOT
AEBB01	DF	DZ42	1.0	--	0.0	--	1.0	--	0.0	--	1.0	----	IMPROPER ADJUSTMENT
AEBB01	DF	[ ]	11.0	--	0.0	--	19.0	--	0.0	--	1.7	----	NOT DESIGNATED

WMATA MAINTENANCE HIGH-DRIVER BY DEFECT CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBB03	--	----	5.0	--	0.0	--	4.0	--	0.0	--	0.8	----	CIRCUIT PROTECTION
AEBB03	PJ	----	5.0	--	0.0	--	4.0	--	0.0	--	0.8	----	PC BOARD (CARD)
AEBB03	PJ	DE2K	2.0	--	0.0	--	3.0	--	0.0	--	1.5	----	TRIPPED
AEBB03	PJ	DE2P	1.0	--	0.0	--	1.0	--	0.0	--	1.0	----	DEFECTIVE CONTACT TIP
AEBB03	PJ	DS13	1.0	--	0.0	--	--	--	--	--	--	----	INTERMITTENT OPER
AEBB03	PJ	DS2L	1.0	--	0.0	--	--	--	--	--	--	----	OPERATE, WILL NOT
AEBB04	--	----	4.0	110.0	0.0	0.1	9.0	251.7	0.0	0.2	2.3	2.3	ELECTROMOTIVE BRAKING CON
AEBB04	5R	----	3.0	--	0.0	--	6.0	--	0.0	--	2.0	----	SWITCH
AEBB04	5R	DE2N	3.0	--	0.0	--	6.0	--	0.0	--	2.0	----	DEFECTIVE SWITCH
AEBB04	PJ	----	1.0	106.0	0.0	0.1	3.0	233.0	0.0	0.1	3.0	2.2	PC BOARD (CARD)
AEBB04	PJ	DD24	--	1.0	--	0.0	--	0.3	--	0.0	----	0.3	DESTROYED
AEBB04	PJ	DE14	--	1.0	--	0.0	--	1.3	--	0.0	----	1.3	LOOSE CONNECTION
AEBB04	PJ	DE2L	--	3.0	--	0.0	--	3.8	--	0.0	----	1.3	TRIPPED CKT BREAKER
AEBB04	PJ	DE48	--	3.0	--	0.0	--	11.0	--	0.0	----	3.7	OVERLOADED MOTOR
AEBB04	PJ	DE65	--	1.0	--	0.0	--	1.3	--	0.0	----	1.3	HIGH VOLTAGE
AEBB04	PJ	DE67	--	5.0	--	0.0	--	20.4	--	0.0	----	4.1	INCORRECT CURRENT
AEBB04	PJ	DE69	--	9.0	--	0.0	--	10.6	--	0.0	----	1.2	INCORRECT SIGNAL
AEBB04	PJ	DE6F	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	LOW VOLTAGE
AEBB04	PJ	DE6L	--	2.0	--	0.0	--	4.6	--	0.0	----	2.3	NO OUTPUT
AEBB04	PJ	DM13	--	2.0	--	0.0	--	0.7	--	0.0	----	0.4	BROKEN/SHEARED
AEBB04	PJ	DM23	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	DIRTY
AEBB04	PJ	DM53	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	LOOSE
AEBB04	PJ	DN11	--	3.0	--	0.0	--	11.0	--	0.0	----	3.7	FAILURE, CANNOT DUP
AEBB04	PJ	DN32	--	4.0	--	0.0	--	7.2	--	0.0	----	1.8	NO DEFECT, PROG MAINT
AEBB04	PJ	DN33	--	5.0	--	0.0	--	10.3	--	0.0	----	2.1	NO DEFECT, SCHED MOD
AEBB04	PJ	DS11	--	1.0	--	0.0	--	--	--	--	----	--	CHATTERING
AEBB04	PJ	DS12	--	8.0	--	0.0	--	27.6	--	0.0	----	3.4	ERRATIC OPERATION
AEBB04	PJ	DS13	--	5.0	--	0.0	--	15.7	--	0.0	----	3.1	INTERMITTENT OPER
AEBB04	PJ	DS26	--	31.0	--	0.0	--	69.6	--	0.0	----	2.2	FAILS TO OPERATE
AEBB04	PJ	DS2C	--	17.0	--	0.0	--	31.1	--	0.0	----	1.8	FAILURE, INTERNAL
AEBB04	PJ	DS2L	1.0	--	0.0	--	3.0	--	0.0	--	3.0	----	OPERATE, WILL NOT
AEBB04	PJ	DS2V	--	1.0	--	0.0	--	1.5	--	0.0	----	1.5	TURN OFF, WILL NOT
AEBB04	PJ	DZ13	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	FAILED SAFETY TEST
AEBB04	RU	----	--	4.0	--	0.0	--	18.7	--	0.0	----	4.7	RELAY
AEBB04	RU	DC21	--	1.0	--	0.0	--	2.2	--	0.0	----	2.2	CORRODED
AEBB04	RU	DE2L	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	TRIPPED CKT BREAKER
AEBB04	RU	DE48	--	1.0	--	0.0	--	11.0	--	0.0	----	11.0	OVERLOADED MOTOR
AEBB04	RU	DZ42	--	1.0	--	0.0	--	5.0	--	0.0	----	5.0	IMPROPER ADJUSTMENT
AEBB05	--	----	73.0	--	0.2	--	409.5	--	1.0	--	5.6	----	PERFORMANCE MODIFICATION
AEBB05	HT	----	2.0	--	0.0	--	18.0	--	0.0	--	9.0	----	HOSE
AEBB05	HT	DD28	1.0	--	0.0	--	2.0	--	0.0	--	2.0	----	LEAKING
AEBB05	HT	DN33	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	NO DEFECT, SCHED MOD

WMATA MAINTENANCE HIGH-DRIVER BY DEFECT CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBB05	PE	----	17.0	--	0.0	--	78.0	--	0.2	--	4.6	----	PANEL
AEBB05	PE	DM44	2.0	--	0.0	--	5.0	--	0.0	--	2.5	----	OUT OF BAL/TOL
AEBB05	PE	DS13	7.0	--	0.0	--	23.0	--	0.1	--	3.3	----	INTERMITTENT OPER
AEBB05	PE	DS23	1.0	--	0.0	--	6.0	--	0.0	--	6.0	----	DEAD CAR
AEBB05	PE	DS2L	3.0	--	0.0	--	21.0	--	0.1	--	7.0	----	OPERATE, WILL NOT
AEBB05	PE	DZ42	2.0	--	0.0	--	19.0	--	0.0	--	9.5	----	IMPROPER ADJUSTMENT
AEBB05	PE	[ ]	2.0	--	0.0	--	4.0	--	0.0	--	2.0	----	NOT DESIGNATED
AEBB05	PJ	----	36.0	--	0.1	--	151.5	--	0.4	--	4.2	----	PC BOARD (CARD)
AEBB05	PJ	DE26	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	DEFECTIVE RELAY
AEBB05	PJ	DM44	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	OUT OF BAL/TOL
AEBB05	PJ	DN22	8.0	--	0.0	--	37.0	--	0.1	--	4.6	----	NO DEFECT,COMP REM
AEBB05	PJ	DN33	1.0	--	0.0	--	11.0	--	0.0	--	11.0	----	NO DEFECT, SCHED MOD
AEBB05	PJ	DS13	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	INTERMITTENT OPER
AEBB05	PJ	DS2E	1.0	--	0.0	--	5.0	--	0.0	--	5.0	----	NO DYNAMIC BRAKE
AEBB05	PJ	DS2L	4.0	--	0.0	--	15.0	--	0.0	--	3.8	----	OPERATE, WILL NOT
AEBB05	PJ	DW34	1.0	--	0.0	--	2.0	--	0.0	--	2.0	----	EXCESSIVE SLIP
AEBB05	PJ	DW42	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	DEFECTIVE WHEEL TREAD
AEBB05	PJ	DZ42	16.0	--	0.0	--	42.5	--	0.1	--	2.7	----	IMPROPER ADJUSTMENT
AEBB05	PJ	[ ]	1.0	--	0.0	--	7.0	--	0.0	--	7.0	----	NOT DESIGNATED
AEBB05	RB	----	4.0	--	0.0	--	61.0	--	0.2	--	15.3	----	RACK
AEBB05	RB	DE72	2.0	--	0.0	--	40.0	--	0.1	--	20.0	----	GROUNDED
AEBB05	RB	DS23	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	DEAD CAR
AEBB05	RB	DW22	1.0	--	0.0	--	5.0	--	0.0	--	5.0	----	FLAT SPOT
AEBB05	RU	----	2.0	--	0.0	--	8.0	--	0.0	--	4.0	----	RELAY
AEBB05	RU	DE26	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	DEFECTIVE RELAY
AEBB05	RU	DS13	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	INTERMITTENT OPER
AEBB05	TW	----	3.0	--	0.0	--	20.0	--	0.1	--	6.7	----	TRANSDUCER
AEBB05	TW	DM44	2.0	--	0.0	--	18.0	--	0.0	--	9.0	----	OUT OF BAL/TOL
AEBB05	TW	DS13	1.0	--	0.0	--	2.0	--	0.0	--	2.0	----	INTERMITTENT OPER
AEBB05	WE	----	9.0	--	0.0	--	73.0	--	0.2	--	8.1	----	WHEEL
AEBB05	WE	DE72	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	GROUNDED
AEBB05	WE	DN22	8.0	--	0.0	--	57.0	--	0.1	--	7.1	----	NO DEFECT,COMP REM
AEBB06	--	----	--	47.0	--	0.0	--	149.9	--	0.1	----	3.2	DECODE/ENCODE
AEBB06	PJ	----	--	47.0	--	0.0	--	149.9	--	0.1	----	3.2	PC BOARD (CARD)
AEBB06	PJ	DE14	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	LOOSE CONNECTION
AEBB06	PJ	DE2A	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	FLASHED/ARCING
AEBB06	PJ	DE2L	--	4.0	--	0.0	--	9.3	--	0.0	----	2.3	TRIPPED CKT BREAKER
AEBB06	PJ	DE48	--	6.0	--	0.0	--	38.5	--	0.0	----	6.4	OVERLOADED MOTOR
AEBB06	PJ	DE54	--	2.0	--	0.0	--	0.5	--	0.0	----	0.3	OPEN CIRCUIT
AEBB06	PJ	DE67	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	INCORRECT CURRENT
AEBB06	PJ	DE69	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	INCORRECT SIGNAL
AEBB06	PJ	DE73	--	2.0	--	0.0	--	7.5	--	0.0	----	3.8	SHORTED

WMATA MAINTENANCE HIGH-DRIVER BY DEFECT CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBB06	PJ	DM65	--	1.0	--	0.0	--	0.3	--	0.0	----	0.3	JAM/BINDING/LOCKED
AEBB06	PJ	DN32	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	NO DEFECT, PROG MAINT
AEBB06	PJ	DN33	--	11.0	--	0.0	--	34.4	--	0.0	----	3.1	NO DEFECT, SCHED MOD
AEBB06	PJ	DS12	--	2.0	--	0.0	--	3.0	--	0.0	----	1.5	ERRATIC OPERATION
AEBB06	PJ	DS13	--	4.0	--	0.0	--	14.3	--	0.0	----	3.6	INTERMITTENT OPER
AEBB06	PJ	DS26	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	FAILS TO OPERATE
AEBB06	PJ	DS2C	--	8.0	--	0.0	--	29.1	--	0.0	----	3.6	FAILURE, INTERNAL
AEBB06	PJ	DZ25	--	1.0	--	0.0	--	1.5	--	0.0	----	1.5	FAILS DIAGNOSTIC TEST
AEBB07	--	----	3.0	817.0	0.0	0.5	21.0	2323.5	0.1	1.4	7.0	2.8	POWER SUPPLY
AEBB07	PJ	----	3.0	817.0	0.0	0.5	21.0	2323.5	0.1	1.4	7.0	2.8	PC BOARD (CARD)
AEBB07	PJ	DD11	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	ACCIDENT/COLLISION
AEBB07	PJ	DE14	--	14.0	--	0.0	--	13.2	--	0.0	----	0.9	LOOSE CONNECTION
AEBB07	PJ	DE2A	--	29.0	--	0.0	--	330.3	--	0.2	----	11.4	FLASHED/ARCING
AEBB07	PJ	DE2K	--	1.0	--	0.0	--	2.2	--	0.0	----	2.2	TRIPPED
AEBB07	PJ	DE2L	--	508.0	--	0.3	--	1001.5	--	0.6	----	2.0	TRIPPED CKT BREAKER
AEBB07	PJ	DE32	--	6.0	--	0.0	--	30.1	--	0.0	----	5.0	MISWIRED/CONNECT INCO
AEBB07	PJ	DE48	--	29.0	--	0.0	--	162.0	--	0.1	----	5.6	OVERLOADED MOTOR
AEBB07	PJ	DE51	--	1.0	--	0.0	--	5.0	--	0.0	----	5.0	BLOWN FUSE
AEBB07	PJ	DE54	--	3.0	--	0.0	--	6.5	--	0.0	----	2.2	OPEN CIRCUIT
AEBB07	PJ	DE65	--	4.0	--	0.0	--	17.5	--	0.0	----	4.4	HIGH VOLTAGE
AEBB07	PJ	DE67	--	9.0	--	0.0	--	22.1	--	0.0	----	2.5	INCORRECT CURRENT
AEBB07	PJ	DE69	--	4.0	--	0.0	--	8.8	--	0.0	----	2.2	INCORRECT SIGNAL
AEBB07	PJ	DE6F	--	48.0	--	0.0	--	139.2	--	0.1	----	2.9	LOW VOLTAGE
AEBB07	PJ	DE6J	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	NO INPUT
AEBB07	PJ	DE6L	--	27.0	--	0.0	--	58.5	--	0.0	----	2.2	NO OUTPUT
AEBB07	PJ	DE73	--	4.0	--	0.0	--	34.0	--	0.0	----	8.5	SHORTED
AEBB07	PJ	DM13	--	1.0	--	0.0	--	1.1	--	0.0	----	1.1	BROKEN/SHEARED
AEBB07	PJ	DM32	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	DEFECTIVE BEARING
AEBB07	PJ	DM3C	--	4.0	--	0.0	--	3.0	--	0.0	----	0.8	STRIPPED
AEBB07	PJ	DM44	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	OUT OF BAL/TOL
AEBB07	PJ	DM53	--	1.0	--	0.0	--	0.2	--	0.0	----	0.2	LOOSE
AEBB07	PJ	DM57	--	1.0	--	0.0	--	6.0	--	0.0	----	6.0	UNSEATED
AEBB07	PJ	DM72	--	9.0	--	0.0	--	139.5	--	0.1	----	15.5	BURNED
AEBB07	PJ	DM75	--	2.0	--	0.0	--	10.0	--	0.0	----	5.0	HOT/OVERHEATED
AEBB07	PJ	DN11	--	4.0	--	0.0	--	9.5	--	0.0	----	2.4	FAILURE, CANNOT DUP
AEBB07	PJ	DN32	--	9.0	--	0.0	--	36.6	--	0.0	----	4.1	NO DEFECT, PROG MAINT
AEBB07	PJ	DN33	--	19.0	--	0.0	--	69.0	--	0.0	----	3.6	NO DEFECT, SCHED MOD
AEBB07	PJ	DS12	--	7.0	--	0.0	--	20.7	--	0.0	----	3.0	ERRATIC OPERATION
AEBB07	PJ	DS13	--	11.0	--	0.0	--	30.7	--	0.0	----	2.8	INTERMITTENT OPER
AEBB07	PJ	DS23	1.0	--	0.0	--	11.0	--	0.0	--	11.0	----	DEAD CAR
AEBB07	PJ	DS26	--	27.0	--	0.0	--	69.9	--	0.0	----	2.6	FAILS TO OPERATE
AEBB07	PJ	DS2C	--	21.0	--	0.0	--	62.4	--	0.0	----	3.0	FAILURE, INTERNAL

WMATA MAINTENANCE HIGH-DRIVER BY DEFECT CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBB07	PJ	DS2D	--	1.0	--	0.0	--	1.6	--	0.0	----	1.6	INOP CHANNEL SELECTOR
AEBB07	PJ	DS2L	1.0	--	0.0	--	2.0	--	0.0	--	2.0	----	OPERATE, WILL NOT
AEBB07	PJ	DZ19	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	REM FOR OTHER MAINT A
AEBB07	PJ	DZ25	--	2.0	--	0.0	--	1.5	--	0.0	----	0.8	FAILS DIAGNOSTIC TEST
AEBB07	PJ	DZ42	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	IMPROPER ADJUSTMENT
AEBB07	PJ	DZ44	--	1.0	--	0.0	--	0.1	--	0.0	----	0.1	INCORRECTLY ASSEMBLED
AEBB07	PJ	[ ]	--	5.0	--	0.0	--	19.3	--	0.0	----	3.9	NOT DESIGNATED
AEBB08	--	----	--	254.0	--	0.2	--	877.5	--	0.5	----	3.5	BUFFER/DRIVER/ISOLATION
AEBB08	PJ	----	--	254.0	--	0.2	--	877.5	--	0.5	----	3.5	PC BOARD (CARD)
AEBB08	PJ	DE14	--	3.0	--	0.0	--	2.2	--	0.0	----	0.7	LOOSE CONNECTION
AEBB08	PJ	DE2A	--	6.0	--	0.0	--	63.0	--	0.0	----	10.5	FLASHED/ARCING
AEBB08	PJ	DE2L	--	8.0	--	0.0	--	11.4	--	0.0	----	1.4	TRIPPED CKT BREAKER
AEBB08	PJ	DE32	--	1.0	--	0.0	--	6.0	--	0.0	----	6.0	MISWIRED/CONNECT INCO
AEBB08	PJ	DE48	--	39.0	--	0.0	--	152.2	--	0.1	----	3.9	OVERLOADED MOTOR
AEBB08	PJ	DE52	--	1.0	--	0.0	--	1.7	--	0.0	----	1.7	BROKEN LEAD
AEBB08	PJ	DE54	--	10.0	--	0.0	--	34.6	--	0.0	----	3.5	OPEN CIRCUIT
AEBB08	PJ	DE67	--	5.0	--	0.0	--	26.0	--	0.0	----	5.2	INCORRECT CURRENT
AEBB08	PJ	DE69	--	8.0	--	0.0	--	13.3	--	0.0	----	1.7	INCORRECT SIGNAL
AEBB08	PJ	DE6L	--	2.0	--	0.0	--	16.0	--	0.0	----	8.0	NO OUTPUT
AEBB08	PJ	DE71	--	2.0	--	0.0	--	3.0	--	0.0	----	1.5	CHANGE OF VALUE
AEBB08	PJ	DE73	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	SHORTED
AEBB08	PJ	DM23	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	DIRTY
AEBB08	PJ	DM55	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	LOST/MISSING
AEBB08	PJ	DM56	--	1.0	--	0.0	--	0.2	--	0.0	----	0.2	MISSING MINOR HDWRE
AEBB08	PJ	DM65	--	1.0	--	0.0	--	0.6	--	0.0	----	0.6	JAM/BINDING/LOCKED
AEBB08	PJ	DM72	--	3.0	--	0.0	--	23.1	--	0.0	----	7.7	BURNED
AEBB08	PJ	DM75	--	2.0	--	0.0	--	8.0	--	0.0	----	4.0	HOT/OVERHEATED
AEBB08	PJ	DN32	--	4.0	--	0.0	--	7.5	--	0.0	----	1.9	NO DEFECT, PROG MAINT
AEBB08	PJ	DN33	--	30.0	--	0.0	--	65.5	--	0.0	----	2.2	NO DEFECT, SCHED MOD
AEBB08	PJ	DP52	--	1.0	--	0.0	--	5.0	--	0.0	----	5.0	RESTRICTED AIR FLOW
AEBB08	PJ	DS12	--	11.0	--	0.0	--	24.0	--	0.0	----	2.2	ERRATIC OPERATION
AEBB08	PJ	DS13	--	15.0	--	0.0	--	56.8	--	0.0	----	3.8	INTERMITTENT OPER
AEBB08	PJ	DS26	--	40.0	--	0.0	--	100.0	--	0.1	----	2.5	FAILS TO OPERATE
AEBB08	PJ	DS2C	--	55.0	--	0.0	--	237.9	--	0.1	----	4.3	FAILURE, INTERNAL
AEBB08	PJ	DS2X	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	UNABLE TO MOVE
AEBB08	PJ	DZ25	--	2.0	--	0.0	--	13.0	--	0.0	----	6.5	FAILS DIAGNOSTIC TEST
AEBB09	--	----	5.0	--	0.0	--	29.0	--	0.1	--	5.8	----	SPEED/TACH
AEBB09	PJ	----	5.0	--	0.0	--	29.0	--	0.1	--	5.8	----	PC BOARD (CARD)
AEBB09	PJ	DN33	3.0	--	0.0	--	11.0	--	0.0	--	3.7	----	NO DEFECT, SCHED MOD
AEBB09	PJ	DS2L	2.0	--	0.0	--	18.0	--	0.0	--	9.0	----	OPERATE, WILL NOT
AEBB10	--	----	8.0	472.0	0.0	0.3	27.0	1925.1	0.1	1.2	3.4	4.1	ACCELERATION CONTROL
AEBB10	PJ	----	8.0	315.0	0.0	0.2	27.0	1313.4	0.1	0.8	3.4	4.2	PC BOARD (CARD)

WMATA MAINTENANCE HIGH-DRIVER BY DEFECT CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBB10	PJ	DE14	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	LOOSE CONNECTION
AEBB10	PJ	DE2A	--	5.0	--	0.0	--	54.0	--	0.0	----	10.8	FLASHED/ARCING
AEBB10	PJ	DE2K	--	1.0	--	0.0	--	1.5	--	0.0	----	1.5	TRIPPED
AEBB10	PJ	DE2L	--	8.0	--	0.0	--	18.7	--	0.0	----	2.3	TRIPPED CKT BREAKER
AEBB10	PJ	DE46	--	1.0	--	0.0	--	8.0	--	0.0	----	8.0	OUT OF ROUND
AEBB10	PJ	DE48	--	74.0	--	0.0	--	366.9	--	0.2	----	5.0	OVERLOADED MOTOR
AEBB10	PJ	DE54	--	2.0	--	0.0	--	12.6	--	0.0	----	6.3	OPEN CIRCUIT
AEBB10	PJ	DE67	--	8.0	--	0.0	--	42.5	--	0.0	----	5.3	INCORRECT CURRENT
AEBB10	PJ	DE69	--	18.0	--	0.0	--	46.5	--	0.0	----	2.6	INCORRECT SIGNAL
AEBB10	PJ	DE6A	--	1.0	--	0.0	--	2.3	--	0.0	----	2.3	INCORRECT TIME DELAY
AEBB10	PJ	DE6F	--	2.0	--	0.0	--	4.1	--	0.0	----	2.1	LOW VOLTAGE
AEBB10	PJ	DE6L	--	4.0	--	0.0	--	13.5	--	0.0	----	3.4	NO OUTPUT
AEBB10	PJ	DM14	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	CRACKED
AEBB10	PJ	DM23	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	DIRTY
AEBB10	PJ	DM37	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	DELAMINATED
AEBB10	PJ	DM53	--	1.0	--	0.0	--	9.0	--	0.0	----	9.0	LOOSE
AEBB10	PJ	DM65	--	2.0	--	0.0	--	4.6	--	0.0	----	2.3	JAM/BINDING/LOCKED
AEBB10	PJ	DM72	--	1.0	--	0.0	--	12.0	--	0.0	----	12.0	BURNED
AEBB10	PJ	DM75	--	2.0	--	0.0	--	9.2	--	0.0	----	4.6	HOT/OVERHEATED
AEBB10	PJ	DN11	--	3.0	--	0.0	--	7.5	--	0.0	----	2.5	FAILURE, CANNOT DUP
AEBB10	PJ	DN13	--	1.0	--	0.0	--	6.0	--	0.0	----	6.0	NO DEFECT, OPER ERROR
AEBB10	PJ	DN32	--	3.0	--	0.0	--	11.0	--	0.0	----	3.7	NO DEFECT, PROG MAINT
AEBB10	PJ	DN33	--	32.0	--	0.0	--	114.4	--	0.1	----	3.6	NO DEFECT, SCHED MOD
AEBB10	PJ	DS12	--	27.0	--	0.0	--	116.0	--	0.1	----	4.3	ERRATIC OPERATION
AEBB10	PJ	DS13	--	20.0	--	0.0	--	63.6	--	0.0	----	3.2	INTERMITTENT OPER
AEBB10	PJ	DS21	--	1.0	--	0.0	--	8.0	--	0.0	----	8.0	CLOSE, WILL NOT
AEBB10	PJ	DS26	--	25.0	--	0.0	--	66.8	--	0.0	----	2.7	FAILS TO OPERATE
AEBB10	PJ	DS2C	--	61.0	--	0.0	--	287.6	--	0.2	----	4.7	FAILURE, INTERNAL
AEBB10	PJ	DS2L	4.0	1.0	0.0	0.0	12.0	4.0	0.0	0.0	3.0	4.0	OPERATE, WILL NOT
AEBB10	PJ	DS43	--	1.0	--	0.0	--	0.3	--	0.0	----	0.3	ERROR, DISPLAY READOU
AEBB10	PJ	DS4E	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	SLUGGISH
AEBB10	PJ	DZ13	--	1.0	--	0.0	--	0.3	--	0.0	----	0.3	FAILED SAFETY TEST
AEBB10	PJ	DZ25	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	FAILS DIAGNOSTIC TEST
AEBB10	PJ	DZ42	3.0	1.0	0.0	0.0	13.0	4.5	0.0	0.0	4.3	4.5	IMPROPER ADJUSTMENT
AEBB10	PJ	DZ43	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	IMPROPER SPACING/CLEA
AEBB10	PJ	( )	1.0	1.0	0.0	0.0	2.0	4.0	0.0	0.0	2.0	4.0	NOT DESIGNATED
AEBB10	RU	----	--	149.0	--	0.1	--	546.2	--	0.3	----	3.7	RELAY
AEBB10	RU	DE14	--	12.0	--	0.0	--	51.8	--	0.0	----	4.3	LOOSE CONNECTION
AEBB10	RU	DE21	--	6.0	--	0.0	--	14.5	--	0.0	----	2.4	BURNED CONTACT
AEBB10	RU	DE29	--	6.0	--	0.0	--	19.5	--	0.0	----	3.3	DIRTY CONTACTS
AEBB10	RU	DE2A	--	11.0	--	0.0	--	44.6	--	0.0	----	4.1	FLASHED/ARCING
AEBB10	RU	DE2C	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	INTERLOCK MALFUNCTION

WMATA MAINTENANCE HIGH-DRIVER BY DEFECT CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	D-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,D-CODE
AEBB10	RU	DE2E	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	RELAY COIL MALFUNCTIO
AEBB10	RU	DE32	--	1.0	--	0.0	--	6.0	--	0.0	----	6.0	MISWIRED/CONNECT INCO
AEBB10	RU	DE48	--	8.0	--	0.0	--	28.5	--	0.0	----	3.6	OVERLOADED MOTOR
AEBB10	RU	DE54	--	16.0	--	0.0	--	54.0	--	0.0	----	3.4	OPEN CIRCUIT
AEBB10	RU	DE67	--	2.0	--	0.0	--	7.7	--	0.0	----	3.8	INCORRECT CURRENT
AEBB10	RU	DE6A	--	1.0	--	0.0	--	2.5	--	0.0	----	2.5	INCORRECT TIME DELAY
AEBB10	RU	DE71	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	CHANGE OF VALUE
AEBB10	RU	DE73	--	5.0	--	0.0	--	15.5	--	0.0	----	3.1	SHORTED
AEBB10	RU	DE74	--	18.0	--	0.0	--	73.8	--	0.0	----	4.1	WELDED CONTACT
AEBB10	RU	DM12	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	BROKEN SPRING
AEBB10	RU	DM13	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	BROKEN/SHEARED
AEBB10	RU	DM53	--	3.0	--	0.0	--	6.3	--	0.0	----	2.1	LOOSE
AEBB10	RU	DM54	--	2.0	--	0.0	--	17.0	--	0.0	----	8.5	LOOSE/DAMAGED COMM HD
AEBB10	RU	DM57	--	1.0	--	0.0	--	1.5	--	0.0	----	1.5	UNSEATED
AEBB10	RU	DM65	--	2.0	--	0.0	--	6.4	--	0.0	----	3.2	JAM/BINDING/LOCKED
AEBB10	RU	DM67	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	STICKING
AEBB10	RU	DM72	--	4.0	--	0.0	--	27.0	--	0.0	----	6.8	BURNED
AEBB10	RU	DN32	--	4.0	--	0.0	--	3.6	--	0.0	----	0.9	NO DEFECT, PROG MAINT
AEBB10	RU	DN33	--	3.0	--	0.0	--	5.7	--	0.0	----	1.9	NO DEFECT, SCHED MOD
AEBB10	RU	DS11	--	1.0	--	0.0	--	6.0	--	0.0	----	6.0	CHATTERING
AEBB10	RU	DS12	--	2.0	--	0.0	--	10.0	--	0.0	----	5.0	ERRATIC OPERATION
AEBB10	RU	DS13	--	9.0	--	0.0	--	26.5	--	0.0	----	2.9	INTERMITTENT OPER
AEBB10	RU	DS26	--	12.0	--	0.0	--	33.5	--	0.0	----	2.8	FAILS TO OPERATE
AEBB10	RU	DS2C	--	4.0	--	0.0	--	33.0	--	0.0	----	8.3	FAILURE, INTERNAL
AEBB10	RU	DZ12	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	CONDEMNED, ADMIN
AEBB10	RU	DZ42	--	8.0	--	0.0	--	33.8	--	0.0	----	4.2	IMPROPER ADJUSTMENT
AEBB10	RU	[ ]	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	NOT DESIGNATED
AEBB10	TY	----	--	8.0	--	0.0	--	65.5	--	0.0	----	8.2	TRANSFORMER
AEBB10	TY	DE2L	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	TRIPPED CKT BREAKER
AEBB10	TY	DE32	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	MISWIRED/CONNECT INCO
AEBB10	TY	DE67	--	1.0	--	0.0	--	14.0	--	0.0	----	14.0	INCORRECT CURRENT
AEBB10	TY	DN33	--	4.0	--	0.0	--	31.5	--	0.0	----	7.9	NO DEFECT, SCHED MOD
AEBB10	TY	DS13	--	1.0	--	0.0	--	14.0	--	0.0	----	14.0	INTERMITTENT OPER

APPENDIX J

Data Extraction No. 10

Logic And Low Voltage By Repair Code

WMATA MAINTENANCE HIGH-DRIVER BY REPAIR CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	R-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,R-CODE
AEBB00	--	----	195.0	452.0	0.5	0.3	858.0	2181.8	2.2	1.3	4.4	4.8	LOGIC AND LO-V CONTROL
AEBB00	00	----	5.0	--	0.0	--	9.0	--	0.0	--	1.8	----	NOT DESIGNATED
AEBB00	00	RJ02	4.0	--	0.0	--	7.0	--	0.0	--	1.8	----	INSP & FOUND OK
AEBB00	00	RJ06	1.0	--	0.0	--	2.0	--	0.0	--	2.0	----	TRACK TEST
AEBB00	1C	----	--	7.0	--	0.0	--	39.5	--	0.0	----	5.6	INDUCTOR
AEBB00	1C	RN03	--	6.0	--	0.0	--	36.5	--	0.0	----	6.1	REMOVED & REPLACED
AEBB00	1C	RN09	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	REPLACED MINOR HDWRE
AEBB00	5N	----	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	SUPPORT
AEBB00	5N	RN03	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	REMOVED & REPLACED
AEBB00	5R	----	3.0	18.0	0.0	0.0	5.0	67.6	0.0	0.0	1.7	3.8	SWITCH
AEBB00	5R	RJ02	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	INSP & FOUND OK
AEBB00	5R	RJ07	--	5.0	--	0.0	--	21.1	--	0.0	----	4.2	TROUBLE SHOOTING
AEBB00	5R	RN03	3.0	9.0	0.0	0.0	5.0	40.0	0.0	0.0	1.7	4.4	REMOVED & REPLACED
AEBB00	5R	RN09	--	2.0	--	0.0	--	3.5	--	0.0	----	1.8	REPLACED MINOR HDWRE
AEBB00	5R	[ ]	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	NOT DESIGNATED
AEBB00	64	----	--	42.0	--	0.0	--	206.1	--	0.1	----	4.9	CRADLE
AEBB00	64	RB01	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	ADJUSTED
AEBB00	64	RE02	--	1.0	--	0.0	--	6.0	--	0.0	----	6.0	MODIFIED
AEBB00	64	RJ02	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	INSP & FOUND OK
AEBB00	64	RJ07	--	4.0	--	0.0	--	16.2	--	0.0	----	4.1	TROUBLE SHOOTING
AEBB00	64	RN03	--	29.0	--	0.0	--	163.4	--	0.1	----	5.6	REMOVED & REPLACED
AEBB00	64	RN05	--	4.0	--	0.0	--	13.0	--	0.0	----	3.3	REPLACED
AEBB00	64	RN09	--	2.0	--	0.0	--	3.0	--	0.0	----	1.5	REPLACED MINOR HDWRE
AEBB00	6R	----	3.0	--	0.0	--	8.0	--	0.0	--	2.7	----	CONTACT
AEBB00	6R	RN03	3.0	--	0.0	--	8.0	--	0.0	--	2.7	----	REMOVED & REPLACED
AEBB00	HE	----	--	344.0	--	0.2	--	1673.0	--	1.0	----	4.9	HARDWARE
AEBB00	HE	RB01	--	39.0	--	0.0	--	109.7	--	0.1	----	2.8	ADJUSTED
AEBB00	HE	RC03	--	1.0	--	0.0	--	0.5	--	0.0	----	0.5	COMPLETED PREVIOUSLY
AEBB00	HE	RE02	--	2.0	--	0.0	--	9.0	--	0.0	----	4.5	MODIFIED
AEBB00	HE	RJ02	--	23.0	--	0.0	--	67.2	--	0.0	----	2.9	INSP & FOUND OK
AEBB00	HE	RJ07	--	50.0	--	0.0	--	308.0	--	0.2	----	6.2	TROUBLE SHOOTING
AEBB00	HE	RN03	--	168.0	--	0.1	--	778.3	--	0.5	----	4.6	REMOVED & REPLACED
AEBB00	HE	RN04	--	10.0	--	0.0	--	99.0	--	0.1	----	9.9	REMOVED TO REPAIR
AEBB00	HE	RN05	--	8.0	--	0.0	--	29.0	--	0.0	----	3.6	REPLACED
AEBB00	HE	RN09	--	39.0	--	0.0	--	254.3	--	0.2	----	6.5	REPLACED MINOR HDWRE
AEBB00	HE	RR10	--	2.0	--	0.0	--	10.0	--	0.0	----	5.0	REMOVE/REPAIR/REPLACE
AEBB00	HE	RR18	--	2.0	--	0.0	--	8.0	--	0.0	----	4.0	SERVICED
AEBB00	PE	----	157.0	5.0	0.4	0.0	654.0	6.3	1.6	0.0	4.2	1.3	PANEL
AEBB00	PE	RB01	13.0	--	0.0	--	65.0	--	0.2	--	5.0	----	ADJUSTED
AEBB00	PE	RC10	3.0	--	0.0	--	7.0	--	0.0	--	2.3	----	NO DEFECT FOUND
AEBB00	PE	RE02	28.0	--	0.1	--	79.0	--	0.2	--	2.8	----	MODIFIED
AEBB00	PE	RE03	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	OVERHAULED
AEBB00	PE	RE05	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	REBUILT

WMATA MAINTENANCE HIGH-DRIVER BY REPAIR CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	R-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,R-CODE
AEBB00	PE	RF02	--	--	--	--	--	--	--	--	----	----	RENEW SOLUTION
AEBB00	PE	RJ02	30.0	--	0.1	--	81.0	--	0.2	--	2.7	----	INSP & FOUND OK
AEBB00	PE	RJ05	17.0	--	0.0	--	44.0	--	0.1	--	2.6	----	TESTED
AEBB00	PE	RJ06	31.0	--	0.1	--	107.0	--	0.3	--	3.5	----	TRACK TEST
AEBB00	PE	RJ07	19.0	2.0	0.0	0.0	144.0	3.0	0.4	0.0	7.6	1.5	TROUBLE SHOOTING
AEBB00	PE	RN03	8.0	3.0	0.0	0.0	91.0	3.3	0.2	0.0	11.4	1.1	REMOVED & REPLACED
AEBB00	PE	RR14	2.0	--	0.0	--	2.0	--	0.0	--	1.0	----	RESET
AEBB00	PE	RR15	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	REWIRED
AEBB00	PE	RR24	2.0	--	0.0	--	6.0	--	0.0	--	3.0	----	TEST & REPAIR
AEBB00	PJ	----	--	27.0	--	0.0	--	138.8	--	0.1	----	5.1	PC BOARD (CARD)
AEBB00	PJ	RJ07	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	TROUBLE SHOOTING
AEBB00	PJ	RN03	--	25.0	--	0.0	--	134.3	--	0.1	----	5.4	REMOVED & REPLACED
AEBB00	PJ	RR18	--	1.0	--	0.0	--	1.5	--	0.0	----	1.5	SERVICED
AEBB00	RU	----	22.0	--	0.1	--	113.0	--	0.3	--	5.1	----	RELAY
AEBB00	RU	RA06	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	CHARGED W/REFRIGERANT
AEBB00	RU	RB01	1.0	--	0.0	--	6.0	--	0.0	--	6.0	----	ADJUSTED
AEBB00	RU	RB04	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	TIGHTENED
AEBB00	RU	RE05	2.0	--	0.0	--	16.0	--	0.0	--	8.0	----	REBUILT
AEBB00	RU	RJ02	3.0	--	0.0	--	6.0	--	0.0	--	2.0	----	INSP & FOUND OK
AEBB00	RU	RJ05	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	TESTED
AEBB00	RU	RJ06	1.0	--	0.0	--	6.0	--	0.0	--	6.0	----	TRACK TEST
AEBB00	RU	RJ07	1.0	--	0.0	--	12.0	--	0.0	--	12.0	----	TROUBLE SHOOTING
AEBB00	RU	RN03	6.0	--	0.0	--	33.0	--	0.1	--	5.5	----	REMOVED & REPLACED
AEBB00	RU	RN05	1.0	--	0.0	--	12.0	--	0.0	--	12.0	----	REPLACED
AEBB00	RU	RN13	2.0	--	0.0	--	2.0	--	0.0	--	1.0	----	REPLACED TERMINAL
AEBB00	RU	RR10	1.0	--	0.0	--	6.0	--	0.0	--	6.0	----	REMOVE/REPAIR/REPLACE
AEBB00	RU	[ ]	1.0	--	0.0	--	2.0	--	0.0	--	2.0	----	NOT DESIGNATED
AEBB00	RY	----	--	8.0	--	0.0	--	49.0	--	0.0	----	6.1	RESISTOR
AEBB00	RY	RN03	--	8.0	--	0.0	--	49.0	--	0.0	----	6.1	REMOVED & REPLACED
AEBB00	SU	----	4.0	--	0.0	--	53.0	--	0.1	--	13.3	----	SHUNT
AEBB00	SU	RM02	1.0	--	0.0	--	8.0	--	0.0	--	8.0	----	MISC REPAIRS
AEBB00	SU	RR01	2.0	--	0.0	--	36.0	--	0.1	--	18.0	----	CONNECTED
AEBB00	SU	RR15	1.0	--	0.0	--	9.0	--	0.0	--	9.0	----	REWIRED
AEBB00	TX	----	--	1.0	--	0.0	--	1.5	--	0.0	----	1.5	TRANSDUCTOR
AEBB00	TX	RJ07	--	1.0	--	0.0	--	1.5	--	0.0	----	1.5	TROUBLE SHOOTING
AEBB01	--	----	41.0	--	0.1	--	101.0	--	0.3	--	2.5	----	ANNUNCIATOR
AEBB01	DF	----	41.0	--	0.1	--	101.0	--	0.3	--	2.5	----	DETECTOR
AEBB01	DF	RB01	1.0	--	0.0	--	1.0	--	0.0	--	1.0	----	ADJUSTED
AEBB01	DF	RC10	3.0	--	0.0	--	6.0	--	0.0	--	2.0	----	NO DEFECT FOUND
AEBB01	DF	RJ02	15.0	--	0.0	--	25.0	--	0.1	--	1.7	----	INSP & FOUND OK
AEBB01	DF	RJ05	8.0	--	0.0	--	30.0	--	0.1	--	3.8	----	TESTED
AEBB01	DF	RJ07	3.0	--	0.0	--	9.0	--	0.0	--	3.0	----	TROUBLE SHOOTING
AEBB01	DF	RN13	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	REPLACED TERMINAL

WMATA MAINTENANCE HIGH-DRIVER BY REPAIR CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	R-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,R-CODE
AEBB01	DF	RR10	--	--	--	--	--	--	--	--	----	----	REMOVE/REPAIR/REPLACE
AEBB01	DF	RR14	8.0	--	0.0	--	10.0	--	0.0	--	1.3	----	RESET
AEBB01	DF	RR24	1.0	--	0.0	--	10.0	--	0.0	--	10.0	----	TEST & REPAIR
AEBB03	--	----	5.0	--	0.0	--	4.0	--	0.0	--	0.8	----	CIRCUIT PROTECTION
AEBB03	PJ	----	5.0	--	0.0	--	4.0	--	0.0	--	0.8	----	PC BOARD (CARD)
AEBB03	PJ	RN03	2.0	--	0.0	--	--	--	--	--	--	----	REMOVED & REPLACED
AEBB03	PJ	RR14	2.0	--	0.0	--	3.0	--	0.0	--	1.5	----	RESET
AEBB03	PJ	RS03	1.0	--	0.0	--	1.0	--	0.0	--	1.0	----	DRESSED & FILED
AEBB04	--	----	4.0	110.0	0.0	0.1	9.0	251.7	0.0	0.2	2.3	2.3	ELECTROMOTIVE BRAKING CON
AEBB04	5R	----	3.0	--	0.0	--	6.0	--	0.0	--	2.0	----	SWITCH
AEBB04	5R	RN03	3.0	--	0.0	--	6.0	--	0.0	--	2.0	----	REMOVED & REPLACED
AEBB04	PJ	----	1.0	106.0	0.0	0.1	3.0	233.0	0.0	0.1	3.0	2.2	PC BOARD (CARD)
AEBB04	PJ	RB01	--	2.0	--	0.0	--	2.3	--	0.0	----	1.2	ADJUSTED
AEBB04	PJ	RJ02	--	1.0	--	0.0	--	6.5	--	0.0	----	6.5	INSP & FOUND OK
AEBB04	PJ	RJ07	--	3.0	--	0.0	--	17.2	--	0.0	----	5.7	TROUBLE SHOOTING
AEBB04	PJ	RN03	1.0	99.0	0.0	0.1	3.0	206.0	0.0	0.1	3.0	2.1	REMOVED & REPLACED
AEBB04	PJ	RR18	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	SERVICED
AEBB04	RU	----	--	4.0	--	0.0	--	18.7	--	0.0	----	4.7	RELAY
AEBB04	RU	RN03	--	3.0	--	0.0	--	16.5	--	0.0	----	5.5	REMOVED & REPLACED
AEBB04	RU	RR10	--	1.0	--	0.0	--	2.2	--	0.0	----	2.2	REMOVE/REPAIR/REPLACE
AEBB05	--	----	73.0	--	0.2	--	409.5	--	1.0	--	5.6	----	PERFORMANCE MODIFICATION
AEBB05	HT	----	2.0	--	0.0	--	18.0	--	0.0	--	9.0	----	HOSE
AEBB05	HT	RE02	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	MODIFIED
AEBB05	HT	RN03	1.0	--	0.0	--	2.0	--	0.0	--	2.0	----	REMOVED & REPLACED
AEBB05	PE	----	17.0	--	0.0	--	78.0	--	0.2	--	4.6	----	PANEL
AEBB05	PE	RB01	2.0	--	0.0	--	19.0	--	0.0	--	9.5	----	ADJUSTED
AEBB05	PE	RC13	1.0	--	0.0	--	3.0	--	0.0	--	3.0	----	REMOVED FOR OTHER USE
AEBB05	PE	RN03	12.0	--	0.0	--	47.0	--	0.1	--	3.9	----	REMOVED & REPLACED
AEBB05	PE	RN05	1.0	--	0.0	--	3.0	--	0.0	--	3.0	----	REPLACED
AEBB05	PE	RR10	1.0	--	0.0	--	6.0	--	0.0	--	6.0	----	REMOVE/REPAIR/REPLACE
AEBB05	PJ	----	36.0	--	0.1	--	151.5	--	0.4	--	4.2	----	PC BOARD (CARD)
AEBB05	PJ	RB01	16.0	--	0.0	--	42.5	--	0.1	--	2.7	----	ADJUSTED
AEBB05	PJ	RE02	1.0	--	0.0	--	11.0	--	0.0	--	11.0	----	MODIFIED
AEBB05	PJ	RJ05	8.0	--	0.0	--	37.0	--	0.1	--	4.6	----	TESTED
AEBB05	PJ	RJ07	2.0	--	0.0	--	7.0	--	0.0	--	3.5	----	TROUBLE SHOOTING
AEBB05	PJ	RN03	7.0	--	0.0	--	46.0	--	0.1	--	6.6	----	REMOVED & REPLACED
AEBB05	PJ	RN05	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	REPLACED
AEBB05	PJ	RR10	1.0	--	0.0	--	4.0	--	0.0	--	4.0	----	REMOVE/REPAIR/REPLACE
AEBB05	RB	----	4.0	--	0.0	--	61.0	--	0.2	--	15.3	----	RACK
AEBB05	RB	RJ02	1.0	--	0.0	--	5.0	--	0.0	--	5.0	----	INSP & FOUND OK
AEBB05	RB	RJ07	3.0	--	0.0	--	56.0	--	0.1	--	18.7	----	TROUBLE SHOOTING
AEBB05	RU	----	2.0	--	0.0	--	8.0	--	0.0	--	4.0	----	RELAY
AEBB05	RU	RN03	2.0	--	0.0	--	8.0	--	0.0	--	4.0	----	REMOVED & REPLACED

WMATA MAINTENANCE HIGH-DRIVER BY REPAIR CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	R-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,R-CODE
AEBB05	TW	----	--	--	--	--	--	--	--	--	----	----	TRANSDUCER
AEBB05	TW	RN03	3.0	--	0.0	--	20.0	--	0.1	--	6.7	----	REMOVED & REPLACED
AEBB05	WE	----	9.0	--	0.0	--	73.0	--	0.2	--	8.1	----	WHEEL
AEBB05	WE	RJ05	5.0	--	0.0	--	20.0	--	0.1	--	4.0	----	TESTED
AEBB05	WE	RP05	1.0	--	0.0	--	16.0	--	0.0	--	16.0	----	CLEARED GROUNDS
AEBB05	WE	RR24	3.0	--	0.0	--	37.0	--	0.1	--	12.3	----	TEST & REPAIR
AEBB06	--	----	--	47.0	--	0.0	--	149.9	--	0.1	----	3.2	DECODE/ENCODE
AEBB06	PJ	----	--	47.0	--	0.0	--	149.9	--	0.1	----	3.2	PC BOARD (CARD)
AEBB06	PJ	RB01	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	ADJUSTED
AEBB06	PJ	RE02	--	2.0	--	0.0	--	1.7	--	0.0	----	0.9	MODIFIED
AEBB06	PJ	RJ07	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	TROUBLE SHOOTING
AEBB06	PJ	RN03	--	43.0	--	0.0	--	145.2	--	0.1	----	3.4	REMOVED & REPLACED
AEBB07	--	----	3.0	817.0	0.0	0.5	21.0	2323.5	0.1	1.4	7.0	2.8	POWER SUPPLY
AEBB07	PJ	----	3.0	817.0	0.0	0.5	21.0	2323.5	0.1	1.4	7.0	2.8	PC BOARD (CARD)
AEBB07	PJ	RB01	--	9.0	--	0.0	--	22.6	--	0.0	----	2.5	ADJUSTED
AEBB07	PJ	RE02	--	4.0	--	0.0	--	12.7	--	0.0	----	3.2	MODIFIED
AEBB07	PJ	RJ02	--	7.0	--	0.0	--	50.6	--	0.0	----	7.2	INSP & FOUND OK
AEBB07	PJ	RJ07	1.0	63.0	0.0	0.0	11.0	76.8	0.0	0.0	11.0	1.2	TROUBLE SHOOTING
AEBB07	PJ	RN03	2.0	713.0	0.0	0.4	10.0	1979.2	0.0	1.2	5.0	2.8	REMOVED & REPLACED
AEBB07	PJ	RN04	--	4.0	--	0.0	--	5.4	--	0.0	----	1.3	REMOVED TO REPAIR
AEBB07	PJ	RN05	--	8.0	--	0.0	--	62.7	--	0.0	----	7.8	REPLACED
AEBB07	PJ	RN09	--	4.0	--	0.0	--	52.5	--	0.0	----	13.1	REPLACED MINOR HDWRE
AEBB07	PJ	RR10	--	1.0	--	0.0	--	15.0	--	0.0	----	15.0	REMOVE/REPAIR/REPLACE
AEBB07	PJ	RR18	--	3.0	--	0.0	--	34.0	--	0.0	----	11.3	SERVICED
AEBB07	PJ	[ ]	--	1.0	--	0.0	--	12.0	--	0.0	----	12.0	NOT DESIGNATED
AEBB08	--	----	--	254.0	--	0.2	--	877.5	--	0.5	----	3.5	BUFFER/DRIVER/ISOLATION
AEBB08	PJ	----	--	254.0	--	0.2	--	877.5	--	0.5	----	3.5	PC BOARD (CARD)
AEBB08	PJ	RB01	--	3.0	--	0.0	--	2.2	--	0.0	----	0.7	ADJUSTED
AEBB08	PJ	RC03	--	1.0	--	0.0	--	1.0	--	0.0	----	1.0	COMPLETED PREVIOUSLY
AEBB08	PJ	RE02	--	6.0	--	0.0	--	10.1	--	0.0	----	1.7	MODIFIED
AEBB08	PJ	RJ02	--	2.0	--	0.0	--	4.5	--	0.0	----	2.3	INSP & FOUND OK
AEBB08	PJ	RJ07	--	10.0	--	0.0	--	38.1	--	0.0	----	3.8	TROUBLE SHOOTING
AEBB08	PJ	RN03	--	226.0	--	0.1	--	817.0	--	0.5	----	3.6	REMOVED & REPLACED
AEBB08	PJ	RN05	--	2.0	--	0.0	--	0.6	--	0.0	----	0.3	REPLACED
AEBB08	PJ	RN09	--	2.0	--	0.0	--	2.0	--	0.0	----	1.0	REPLACED MINOR HDWRE
AEBB08	PJ	RR18	--	2.0	--	0.0	--	2.0	--	0.0	----	1.0	SERVICED
AEBB09	--	----	5.0	--	0.0	--	29.0	--	0.1	--	5.8	----	SPEED/TACH
AEBB09	PJ	----	5.0	--	0.0	--	29.0	--	0.1	--	5.8	----	PC BOARD (CARD)
AEBB09	PJ	RE02	3.0	--	0.0	--	11.0	--	0.0	--	3.7	----	MODIFIED
AEBB09	PJ	RN03	2.0	--	0.0	--	18.0	--	0.0	--	9.0	----	REMOVED & REPLACED
AEBB10	--	----	8.0	472.0	0.0	0.3	27.0	1925.1	0.1	1.2	3.4	4.1	ACCELERATION CONTROL
AEBB10	PJ	----	8.0	315.0	0.0	0.2	27.0	1313.4	0.1	0.8	3.4	4.2	PC BOARD (CARD)
AEBB10	PJ	RB01	3.0	4.0	0.0	0.0	13.0	10.0	0.0	0.0	4.3	2.5	ADJUSTED

WMATA MAINTENANCE HIGH-DRIVER BY REPAIR CODE

LOGIC AND LOW VOLTAGE CONTROL
(GPN AEBB--)

BASED ON 10,000 MILES OF REVENUE SERVICE OPERATION

GPN	UCC	R-CODE	MAINTENANCE ACTIONS		MAINTENANCE RATE		LABOR HOURS		LABOR RATE		MLHTR		DESCRIPTION
			PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	PATCO	WMATA	GPN,UCC,R-CODE
AEBB10	PJ	RJ07	1.0	10.0	0.0	0.0	6.0	41.0	0.0	0.0	6.0	4.1	TROUBLE SHOOTING
AEBB10	PJ	RN03	3.0	296.0	0.0	0.2	6.0	1251.8	0.0	0.8	2.0	4.2	REMOVED & REPLACED
AEBB10	PJ	RN05	--	1.0	--	0.0	--	0.1	--	0.0	----	0.1	REPLACED
AEBB10	PJ	RR10	--	1.0	--	0.0	--	6.0	--	0.0	----	6.0	REMOVE/REPAIR/REPLACE
AEBB10	PJ	RR18	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	SERVICED
AEBB10	PJ	[ ]	1.0	1.0	0.0	0.0	2.0	--	0.0	--	2.0	--	NOT DESIGNATED
AEBB10	RU	----	--	149.0	--	0.1	--	546.2	--	0.3	----	3.7	RELAY
AEBB10	RU	RB01	--	22.0	--	0.0	--	63.4	--	0.0	----	2.9	ADJUSTED
AEBB10	RU	RJ02	--	2.0	--	0.0	--	6.0	--	0.0	----	3.0	INSP & FOUND OK
AEBB10	RU	RJ07	--	17.0	--	0.0	--	36.8	--	0.0	----	2.2	TROUBLE SHOOTING
AEBB10	RU	RN03	--	82.0	--	0.0	--	338.4	--	0.2	----	4.1	REMOVED & REPLACED
AEBB10	RU	RN04	--	1.0	--	0.0	--	0.2	--	0.0	----	0.2	REMOVED TO REPAIR
AEBB10	RU	RN09	--	15.0	--	0.0	--	72.0	--	0.0	----	4.8	REPLACED MINOR HDWRE
AEBB10	RU	RR10	--	3.0	--	0.0	--	14.1	--	0.0	----	4.7	REMOVE/REPAIR/REPLACE
AEBB10	RU	RR18	--	6.0	--	0.0	--	12.3	--	0.0	----	2.1	SERVICED
AEBB10	RU	[ ]	--	1.0	--	0.0	--	3.0	--	0.0	----	3.0	NOT DESIGNATED
AEBB10	TY	----	--	8.0	--	0.0	--	65.5	--	0.0	----	8.2	TRANSFORMER
AEBB10	TY	RN03	--	6.0	--	0.0	--	59.5	--	0.0	----	9.9	REMOVED & REPLACED
AEBB10	TY	RN05	--	1.0	--	0.0	--	2.0	--	0.0	----	2.0	REPLACED
AEBB10	TY	RR10	--	1.0	--	0.0	--	4.0	--	0.0	----	4.0	REMOVE/REPAIR/REPLACE

APPENDIX K

Propulsion System Functional Hierarchy

A00000 . TRANSIT VEHICLE

AE0000 . . PROPULSION SYSTEM

AEA000 . . . MANUAL CONTROLS, T/L

AEAA00 . . . . MASTER CONTROLLER

AEAA01 . . . . . MASTER KEY SWITCH

AEAA02 . . . . . MODE SELECTOR

AEAA03 . . . . . DIRECTION SELECTOR

AEAA04 . . . . . RATE CONTROLLER

AEAA05 . . . . . RESET

AEAA06 . . . . . CIRCUIT PROTECTION

AEAB00 . . . . AUXILIARY CONTROLLER

AEAB01 . . . . . MASTER KEY SWITCH

AEAB02 . . . . . MODE SELECTOR

AEAB03 . . . . . DIRECTION SELECTOR

AEAB04 . . . . . RATE CONTROLLER

AEAB05 . . . . . RESET

AEAB06 . . . . . CIRCUIT PROTECTION

AEAC00 . . . . T/L PROPULSION/BRAKING

AEB000 . . . TRACTIVE EFFORT CONTROLLER

AEBA00 . . . . TRAINLINE DETECTORS

AEBB00 . . . . LOGIC AND LO-V CONTROL

AEBB01 . . . . . ANNUNCIATOR

AEBB02 . . . . . CUTOUT

AEBB03 . . . . . CIRCUIT PROTECTION

AEBB04 . . . . . ELECTROMOTIVE BRAKING CONTROL

AEBB05 . . . . . PERFORMANCE MODIFICATION

AEBB06 . . . . . DECODE/ENCODE

AEBB07 . . . . . POWER SUPPLY

AEBB08 . . . . . BUFFER/DRIVER/ISOLATION

AEBB09 . . . . . SPEED/TACH

AEBB10 . . . . . ACCELERATION CONTROL

AEBC00 . . . . HIGH VOLTAGE SWITCH GEAR

AEBC01 . . . . . BRAKE

AEBC02 . . . . . FIELD

AEBC03 . . . . . GROUND

AEBC04 . . . . . LINE

AEBC05 . . . . . LOOP

AEBC06 . . . . . OVERLOAD

AEBC07 . . . . . PARALLEL

AEBC08 . . . . . POWER BRAKE

AEBC09 . . . . . REVERSER

AEBC10 . . . . . SERIES

AEBC11 . . . . . CIRCUIT PROTECTION

AEBC12 . . . . . SERIES PARALLEL

AEBC13 . . . . . RETROGRESSION

AEBC14 . . . . . POWER

AEBD00 . . . . POWER REGULATION

AEBD01 . . . . . CAM

AEBD02 . . . . . SOLID STATE

AEBD03 . . . . . ACCELERATOR

AEBE00 . . . . LINE FILTER

AEC000 . . . VENTILATION-COOLING

AECA00 . . . . BLOWERS

AECB00 . . . . CONTROLS

AECC00 . . . . FILTERS

AECD00 . . . . DUCTING

AECE00 . . . . CIRCUIT PROTECTION

AED000 . . . TRACTION MOTOR ASSY

AEDA00 . . . . FIELD

AEDA01 . . . . . MAIN

AEDA02 . . . . . COMMUTATING

AEDB00 . . . . ARMATURE ASSY

AEDB01 . . . . . COMMUTATOR ASSY

AEDC00 . . . . BRUSHHOLDER ASSY

AEDD00 . . . . BRUSH

AEDF00 . . . . BEARINGS

APPENDIX L

Universal Component Codes

UNIVERSAL COMPONENT CODES

CODE	DESCRIPTION
00	NOT DESIGNATED
AA	ABSORBER
AB	ACCELERATOR
AC	ACCELEROMETER
AD	ACCUMULATOR
AX	ACTUATOR
AE	ADAPTER
AF	ALARM
AH	ALTERNATOR
AJ	AMMETER
AK	AMPLIFIER
AL	ANCHOR
AM	ANGLE IRON
AN	ANNUNCIATOR
AP	ANODE
AR	ANTENNA
AS	ARCHORN
AT	ARM
AU	ARMATURE
AV	ARRESTOR
AW	AXLE
BA	BAFFLE
BB	BALLAST
BC	BAND
BD	BAR
BE	BARRIER
BF	BASE
BH	BASEPLATE
BJ	BATTEN
BK	BATTERY
BL	BEAM
BM	BEARING
BN	BELL
BP	BELLOWS
BR	BELT
BS	BEZEL
BT	BLADDER
BU	BLADE
BV	BLOCK
BW	BLOWER
BX	BOARD
BY	BODY
BZ	BOLSTER
B0	BOLT
B1	BOOT
B2	BOX
B3	BRACE
B4	BRACKET
B5	BRAKE
B6	BREATHER
B7	BRIDGE
B8	BRUSH
B9	BRUSHHOLDER
3A	BUFFER
3B	BULB
3C	BULKHEAD
3D	BUMPER
3E	BUS
3F	BUS BAR
3H	BUSHING
3J	BUZZER
CA	CAB
CB	CABINET
CC	CABLE
CD	CALIPER
CE	CAM
CF	CAM SWITCH
CH	CAP
CJ	CAPACITOR
CK	CARD
CL	CARRIER
CM	CARTRIDGE
CN	CASE
CP	CASEMENT
CR	CASING
CS	CASTING
CT	CATCH
CU	CATHODE
CV	CELL
CW	CHAIN
CX	CHANNEL
CY	CHARGER
CZ	CHASSIS
C0	CHECK
C1	CHOKE
C2	CHOPPER
C3	CHUTE
C4	CIRCUIT
C5	CIRCUIT BREAKER
C6	COCK
C7	CLAMP
C8	CLEAT
C9	CLEVIS
6A	CLEVIS PIN
6B	CLIP
6C	CLOCK
6D	CLOSER

UNIVERSAL COMPONENT CODES

CODE	DESCRIPTION
6E	CLUTCH
4B	COIL
6F	COLLAR
6H	COLLECTOR
6J	COMMUTATOR
6K	COMPRESSOR
6L	CONDENSOR
6M	CONDUIT
6N	CONNECTOR
6P	CONSOLE
6R	CONTACT
6S	CONTACTOR
6T	CONTAINER
6U	CONTROL
6V	CONTROLLER
6W	CONVERTER
6X	CORD
6Y	CORE
6Z	COTTER PIN
60	COUNTER
61	COUPLER
62	COUPLING
63	COVER
64	CRADLE
65	CRANK
66	CRANKCASE
67	CRANKSHAFT
68	CURTAIN
69	CUSHION
4A	CYLINDER
DA	DAMPER
DB	DECAL
DC	DECODER
DD	DEHYDRATOR
DE	DEMODULATOR
DZ	DESICCANT
DF	DETECTOR
DH	DIAPHRAGM
DJ	DIFFERENTIAL
DK	DIFFUSER
DL	DIODE
DM	DISC
DN	DISCRIMINATOR
DP	DISPENSER
DR	DISPLAY
DS	DISSIPATOR
DT	DOOR
DU	DRAWER
DV	DRIER
DW	DRIVER
DX	DRUM
DY	DUCT
EA	ELEMENT
EB	ENCLOSURE
EC	ENCODER
ED	ENGINE
EE	EQUALIZER
EF	EVAPORATOR
EH	EXCITER
EJ	EXTINGUISHER
FA	FAN
FC	FIELD
FD	FILTER
FE	FIN
FF	FINGER
FH	FINGER BOARD
FJ	FITTING
FK	FIXTURE
FL	FLANGE
FM	FLASHBOARD
FN	FLOAT
FP	FLUID
FR	FLYWHEEL
FS	FOLLOWER
FT	FRAME
FU	FUEL
FV	FUSE
FW	FUSE BLOCK
9A	GASKET
9B	GAUGE
9C	GEAR
9D	GEARBOX
9E	GENERATOR
9F	GLAND
9H	GLASS
9J	GLAZING
9K	GONG
9L	GOVERNOR
9M	GRID
9N	GRILL
9P	GROMMET
9R	GUARD
9S	GUIDE
HA	HAMMER
HB	HANDLE

CODE	DESCRIPTION
HC	HANDSET
HD	HANGER
HE	HARDWARE
HF	HARNESS
HH	HEAD
HJ	HEADSET
HK	HEAT EXCHANGER
HL	HEAT SINK
HM	HEATER
HN	HINGE
HP	HOLDER
HR	HOPPER
HS	HORN
HT	HOSE
HU	HOUSING
HV	HUB
1A	IMPELLER
1B	INDICATOR
1C	INDUCTOR
1D	INSERT
1E	INSULATION
1F	INSULATOR
1H	I.C.
1J	INTERLOCK
1K	INTERPOLE
1L	INVERTER
JA	JACK
JB	JOINT
JC	JOURNAL
JD	JUMPER
KA	KEEPER
KB	KEY
KC	KIT
KD	KNOB
LA	LAMINATION
LB	LAMP
LC	LATCH
LD	LEAD
LE	LENS
LF	LEVER
LH	LIGHT
LJ	LINING
LK	LINK
LL	LINKAGE
LM	LOCK
LN	LOGIC
LP	LOUVER
LR	LUBRICANT
LS	LUG
MA	MAGAZINE
MB	MAGNET
MC	MAGNET VALVE
MD	MANIFOLD
ME	MARKER
MF	METER
MH	MICROPHONE
MJ	MIXER
MK	MODEM
ML	MODULATOR
MM	MODULE
MN	MOLDING
MP	MONITOR
MR	MOTOR
MS	MOTOR-ALTERNATOR
MT	MOTOR-GENERATOR
MU	MOUNT
MV	MUFFLER
NA	NIPPLE
NB	NUT
NC	NUTSERT
0A	ODOMETER
0B	OPERATOR
0C	ORIFICE
0D	O-RING
0E	OSCILLATOR
0F	OUTLET
PA	PACKING
PB	PAD
PC	PADDLE
PD	PADLOCK
PE	PANEL
PF	PANTOGRAPH
PH	PAWL
PJ	PC BOARD (CARD)
PK	PEDESTAL
PL	PETCOCK
PM	PIN
PN	PINION
PP	PIPE
PR	PIPING
PS	PISTON
PT	PISTON RING

UNIVERSAL COMPONENT CODES

CODE	DESCRIPTION
PU	PIVOT
PV	PLATE
PW	PLENUM
PX	PLUG
PY	PLUNGER
PZ	POLE
P0	POST
P1	POWER SUPPLY
P2	PRIMER
P3	PRINTER
P4	PROTECTOR
P5	PULLEY
P6	PUMP
RA	RACE
RB	RACK
RC	RADIO
RD	RADOME
RE	RAIL
RF	RAMP
RH	RATCHET
RJ	REACTOR
RK	RECEIVER
RL	RECEPTACLE
RM	RECTIFIER
RN	REDUCER
RP	REFLECTOR
RR	REFRIGERANT
RS	REGISTER
RT	REGULATOR
RU	RELAY
RV	RELAY DRIVER
RW	REPEATER
RX	RESERVOIR
RY	RESISTOR
RZ	RESTRICTOR
R0	RETAINER
R1	RETURN
R2	REVERSER
R3	RHEOSTAT
R4	RIBBON
R5	RING
R6	RISER
R7	RIVET
R8	ROCKER
R9	ROD
8A	ROLLER
8C	ROPE
8B	ROTOR

CODE	DESCRIPTION
5T	SANDER
SA	SCREEN
SB	SCREW
SC	SCROLL
5U	SCRUBBER
SD	SEAL
SE	SEALANT
SF	SEAT
SH	SENSITIVE EDGE
SJ	SENSOR
SK	SEPARATOR
SL	SHADE
SM	SHAFT
SN	SHELL
SP	SHIELD
SR	SHIM
SS	SHOE
ST	SHROUD
SU	SHUNT
SV	SHUTTER
SW	SIGN
SX	SLIP RING
SY	SOCKET
SZ	SOLENOID
S0	SOLENOID VALVE
S1	SNUBBER
S2	SPACER
S3	SPEAKER
S4	SPEEDOMETER
S5	SPIDER
S6	SPLINE
S7	SPRING
S8	STABILIZER
S9	STANCHION
5A	STARTER
5B	STARWHEEL
5C	STATOR
5D	STIFFENER
5E	STOP
5F	STRAIN RELIEF
5H	STRAINER
5J	STRAP
5K	STRIP
5L	STUD
5M	SUMP
5N	SUPPORT
5P	SUPPRESSOR
5R	SWITCH
5S	SWITCHBOARD

UNIVERSAL COMPONENT CODES

CODE	DESCRIPTION
TA	TACHOMETER
TB	TANK
TC	TAPE
TD	TELEPHONE
TE	TERMINAL
TF	TERMINAL BOARD
TH	TROLLEY POLE
TJ	THERMISTOR
TK	THERMOSTAT
TL	THRESHOLD
TM	THROWER
TN	THYRECTOR
TP	THYRISTOR
TR	TIE
TS	TIMER
TT	TIP
TU	TIRE
TV	TRACK
TW	TRANSDUCER
TX	TRANSDUCTOR
TY	TRANSFORMER
TZ	TRANSISTOR
T0	TRANSMITTER
T1	TRANSPORT
T2	TRAP
T3	TRAY
T4	TREAD
T5	TRIM
T6	TRIP
T7	TRUNNION
T8	TUBE
T9	TUBING
7A	TURBINE
7B	TURNBUCKLE
UA	UNION
VA	VALIDATOR
VB	VALVE
VC	VANE
VD	VARISTOR
VE	VENT
VF	VISOR
VH	VOLTMETER
VJ	VOLTRAP
WA	WASHER
WB	WEDGE
WC	WEIGHT
WD	WELDMENT
WE	WHEEL
WF	WINDING
WH	WINDOW
WJ	WIPER
WK	WIRE
WL	WIREWAY
WM	WIRING
YA	YOKE
ZZ	MISCELLANEOUS

APPENDIX M

Generic Defect Codes

D-CODE	CODE DEFINITION	WMATA	PATCO
D000	DEFECT CODES		
DC00	CLIMATIC/CORROSION		
DC10	CONDENSATION		
DC11	DAMP		
DC12	MOISTURE PRESENT	623	
DC13	WET		
DC20	CORROSION		
DC21	CORRODED	391	115
DC22	FROZEN	492	152
DC22	FROZEN		194
DC23	PITTED	713	163
DC24	RUSTED	759	
DD00	DAMAGE		
DD10	ACCIDENT/COLLISION		
DD11	ACCIDENT, COLLISION	301	140
DD12	DAMAGE, DERAIL	415	149
DD13	DROPPED		
DD20	GENERAL		
DD21	CUT	406	117
DD22	DAMAGE, SEC AC		
DD23	DAMAGED		
DD24	DESTROYED	414	
DD25	FIRE DAMAGE/SMOKE	443	191
			282
DD26	FOREIGN OBJECT DAMAGE	486	
DD27	FOREIGN OBJECT OBSTRUCT	483	123
DD28	LEAKING	583	133
DD29	OBSTRUCTED		
DD2A	PUNCTURED	731	
DD2B	TORN	826	
DD30	VANDALISM		
DD31	BROKEN GLASS	517	199
DD32	DEFECTS, FLOOR/SEATS		285
DD33	GRAFFITI	520	
DD34	VANDALISM		0300
DE00	ELECTRICAL		
DE10	BAD CONNECTION		

D-CODE	CODE DEFINITION	WMATA	PATCO
DE11	BAD SOLDER CONNECTION	320	161
DE12	DEFECTIVE CANNON PLUG	350	
DE13	DEFECTIVE WIRING		144
DE14	LOOSE CONNECTION, NONE	381	157
DE15	PUSHED PIN		
DE20	GENERAL		
DE21	BURNED CONTACT	383	
DE22	DEFECT, POTTING MATTER	719	
DE23	DEFECTIVE CAPACITOR		148
DE24	DEFECTIVE CONDENSOR		147
DE25	DEFECTIVE DIODE		122
DE26	DEFECTIVE RELAY		165
DE27	DEFECTIVE RESISTOR		166
DE28	DEFECTIVE TRANSISTOR		136
DE29	DIRTY CONTACTS	380	171
DE33	CONFLICTING CAB SIGNALS		266
DE2A	FLASHED/ARCING	317	188
			192
DE2B	INSULATION BREAKDOWN	553	153
DE2C	INTERLOCK MALFUNCTION	556	
DE2D	LOST THIRD RAIL POWER	590	
DE2E	MALFUNCTION, RELAY COIL	753	
DE2F	MISC ELECTRICAL TRBLE		269
DE2H	NO PRIMARY POWER		158
DE2J	OVERLOAD		206
DE2K	TRIPPED	832	137
DE2L	TRIPPED, CIRCUIT BREAKER	371	210
DE2M	TROUBLE, TRAINLINE		198
DE2N	DEFECTIVE SWITCH		290
DE2P	DEFECTIVE CONTACT TIP		295
DE30	MISWIRED		
DE31	CROSSED LEADS	397	
DE32	MISWIRED/CONNECT INCORR	377	116
DE33	CONFLICTING CAB SIGNALS		266
DE40	MOTOR-SPECIFIC		
DE41	DAMAGED ARMATURE	309	156
DE42	DAMAGED COMMUTATOR	399	
DE43	HIGH MICA	613	293
DE44	LOW MICA	619	294
DE45	OPEN AT RISER, COMM		113
DE46	OUT OF ROUND	679	
DE47	OUT OF ROUND, COMM		114
DE48	OVERLOADED MOTOR	626	202
DE49	WORN BRUSHES	335	267
DE50	OPEN CIRCUIT		
DE51	BLOWN FUSE	508	124
DE52	BROKEN LEAD	580	

D-CODE	CODE DEFINITION	WMATA	PATCO
DE53	BURNED OUT BULB	347	
DE54	OPEN CIRCUIT	368	169
DE55	OPEN FILAMENT		
DE60	OUT OF SPECIFICATION		
DE61	DISTORTED OUTPUT		
DE62	EXCESSIVE HUM/STATIC	423	
DE63	HIGH INPUT		
DE64	HIGH OUTPUT		
DE65	HIGH VOLTAGE	531	
DE66	INCORRECT CAPACITANCE	356	
DE67	INCORRECT CURRENT	401	
DE68	INCORRECT FREQUENCY	489	
DE69	INCORRECT SIGNAL	557	200
DE6A	INCORRECT TIME DELAY	823	
DE6B	INCORRECT VOLTAGE	860	
DE6C	LOSS OF GAIN		
DE6D	LOW INPUT		
DE6E	LOW OUTPUT		
DE6F	LOW VOLTAGE	598	
DE6H	NO HIGH TONE	660	
DE6J	NO INPUT	651	
DE6K	NO LOW TONE	663	
DE6L	NO OUTPUT	648	
DE6M	OVERSPEED	697	203
DE70	SHORTED		
DE71	CHANGE OF VALUE	359	
DE72	GROUNDED	516	126
DE73	SHORTED	791	135
DE74	WELDED, CONTACTS	386	109
DE76	DEFECTIVE I.C.		298
DM00	PHYSICAL/MECHANICAL		
DM10	BROKEN/CRACKED		
DM11	BROKEN SEAL	776	
DM12	BROKEN SPRING	341	162
DM13	BROKEN/SHEARED	338	108
DM14	CRACKED	394	
DM15	CRACKS, THERMAL	820	
DM16	RUPTURED	349	132
DM17	SHEARED SHAFT	788	
DM20	CONTAMINATED, SURFACE		
DM21	BUILDUP SCALE	770	
DM22	CONTAMINATED	387	172
DM23	DIRTY	419	120
DM24	STICKY/GUMMY	812	

D-CODE	CODE DEFINITION	WMATA	PATCO
DM30	DEFECTIVE		
DM31	DEFECTIVE		
DM32	DEFECTIVE BEARING	323	104
DM33	DEFECTIVE FUEL LINE		
DM34	DEFECTIVE GASKET	510	125
DM35	DEFECTIVE GROMMET	513	
DM36	DEFECTIVE PACKING	710	
DM37	DELAMINATED	410	182
DM38	DETERIORATED	416	
DM39	PULLED APART	728	164
DM3A	ROUGH/SCORED	750	131
DM3B	SEPARATED	779	
DM3C	STRIPPED	815	
DM3D	DEFECTIVE SHUNT		208
DM40	DEFORMED/DISTORTED		
DM41	BENT/BUCKLED/DENT/TWIST	326	105
DM42	CRUSHED/CRIMPED	403	179
DM43	DEFORMED/DISTORTED	411	
DM44	OUT OF BAL/TOL	676	146
DM45	STRETCHED		
DM46	UNBALANCED	856	205
DM50	GENERAL		
DM51	CHIPPED/PEELING	366	
DM52	INCORRECT TORQUE	554	
DM53	LOOSE	589	155
DM54	LOOSE/DAMAGED COMM HDW	592	
DM55	LOST/MISSING	595	145
DM56	MISSING MINOR HDW	616	107
DM57	UNSEATED	859	138
DM58	WEAK	870	
DM59	WORN HOLES/OVERSIZE	533	
DM5A	WORN, BRAKE RIGGING		
DM5B	WORN	899	143
DM5C	WORN BEYOND LIMITS	899	
DM60	JAMMED/STUCK		
DM61	BOUND, BOX		
DM62	JAM, COIN		176
DM63	JAM, PAPER/TRANSFER		180
DM64	JAM, TICKET		177
DM65	JAM/BINDING/LOCKED	332	106
DM66	SEIZED		
DM67	STICKING	809	
DM68	TIGHT		170
DM70	THERMAL		
DM71	BLISTERED		
DM72	BURNED	329	111
DM73	CARBONIZED		

D-CODE	CODE DEFINITION	WMATA	PATCO
DM74	CRYSTALIZED	409	174
DM75	HOT/OVERHEATED	536	130
DM76	THERMAL		204
DM77	DEFECTIVE INTER LOCK		296
DM78	DEFECTIVE TRANSFORMER		299
DN00	NO DEFECT		
DN10	CND/NTF		
DN11	FAILURE, CANNOT DUP	353	
DN12	NO DEFECT NOTED	654	
DN13	NO DEFECT, OPER ERROR	636	
DN14	SELF-CLEAR		
DN20	INSPECTION/TEST		
DN21	INSPECTION, SPECIAL		
DN21	INSPECTION, SPECIAL		
DN22	NO DEFECT, COMP REM/TEST	633	185
DN23	TRACK TEST REQUIREMENT		
DN30	SCHEDULED MAINT		
DN31	INIT CONSTRUCTION/FAB	560	
DN32	NO DEFECT, PROG/MAIN	630	119
DN33	NO DEFECT, SCHED MOD/MAI	639	118
DN34	NO DEFECT, TIME CHG REM	642	
DP00	PNEUMATIC/HYDRAULIC		
DP10	CONTAMINATED		
DP11	AIR IN SYSTEM	312	
DP12	CONTAMINATED, OIL	670	
DP20	DEFECTIVE		
DP21	DEFECTIVE AIR BELLOWS		258
DP22	DEFECTIVE PIPING		
DP23	DRY	418	183
DP30	GENERAL		
DP31	EXCESSIVE LUB/OIL	420	184
DP32	EXCESSIVE REFRIGERANT	429	
DP33	OFF, FITTING		
DP34	OVERAGE		167
DP35	OVERSERVICED	694	
DP40	LOW/INSUFFICIENT		
DP41	LOW FLUID LEVEL	480	151
DP42	LOW LUBRICANT	603	
DP43	LOW REFRIGERANT	602	297
DP44	LOW TRANS OIL		

D-CODE	CODE DEFINITION	WMATA	PATCO
DP50	RESTRICTED		
DP51	RESTRICTED		
DP52	RESTRICTED AIR FLOW	315	160
DS00	SYSTEM OPERATION		
DS10	ERRATIC		
DS11	CHATTERING	365	
DS12	ERRATIC OPERATION	425	
DS12	ERRATIC OPERATION		
DS12	ERRATIC OPERATION		
DS12	ERRATIC OPERATION		
DS12	ERRATIC OPERATION		
DS13	INTERMITTENT OPER	559	154
DS14	MOTION, LATERAL		139
DS15	MOTION, VERTICAL		142
DS16	NOISY	645	281
DS20	FAILURE TO OPERATE		
DS21	CLOSE, WILL NOT	879	232
DS22	DARK CAR		264
DS23	DEAD CAR		263
DS24	FAILED, BRAKE CHARGE		216
DS25	FAILED, BRAKE RELEASE		215
DS26	FAILS TO OPERATE	441	
DS27	FAILURE, A/C		134
DS28	FAILURE, ASSOCIATED		
DS29	FAILURE, ATC		255
DS2A	FAILURE, ATO		250
DS2B	FAILURE, CAB SIGNAL		251
DS2C	FAILURE, INTERNAL	562	
DS2D	INOP CHANNEL SELECTOR	362	
DS2E	NO DYNAMIC BRAKE		212
DS2F	NO GO INDICATION	657	
DS2H	NO PRESSURE		
DS2J	NO PUBLIC ADDRESS		175
DS2K	OPEN, WILL NOT	885	231
DS2K	OPEN, WILL NOT		
DS2L	OPERATE, WILL NOT	682	141
DS2M	RECEIVE, WILL NOT		186
DS2N	RECHARGE, WILL NOT	888	
DS2P	RECOVER, WILL NOT	876	
DS2R	STATION BYPASSED		129
DS2S	STATION STOP LONG		112
DS2T	STATION STOP SHORT		127
DS2U	TRANSMIT, WILL NOT	882	187
DS2V	TURN OFF, WILL NOT	894	
DS2W	TURN ON, WILL NOT	891	
DS2X	UNABLE TO MOVE	850	

D-CODE	CODE DEFINITION	WMATA	PATCO
DS30	GENERAL		
DS31	FALSE REJECTION		
DS32	FAULTY AUDIO	319	121
DS33	FREE-WHEELING		
DS34	BRAKE PENALTY		265
DS35	BRAKE FAULT		289
DS40	OUT OF SPECIFICATION		
DS41	BRAKES, IN EMERGENCY		213
DS42	COLD CAR		243
DS43	ERROR, DISPLAY READOUT	417	
DS44	HIGH PRESSURE	530	128
DS45	HIGH TEMPERATURE	532	
DS46	LOW		181
DS47	LOW COMPRESSION	389	173
DS47	LOW COMPRESSION		201
DS48	LOW PRESSURE	601	211
DS49	LOW TEMPERATURE	599	
DS4A	POOR BRAKING		214
DS4B	SLOW	797	
DS4C	SLOW ACCELERATION		159
DS4C	SLOW ACCLERATION		291
DS4D	SLOW BRAKE RELEASE		102
DS4E	SLUGGISH	800	
DS4F	SQUELCH	782	
DS4G	DEFECTIVE THERMOSTAT		209
DS4H	FAILS TO MEET SPEC		292
DS4J	EXCESSIVE POWER		
DS4K	P-SIG PROBLEM		
DW00	WHEELS		
DW10	FLANGE		
DW11	CHIPPED FLANGE	466	
DW12	CUT FLANGE	469	
DW13	HIGH FLANGE	471	103
DW14	LOW FLANGE		
DW15	SHARP FLANGE	474	
DW16	THIN FLANGE	477	195
DW20	FLATS		
DW21	FLAT		
DW22	FLAT SPOT		190
DW23	FLAT SPOT, 1.5-2.5"	454	
DW24	FLAT SPOT, 2.5-3.5"	457	
DW25	FLAT SPOT, 3.5-4.5"	460	
DW26	FLAT SPOT, 4.5-6.5"	463	
DW27	FLAT SPOT, <1.5"	451	
DW28	FLAT SPOT, >6"		

D-CODE	CODE DEFINITION	WMATA	PATCO
DW30	GENERAL		
DW31	CONDEMNED, WHEELS		197
DW32	LIMIT, WHEEL	586	
DW33	MISMATCHED WHEELS		
DW34	EXCESSIVE SLIP		207
DW40	PROFILE		
DW41	CONTOUR, TREAD OUT OF		
DW42	DEFECTIVE WHEEL TREAD		196
DW43	PROFILE BAD		
DZ00	MISCELLANEOUS		
DZ10	ADMINISTRATIVE		
DZ11	CANNIBALIZED	355	
DZ12	CONDEMNED, ADMIN	303	
DZ13	FAILED SAFETY TEST	442	0193
DZ14	NOT REPORTED		
DZ15	NUMBER CHANGE, CAR		
DZ16	OFF, TRUCK (TEMP)		
DZ17	SHORTAGE		168
DZ18	UNKNOWN		
DZ19	REM FOR OTHER MAIN ACT	735	
DZ20	EQUIPMENT		
DZ21	DEFECT, CONSOLE		252
DZ22	DEFECT, COUPLER		288
DZ23	DEFECTIVE HORN		287
DZ24	DEFECTIVE INDENTRA		110
DZ25	FAILS DIAGNOSTIC TEST	440	
DZ26	FIRE EXTING EMPTY	446	
DZ27	LIGHTS, EXTERIOR		253
DZ29	LIGHTS, INTERIOR		254
DZ1A	SUBASSEMBLY FAILURE	805	
DZ2A	PROBLEM, ENGINE		
DZ30	GENERAL		
DZ31	CLOSED		
DZ32	MERCURY SPLIT		
DZ33	MISCELLANEOUS DEFECTS		189
DZ34	OPEN	673	178
DZ35	OVERCHARGED	691	
DZ36	SECONDARY		
DZ37	UNABLE TO ADJUST	853	
DZ41	HUMAN ERROR		
DZ42	IMPROPER ADJUSTMENT	300	101
DZ43	IMPROPER SPACING/CLEAR	550	
DZ44	INCORRECTLY ASSEMBLED	306	150
DZ45	MISMATCHED PAIR		

D-CODE	CODE DEFINITION	WMATA	PATCO
DZ46	STUCK IN GAP, TRAIN	833	
DZ47	WRONG PART		
DZ50	INDICATORS/SIGNALS		
DZ51	BLUE LIGHT		
DZ52	CONDUCTOR INDICATOR		
DZ53	GUARD LIGHT		
DZ54	MOTORMAN INDICATOR		
DZ55	MISC INDICATORS		233

APPENDIX N

Generic Repair Codes

R-CODE	CODE DEFINITION	WMATA	PATCO
R000	REPAIR CODES		
RA00	ADDITION		
RA01	ADDED		26
RA02	ADDED ANTI-FREEZE		
RA03	ADDED ENGINE OIL		
RA04	ADDED FLUID		04
RA05	ADDED OIL		14
RA06	CHARGED WITH REFRIGERANT		22
RA07	LUBRICATED		37
RA08	CHECK SOLUTION		32
RB00	ADJUSTMENT		
RB01	ADJUSTED	22	01
RB02	ALIGNED		24
RB03	SHIMMED		55
RB04	TIGHTENED		65
RB05	CALIBRATED		
RC00	ADMINISTRATIVE		
RC01	ADDITIONAL MATERIAL REQ		
RC02	CAR NOT YET IN SHOP		83
RC03	COMPLETED PREVIOUSLY	35	
RC04	COMPLETED PROGRAM		
RC05	COMPLETED TEST		
RC06	DEFERRED REPAIR		88
RC07	INSUFFICIENT TIME		81
RC08	JOB INCOMPLETE		
RC09	LABOR NOT AVAILABLE		80
RC10	NO DEFECT FOUND		99
RC11	NO MATERIAL AVAILABLE		82
RC12	OPERATOR ERROR		98
RC13	REMOVED FOR OTHER USE		74
RC14	REPAIRED BY VENDOR		
RC15	SCRAPPED	97	
RC16	TRANSFER JOB SITE		
RC17	TRANSFER TO MAIN SHOP		
RC18	VENDOR TO REPAIR	93	85
RC19	WARRANTY REPAIR		
RC20	WAITING FOR CAR MOVE		87

R-CODE	CODE DEFINITION	WMATA	PATCO
RC21	WAITING FOR CAR SHIFT		86
RC22	WAITING FOR TRACK TEST		84
RC23	WRONG PART		
RC24	WAIVED REPAIR		
RD00	DRAIN / PURGE		
RD01	DRAINED REFRIGERANT		
RD02	DRAINED TANKS		
RD03	EVACUATED		
RD04	PURGED		18
RE00	FAB / MODIFY / REBUILD		
RE01	FABRICATE	85	
RE02	MODIFIED	55	38
RE03	OVERHAULED	75	31
			58
RE04	OVERHAULED TRUCK		
RE05	REBUILT		97
RF00	FILTER / RENEW		
RF01	FILTERED OIL		78
RF02	RENEW SOLUTION		28
RJ00	INSPECTION / TEST		
RJ01	DIAGNOSTIC TESTED		
RJ02	INSPECTED & FOUND OK	11	67
RJ03	ORIFICE TEST		35
RJ04	QC TEST - MOTOR BRUSH		
RJ05	TESTED		03
RJ06	TRACK TEST		89
RJ07	TROUBLE SHOOTING	33	12
RJ08	VOLTAGE CHECK		30
RJ09	CURRENT CHECK		
RM00	MISCELLANEOUS		
RM01	JUMPER		79
RM02	MISC REPAIRS		47

R-CODE	CODE DEFINITION	WMATA	PATCO
RM03	PRELOADED		
RM04	ACCIDENT REPAIR		
RM05	VANDALISM REPAIR		
RM06	RERAILED		60
RN00	REMOVAL / REPLACEMENT		
RN01	CHANGED OIL		77
RN02	REMOVED		
RN03	REMOVED & REPLACED	21	75
RN04	REMOVED TO MAKE REPAIRS	15	73
RN05	REPLACED	20	76
RN06	REPLACED DIODE		42
RN07	REPLACED GASKET		
RN08	REPLACED GROMMET		
RN09	REPLACED MINOR HARDWARE	41	51
RN10	REPLACED RELAY	25	08
RN11	REPLACED RESISTOR		43
RN12	REPLACED SPRING		61
RN13	REPLACED TERMINAL		16
RN14	REPLACED TRANSISTOR		02
RN15	REPLACED, BRUSHES		36
RN16	REPLACED, NEW		
RN17	REPLACED, RECONDITIONED		
RP00	REMOVE OBSTRUCTION		
RP01	CLEARED JAM		29
RP02	REMOVED BAD COIN		20
RP03	REMOVED BAD TICKET		21
RP04	REMOVED FOREIGN OBJECT		17
RP05	CLEARED GROUNDS		56
RR00	REPAIR / CORRECTION		
RR01	CONNECTED		10
RR02	DISCHARGE/RECHARGE		06
RR03	DISCONNECTED		27
RR04	FREED BINDING PARTS		19
RR05	PACKED		
RR06	RE-BONDED		
RR07	REASSEMBLED CORRECTLY		
RR08	RECOUPLED		15
RR09	REJOINED MERCURY		
RR10	REMOVE/REPAIR/REPLACED	25	13
RR11	REPAIRED		
RR12	REPAIRED FUEL LINE		

R-CODE	CODE DEFINITION	WMATA	PATCO
RR13	REPAIRED PIPING		
RR14	RESET		07
RR15	REWIRED		54
RR16	RIVETED		52
RR17	SEALED		40
RR18	SERVICED	23	
RR19	SET		53
RR20	SOLDERED		57
RR21	SPLICED		59
RR22	STANDARD TRUCK REPAIRS		
RR23	STRAIGHTEN		63
RR24	TEST & REPAIR		62
RR25	THAWED		64
RR26	WELDED		66
RR27	WIRING REPLACED/SPLICED		
RR28	DISASSEMBLE AND/OR BREAKDOWN		68
RS00	SURFACE TREATMENT		
RS01	BURNISHED/POLISHED		05
RS02	CLEANED		09
RS03	DRESSED & FILED		11
RS04	GROUND/TURNED		48
RS05	INSULATED		33
RS06	MACHINED	76	34
RS07	PAINTED/COATED		39
RS08	PATCHED		41
RS09	REBORED CYLINDER		
RS10	TURNED/UNDERCUT		25
RS11	WHEEL TRUED BY HAND		
RS12	WHEEL TRUED OFF CAR		
RS13	WHEEL TRUED ON CAR		72
RS14	WHEEL TRUED ON LATHE		23
RS15	WHEEL PRESSED OFF		44
RS16	UPHOLSTERED, PATCHED OR SEWN		
RS17	WHEEL BORED		46
RS18	WHEEL MOUNTED		45

APPENDIX O

PATCO Generic Parts List

GENERIC PART NO	UCC	TYPE CODE	PATCO 10/18/82 COMPONENT DESCRIPTION AND TYPE/USE	PROPERTY PART NUMBER
AEAA00	6V	AF	CONTROLLER, ASSY *MASTER	4TV
AEAA00	KD	00	KNOB *CONTROLLER	4TV0201
AEAA00	5R	00	SWITCH	4TV09
AEAA00	6B	00	CLIP *GRAY SWITCH	4TV0901
AEAA00	RY	VA	RESISTOR, VARIABLE	4TV10
AEAA00	AT	00	ARM *POT CONTACT ASSY	4TV1001
AEAA00	S7	CJ	SPRING, COMPRESSION *CONT ARM	4TV1002
AEAA00	PV	00	PLATE *POTENTIOMETER DRIVE	4TV11
AEAA03	CE	AF	CAM, ASSY *REVERSE	4TV05
AEAA03	DM	00	DISC *DETENT REVERSE CAM	4TV0501
AEAA03	SM	00	SHAFT *W/GEAR KEY P N REV	4TV0804
AEAA04	CE	AF	CAM, ASSY *THROTTLE	4TV03
AEAA04	S7	00	SPRING *THROTTLE CAM	4TV0302
AEAA04	SM	00	SHAFT *W/GEAR & KEY THRTTL	4TV08
AEAA04	9C	00	GEAR *THROTTLE SHAFT	4TV0801
AEAA04	BM	TJ	BEARING, THRUST *THRTTL SHAFT	4TV0802
AEAA04	S7	00	SPRING *STUD THROTTLE SHAFT	4TV0803
AEB000	PE	00	PANEL *PART OF AUX CNTL GRP	42K
AEB000	R3	00	RHEOSTAT *175 OHMS AUX CNTL GRP	42M
AEB000	BV	00	BLOCK *SWITCH ASSY TIMING RELAY	43G0901
AEBB00	RU	AF	RELAY, ASSY *PROPULSION ETC	43B
AEBB00	RU	00	RELAY *BRAKE, BR-GEG 9323	43B01
AEBB00	4B	00	COIL *OPERATING BR	43B0101
AEBB00	6R	MH	CONTACT, MOVABLE *BR	43B0102
AEBB00	6R	SN	CONTACT, STATIONARY *INNER BR	43B0103
AEBB00	6R	SN	CONTACT, STATIONARY *OUTER BR	43B0104
AEBB00	5N	SN	SUPPORT, STATIONARY *BR	43B0105
AEBB00	S7	CJ	SPRING, COMPRESSION *CONTACT FINGER BR	43B0106
AEBB00	S7	CJ	SPRING, COMPRESSION *ARMATURE BR	43B0107
AEBB00	RU	00	RELAY *BRAKE CHECK BCR	43B02
AEBB00	RU	00	RELAY *CKT BRKR RESET CBR	43B03
AEBB00	4B	00	COIL *OPERATING CBR	43B0301
AEBB00	RU	00	RELAY *CRT CHECK CCR	43B04
AEBB00	RU	00	RELAY *CURRENT LEVEL CLR	43B05
AEBB00	RU	00	RELAY *CARWASH CWR	43B06
AEBB00	RU	00	RELAY *DYN GRID CHECK DGC	43B07
AEBB00	4B	00	COIL *OPERATING DGC	43B0701
AEBB00	S7	CJ	SPRING, COMPRESSION *ARMATURE DGC	43B0702
AEBB00	6R	SN	CONTACT, STATIONARY *DGC	43B0703
AEBB00	5N	00	SUPPORT *CONTACT DGC	43B0705
AEBB00	SD	00	SCREW *ARMATURE ADJUSTING DGC	43B0706
AEBB00	6F	00	COLLAR *ADJUSTING SCREW DGC	43B0707
AEBB00	RU	00	RELAY *DIRECTIONAL DIR	43B08
AEBB00	RU	00	RELAY *DIFFERENTIAL DR	43B09

GENERIC PART NO	UCC	TYPE CODE	PATCO 10/18/02 COMPONENT DESCRIPTION AND TYPE/USE	PROPERTY PART NUMBER
AEBB00	5R	00	SWITCH *W/SUPPORTS DR	43B0901
AEBB00	RU	00	RELAY *EMERGENCY ER	43B10
AEBB00	RU	00	RELAY *FIELD "A" FAR	43B11
AEBB00	RU	00	RELAY *FIELD "B" FBR	43B12
AEBB00	RU	TL	RELAY, TIME DELAY *GRID PROTECTION	43B13
AEBB00	RU	00	RELAY *TRANSITION LRTR	43B14
AEBB00	RU	00	RELAY *PARALLEL PAR	43B15
AEBB00	RU	00	RELAY *PWR CHECK PC	43B16
AEBB00	5R	00	SWITCH *REED PC	43B1901
AEBB00	RU	00	RELAY *PILOT MTR PMR	43B17
AEBB00	RU	00	RELAY *POWER PR	43B18
AEBB00	RU	00	RELAY *POTENTIAL PTR	43B19
AEBB00	RY	AB	RESISTOR, ADJUSTABLE *PTR	43B1905A
AEBB00	RY	FC	RESISTOR, FIXED *PTR	43B1905B
AEBB00	3H	00	BUSHING *RESISTOR PTR	43B1905C
AEBB00	SB	00	SCREW *RESISTOR PTR	43B1905D
AEBB00	RY	FC	RESISTOR; FIXED *WIRE WD PTR	43B1905E
AEBB00	RY	VA	RESISTOR, VARIABLE *WIRE WD PTR	43B1905F
AEBB00	RU	TL	RELAY, TIME DELAY *POWER PTDR	43B20
AEBB00	BV	AF	BLOCK, ASSY *SWITCH FOR REPAIR OF PTDR	43B2001
AEBB00	RU	00	RELAY *RUN BACK RBR	43B21
AEBB00	RU	00	RELAY *WHEEL SLIP 1 TRUCK WSR1	43B22
AEBB00	RU	00	RELAY *WHEEL SLIP 2 TRUCK WSR2	43B23
AEBB00	RU	00	RELAY *PWR INTERLOCK PIR	43B24
AEBB00	6R	MH	CONTACT, MOVABLE *PIR	43B2401
AEBB00	6R	SN	CONTACT, STATIONARY *PIR	43B2402
AEBB00	4B	00	COIL *OPERATING PIR	43B2403
AEBB00	SU	00	SHUNT *MOVABLE CONTACT PIR	43B2404
AEBB00	S7	CJ	SPRING, COMPRESSION *ARMATURE PIR	43B2405
AEBB00	RU	00	RELAY *CONTROL PLUG CPRA	43B25
AEBB00	RU	TL	RELAY, TIME DELAY *MAIN CNTRL SRP	43B26
AEBB00	RU	TL	RELAY, TIME DELAY *LIGHTING	43B28
AEBB00	CJ	00	CAPACITOR *SURGE MAIN CNTRL GRP	43C01
AEBB00	CJ	00	CAPACITOR *SURGE MAIN CNTRL GRP	43C02
AEBB00	RY	VA	RESISTOR, VARIABLE *MAIN CNTRL GRP	43C09
AEBB00	00	00	LOGIC AND LO-V CONTROL	43F
AEBB00	PJ	00	PC BOARD	43F19
AEBB00	RJ	00	REACTOR *ATX	43G01
AEBB00	S2	00	SPACER *REACTOR SUPPORT	43G0201
AEBB00	S2	00	SPACER *REACTOR TO SHUNT BUS BAR	43G0202
AEBB00	S2	00	SPACER *REACTOR SUPPORT	43G0203
AEBB00	B0	MJ	BOLT, MOUNTING *REACTOR	43G0204
AEBB00	3F	00	BUS BAR *REACTOR TO SHUNT	43G0205
AEBB00	RJ	00	REACTOR *OLMXI OVERLOAD	43G03

GENERIC PART NO	SUCC	TYPE CODE	PATCO 10/18/82 COMPONENT DESCRIPTION AND TYPE/USE	PROPERTY PART NUMBER
AEBB00	SU	1C	SHUNT, INDUCTIVE	43G05
AEBB00	RY	FC	RESISTOR, FIXED	43G12
AEBB00	RY	FC	RESISTOR, FIXED *MAIN CNTRL GRP	43G14
AEBB00	RY	FC	RESISTOR, FIXED *MAIN CNTRL GRP	43G15
AEBB00	RY	00	RESISTOR *MAIN CNTRL GRP	43G16
AEBB00	RY	FC	RESISTOR, FIXED *MAIN CNTRL GRP	43G17
AEBB00	RY	FC	RESISTOR, FIXED *MAIN CNTRL GRP	43G18
AEBB00	PE	00	PANEL	43H
AEBB00	PE	00	PANEL *PILOT MOTOR & RATE CONTROL	43H0101
AEBB01	DF	AF	DETECTOR, ASSY *DEAD CAR	43D
AEBB01	RU	00	RELAY *PRD DEAD CAR DET	43D0101
AEBB01	RU	TL	RELAY, TIME DELAY *DCTD DEAD CAR DET	43D0102
AEBB01	CJ	00	CAPACITOR *DC1 DEAD CAR DET	43D0103
AEBB01	RU	00	RELAY *DCR DEAD CAR DET	43D0104
AEBB01	DL	00	DIODE *MODULE CRD DEAD CAR DET	43D0105
AEBB03	60	00	COUNTER *VEEDER ROOT CTR	43D0106
AEBB03	PJ	00	PC BOARD *DIFFERENTIAL RELAY 109	43F01
AEBB03	RU	00	RELAY *POTTED DIFFERENTIAL RELAY	43F01G01
AEBB03	PJ	00	PC BOARD *OVERLOAD TRIP RELAY 109	43F02
AEBB03	RU	00	RELAY *POTTED OVLD TRIP RELAY	43F0201
AEBB04	PJ	00	PC BOARD *DYN BRK FEEDBACK 353	43F05
AEBB04	R3	00	RHEOSTAT *353	43F0501
AEBB04	R3	00	RHEOSTAT *353	43F0502
AEBB04	PJ	00	PC BOARD *DYN BRAKE FFEDBACK 1313	43H0103E
AEBB05	PJ	00	PC BOARD *LOAD WEIGHT 352	43F04
AEBB05	RX	FC	RESISTOR, FIXED *352	43F0401
AEBB05	RY	FC	RESISTOR, FIXED *352	43F0402
AEBB05	RY	FC	RESISTOR, FIXED *352	43F0403
AEBB05	RU	00	RELAY *REED 352	43F0404
AEBB05	RU	00	RELAY *REED 352	43F0405
AEBB05	RY	VA	RESISTOR, VARIABLE *TRIMMER 352	43F0406
AEBB05	RY	VA	RESISTOR, VARIABLE *TRIMMER 352	43F0407
AEBB05	RY	VA	RESISTOR, VARIABLE *TRIMMER 352	43F0408
AEBB05	RY	VA	RESISTOR, VARIABLE *TRIMMER 352	43F0409
AEBB05	PJ	00	PC BOARD *SPEED EVENT WHEEL SLIP GRP 277	43F21
AEBB05	DL	ZA	DIODE, ZENER *1N751 277	43F2101
AEBB05	RU	00	RELAY *PART OF CARD 277	43F2102
AEBB05	PJ	00	PC BOARD *SLIP COMPARITOR 278	43F22
AEBB05	CJ	00	CAPACITOR *0.047 MFD 278	43F2201
AEBB05	CJ	00	CAPACITOR *68 MFD 278	43F2202
AEBB05	RU	00	RELAY *PART OF CARD 278	43F2203
AEBB05	PJ	00	PC BOARD *SYNC SLIP 279	43F23
AEBB05	TZ	00	TRANSITOR *2N2904 279	43F2301
AEBB05	RB	AF	RACK, ASSEMBLY *WHEEL SLIP LESS PC BOARDS	43F29

GENERIC PART NO	IUCC	TYPE CODE	PATCO 10/18/82 COMPONENT DESCRIPTION AND TYPE/USE	PROPERTY PART NUMBER
AEBB05	PM	CK	PIN, CONNECTING *WHEEL SLIP RACK ASSY	43F2901
AEBB05	PE	AF	PANEL, ASSY *LOAD WEIGHING	43G19
AEBB05	TW	PH	TRANSDUCER, PRESSURE *LOAD WEIGH	43G1901
AEBB05	VB	MA	VALVE, MAGNETIC *LOAD WEIGH	43G1902
AEBB05	HT	AF	HOSE, ASSY *LOAD WEIGH	43G1903
AEBB05	HT	AF	HOSE, ASSY *LOAD WEIGH	43G1904
AEBB05	KC	00	KIT *REPAIR LOAD WEIGH TRANSDUCER	43G1905
AEBB05	PE	00	PANEL *SPIN SLIDE SYSTEM	43H0102
AEBB05	PJ	00	PC BOARD *RATE OF CHANGE DETECTOR 1206	43H0102D
AEBB05	PE	AF	PANEL, ASSY *LOAD WEIGH FOR CVI CARS	43H19
AEBB05	TW	00	TRANSDUCER *LD WHT PNL ASSY ON CVI CARS	43H1901
AEBB06	PJ	00	PC BOARD *TRANSLATOR 355	43F08
AEBB06	PE	00	PANEL *TRANSLATOR LESS PC BOARDS	43F30
AEBB06	PJ	00	PC BOARD *TRAIN LINE DECODER PWR CHK 1212	43H0101A
AEBB07	PJ	00	PC BOARD *15 VOLT REGULATOR 354	43F06
AEBB07	DL	ZA	DIODE, ZENER *354	43F0601
AEBB07	CJ	EE	CAPACITOR, ELECTROLYTIC *354	43F0602
AEBB07	RY	FC	RESISTOR, FIXED *354	43F0603
AEBB07	TZ	00	TRANSISTOR *354	43F0604
AEBB07	PJ	00	PC BOARD *15 VOLT REGULATOR 354	43F07
AEBB07	RY	FC	RESISTOR, FIXED *354	43F0701
AEBB07	PJ	00	PC BOARD *ZENER VOLTAGE 363	43F09
AEBB07	DL	ZA	DIODE, ZENER *363	43F0901
AEBB07	PJ	00	PC BOARD *FREQ 0 DC WHEEL SLIP GRP	43F24
AEBB07	B7	00	BRIDGE *RECTIFIER 280	43F2401
AEBB07	PJ	00	PC BOARD *27V ZENER SUPPLY WHL SLP GRP 282	43F26
AEBB07	P1	00	POWER SUPPLY *900 CYCLE	43F28
AEBB07	DL	ZA	DIODE, ZENER *900HZ PWR SUPPLY	43F2901
AEBB07	PJ	00	PC BOARD *I/V CONVERTER 422	43H0101C
AEBB07	PJ	00	PC BOARD *PLUS 10 VDC LD WHT PWR SUP 1209	43H0101D
AEBB07	PJ	00	PC BOARD *FREQ TO DC CONVERTER 1204	43H0102A
AEBB07	PE	00	PANEL *PWR SUPPLY OBFB LATCHING RELAYS	43H0103
AEBB07	FD	00	FILTER *PWR SUPPLY	43H0103A
AEBB07	PJ	00	PC BOARD *OSCILLATOR 472	43H0103B
AEBB07	PJ	00	PC BOARD *15 VOLT REGULATOR 1135	43H0103C
AEBB07	PJ	00	PC BOARD *PLUS 22 VOLT REGULATOR	43H0103D
AEBB08	PJ	00	PC BOARD *CMR FILTER 6801	43H0101E
AEBB08	PJ	00	PC BOARD *RELAY DRIVER 764	43H0102F
AEBB09	PJ	00	PC BOARD *TACH SQUARING WHEEL SLIP GRP	43F25
AEBB09	RY	FC	RESISTOR, FIXED *1/2W 180K OHM 281	43F2501
AEBB09	PJ	00	PC BOARD *MANUAL DIAMETER CORRECTION 401	43H0102B
AEBB09	PJ	00	PC BOARD *DIFFERENTIAL SPEED DETECTOR 691	43H0102C
AEBB09	PJ	00	PC BOARD *SPEED COMPARITOR & SPEED OUTPUT 752	43H0102E
AEBB10	PJ	00	PC BOARD *SPEED TAPER 350	43F03

GENERIC PART NO	IUCC	TYPE CODE	PATCO 10/18/82 COMPONENT DESCRIPTION AND TYPE/USE	PROPERTY PART NUMBER
AEBB10	RM	00	RECTIFIER *344	43F0301
AEBB10	RM	00	RECTIFIER *344	43F0302
AEBB10	RY	VA	RESISTOR, VARIABLE *TRIM 350	43F0303
AEBB10	RY	VA	RESISTOR, VARIABLE *350	43F0304
AEBB10	PJ	00	PC BOARD *PILOT MOTOR CURRENT LIMIT 2 103	43F10
AEBB10	TZ	00	TRANSISTOR *2N527 103	43F1001
AEBB10	TZ	00	TRANSISTOR *2N388 103	43F1002
AEBB10	RY	FC	RESISTOR, FIXED *5W 5K OHM 103	43F1003
AEBB10	RY	FC	RESISTOR, FIXED *10W 0.1 OHM 103	43F1004
AEBB10	DL	00	DIODE *1N1200 103	43F1005
AEBB10	RY	FC	RESISTOR, FIXED *3W 1K OHM 103	43F1006
AEBB10	PJ	00	PC BOARD *PILOT MOTOR CURRENT LIMIT 1 107	43F11
AEBB10	TZ	00	TRANSISTOR *MP1560 107	43F1101
AEBB10	DL	00	DIODE *1N1200 107	43F1102
AEBB10	PJ	00	PC BOARD *PILOT MOTOR POWER CUSHION 346	43F12
AEBB10	DL	00	DIODE *1N5060 346	43F1201
AEBB10	RY	VA	RESISTOR, VARIABLE *2W 10K 346	43F1202
AEBB10	PJ	00	PC BOARD *PILOT MOTOR CURRENT LIMIT 4 349	43F13
AEBB10	PJ	00	PC BOARD *PILOT MOTOR ADVANCE 351	43F14
AEBB10	RY	FC	RESISTOR, FIXED *5W 12K OHM 351	43F1401
AEBB10	CJ	00	CAPACITOR *2MFD 351	43F14B02
AEBB10	PJ	00	PC BOARD *PILOT MOTOR KM BACKUP 356	43F15
AEBB10	PJ	00	PC BOARD *PILOT MOTOR KM BACKUP 359	43F16
AEBB10	TZ	00	TRANSISTOR *484 359	43F1601
AEBB10	DL	00	DIODE *1N469 359	43F1602
AEBB10	DL	00	DIODE *1N470 359	43F1603
AEBB10	DL	00	DIODE *1N961 359	43F1604
AEBB10	PJ	00	PC BOARD *PILOT MOTOR FIELD SHUNT 1360	43F17
AEBB10	DL	00	DIODE *1N746 360	43F1701
AEBB10	TZ	00	TRANSISTOR *RA360	43F1702
AEBB10	PJ	00	PC BOARD *PILOT MOTOR FIELD SHUNT 361	43F18
AEBB10	DL	00	DIODE *1N9648 361	43F1801
AEBB10	TZ	00	TRANSISTOR *361	43F1802
AEBB10	RY	VA	RESISTOR, VARIABLE *TRIM 361	43F1803
AEBB10	PJ	00	PC BOARD *PILOT MOTOR CURRENT LIMIT 3 404	43F20
AEBB10	TZ	00	TRANSISTOR *2N333	43F2001
AEBB10	PE	00	PANEL *PILOT MOTOR LESS PC BOARDS	43F31
AEBB10	PJ	00	PC BOARD *RATE CONTROL 1165	43H0101B
AEBB10	PJ	00	PC BOARD *CAM BACKUP & SUMMING 1192	43H0101F
AEBB10	PJ	00	PC BOARD *PILOT MOTOR CONTROL 1312	43H0101G
AEBB10	PJ	00	PC BOARD *PILOT MOTOR DRIVER 1111	43H0101H
AEBC00	6S	AF	CONTACTOR, ASSY	42
AEBC00	1J	00	INTERLOCK *CONTROL	420
AEBC00	6R	MH	CONTACT, MOVABLE *INTERLOCK	42001

GENERIC PART NO	IUCC	TYPE CODE	PATCO 10/18/82 COMPONENT DESCRIPTION AND TYPE/USE	PROPERTY PART NUMBER
AEBC00	6R	SN	CONTACT, STATIONARY *INTERLOCK	42G02
AEBC00	6R	SN	CONTACT, STATIONARY *INTERLOCK	42G03
AEBC00	S7	00	SPRING *CONTACT INTERLOCK	42G04
AEBC00	1J	00	INTERLOCK *CONTROL GE69343F	42H
AEBC00	6R	AF	CONTACT, ASSY *& SHUNT INTLK	42H01
AEBC00	6R	SN	CONTACT, STATIONARY *INTERLOCK	42H02
AEBC00	6R	SN	CONTACT, STATIONARY *INTERLOCK	42H03
AEBC00	S7	CJ	SPRING, COMPRESSION *CONTACT	42H04
AEBC00	5R	KB	SWITCH, KNIFE *K5	43C08
AEBC00	6S	AF	CONTACTOR, ASSY	45A
AEBC01	6S	AF	CONTACTOR, ASSY *BRAKING SWITCH	42F
AEBC01	6R	00	CONTACT *BRAKING SWITCH	42F01
AEBC01	C3	00	CHUTE *ARC BRAKING SWITCH	42F03
AEBC01	4B	00	COIL *OPERATING BRK SW	42F04
AEBC01	AT	00	ARM *CONTACT BRK SW	42F05
AEBC01	SF	00	SEAT *COMPRESSION SPRNG BRK SW	42F06
AEBC01	AS	00	ARCHORN	42F07
AEBC01	S7	00	SPRING *ARC HRN SUPRT BRK SW	42F08
AEBC02	6S	00	CONTACTOR *FIELD SHUNT	42L
AEBC02	4B	00	COIL *OPERATING FS CONT	42L01
AEBC02	6R	MH	CONTACT, MOVABLE *FS CONT	42L02
AEBC02	SU	00	SHUNT *FIELD SHUNT CONTACTR	42L03
AEBC02	AS	00	ARCHORN *FS CONTACTOR	42L04
AEBC02	C3	AE	CHUTE, ARC *FS CONTACTOR	42L05
AEBC02	1J	00	INTERLOCK *FIELD SHUNT CONTACTR	42L06
AEBC02	63	00	COVER *FIELD SHUNT CMPRTMNT	42Z
AEBC02	SD	00	SEAL *COVER FS CMPRTMNT	42Z01
AEBC03	6S	AF	CONTACTOR, ASSY *L SW FOR GND SW	42D
AEBC04	6S	AF	CONTACTOR, ASSY *LINE SWITCH	42C
AEBC04	6R	SN	CONTACT, STATIONARY *L SWITCH	42C01
AEBC04	6R	MH	CONTACT, MOVABLE *L SWITCH	42C02
AEBC04	4B	00	COIL *OPERATING L SWITCH	42C03
AEBC04	C3	AE	CHUTE, ARC *L SWITCH	42C04
AEBC04	SU	00	SHUNT *LINE SWITCH	42C05
AEBC04	S7	TD	SPRING, TENSION *L SWITCH	42C06
AEBC04	S7	TD	SPRING, TENSION *L SWITCH	42C07
AEBC04	AS	00	ARCHORN *MVBL CONTACT TIP	42C08
AEBC04	AS	00	ARCHORN *W/SPRING L SW	42C09
AEBC04	AS	00	ARCHORN *STAT CONT TIP	42C10
AEBC04	5N	00	SUPPORT *W/BLOWOUT COIL L SW	42C13
AEBC04	AT	00	ARM *CONTACT W/BSHNG L SW	42C14
AEBC04	PM	00	PIN *CONT ARM HINGE L SW	42C1401
AEBC04	C7	00	CLAMP *HINGE PIN L SW	42C1402
AEBC04	SF	00	SEAT *COMPRESSION SPRNG L SW	42C15

GENERIC PART NO	IUCC	TYPE CODE	PATCO 10/18/82 COMPONENT DESCRIPTION AND TYPE/USE	PROPERTY PART NUMBER
AEBC04	5E	00	STOP *ARMATURE L SW	42C16
AEBC04	AU	00	ARMATURE *W/SPRNG PST & BRCKT	42C17
AEBC07	6S	AF	CONTACTOR, ASSY *PARALLEL SWITCH	42E00B
AEBC07	4B	00	COIL *OPERATING P SW	42E00B1
AEBC07	6R	00	CONTACT *TIP P SW	42E0101
AEBC07	5E	00	STOP *ARMATURE P SW	42E0102
AEBC07	C3	AE	CHUTE, ARC *P SW	42E0103
AEBC07	AT	00	ARM *CONTACT P SW	42E0104
AEBC07	PM	00	PIN *CONT ARM HINGE P SW	42E0104A
AEBC07	C7	00	CLAMP *HINGE PIN P SW	42E0104B
AEBC07	BF	00	BASE *PARALLEL SWITCH	42E0105
AEBC07	SU	00	SHUNT *PARALLEL SWITCH	42E0202
AEBC07	S7	CJ	SPRING, COMPRESSION *P SW	42E05
AEBC07	AS	00	ARCHORN *STAT CONT TIP	42E06
AEBC07	AS	00	ARCHORN *MVBL CONT TIP	42E07
AEBC07	AS	00	ARCHORN *W/SPRING P SW	42E08
AEBC07	5N	00	SUPPORT *W/BLOWOUT COIL P SW	42E09
AEBC09	6R	00	CONTACT *REV SW	43A1301A
AEBC09	6R	SN	CONTACT, STATIONARY *REV SW	43A1301D
AEBC09	6R	SN	CONTACT, STATIONARY *REV SW	43A1301E
AEBC09	6S	00	CONTACTOR *REVERSER	4SA0108
AEBC09	RU	CH	RELAY, COIL *REVERSER	4SA0108A
AEBC09	6R	00	CONTACT *PART OF CONTACTOR	4SA0108B
AEBC09	6R	00	CONTACT *PART OF CONTACTOR	4SA0108C
AEBC10	6S	AF	CONTACTOR, ASSY *SERIES SW	42E00A
AEBC10	4B	00	COIL *OPERATING SERIES SW	42E00A1
AEBC10	3F	00	BUS BAR *SERIES SW	42E00A2
AEBC10	3F	00	BASE *BLOCK SERIES SW	42E00A4
AEBD00	B2	EK	BOX, EQUIPMENT	43
AEBD01	SM	00	SHAFT *MAIN CAM RVRSR & CAM	43A
AEBD01	MR	DA	MOTOR, DC *PILOT	43A01
AEBD01	B8	00	BRUSH *CARBON PILOT MTR	43A0101
AEBD01	CH	00	CAP *BRUSH PILOT MTR	43A0102
AEBD01	4B	00	COIL *FIELD PILOT MTR	43A0103
AEBD01	BM	BC	BEARING, BALL *PILOT MTR	43A0104
AEBD01	8B	00	ROTOR *PILOT MTR	43A0105
AEBD01	9C	00	GEAR *PILOT MTR GEAR CASE	43A0106
AEBD01	KB	00	KEY *HUB PILOT MTR GR CS	43A0107
AEBD01	9D	AF	GEARBOX, ASSY *CAM CNTRLLR	43A02
AEBD01	SM	AF	SHAFT, ASSY *CAM	43A0204
AEBD01	9C	00	GEAR *CAMSHAFT 6 IN	43A0204A
AEBD01	9C	00	GEAR *CAMSHAFT 3 IN	43A0204B
AEBD01	KB	00	KEY *GEAR TO SHAFT	43A0204C
AEBD01	SM	00	SHAFT *CAMSHAFT DRIVE	43A0204D

GENERIC PART NO	UCC	TYPE CODE	PATCO COMPONENT DESCRIPTION AND TYPE/USE 10/18/82	PROPERTY PART NUMBER
AEBD01	BM	BC	BEARING, BALL *CAMSHAFT	43A0204E
AEBD01	BM	BC	BEARING, BALL *CAMSHAFT	43A0204F
AEBD01	R5	RF	RING, RETAINING *GEAR SHAFT	43A0204G
AEBD01	R5	RF	RING, RETAINING *GEAR SHAFT	43A0204H
AEBD01	6R	00	CONTACT *NOTCH INTLCK	43A0301
AEBD01	6R	00	CONTACT *NOTCH INTLCK ASSY	43A0302
AEBD01	SM	AF	SHAFT, ASSY *MAIN CAM	43A04
AEBD01	CE	00	CAM *1ST MAIN CAMSHFT ASSY	43A0401A01
AEBD01	CE	00	CAM *2ND MAIN CAMSHAFT ASSY	43A0401A02
AEBD01	CE	00	CAM *3RD MAIN CAMSHAFT ASSY	43A0401A03
AEBD01	CE	00	CAM *4TH MAIN CAMSHAFT ASSY	43A0401A04
AEBD01	CE	00	CAM *5TH MAIN CAMSHAFT ASSY	43A0401A05
AEBD01	CE	00	CAM *6TH MAIN CAMSHAFT ASSY	43A0401A06
AEBD01	CE	00	CAM *7TH MAIN CAMSHAFT ASSY	43A0401A07
AEBD01	CE	00	CAM *8TH MAIN CAMSHAFT ASSY	43A0401A08
AEBD01	CE	00	CAM *9TH MAIN CAMSHAFT ASSY	43A0401A09
AEBD01	CE	00	CAM *10TH MAIN CAMSHAFT ASSY	43A0401A10
AEBD01	CE	00	CAM *11TH MAIN CAMSHAFT ASSY	43A0401A11
AEBD01	CE	00	CAM *12TH MAIN CAMSHAFT ASSY	43A0401A12
AEBD01	CE	00	CAM *13TH MAIN CAMSHAFT ASSY	43A0401A13
AEBD01	CE	00	CAM *14TH MAIN CAMSHAFT ASSY	43A0401A14
AEBD01	CE	00	CAM *15TH MAIN CAMSHAFT ASSY	43A0401A15
AEBD01	CE	00	CAM *16TH MAIN CAMSHAFT ASSY	43A0401A16
AEBD01	CE	00	CAM *17TH MAIN CAMSHAFT ASSY	43A0401A17
AEBD01	CE	00	CAM *18TH MAIN CAMSHAFT ASSY	43A0401A18
AEBD01	CE	00	CAM *19TH MAIN CAMSHAFT ASSY	43A0401A19
AEBD01	CE	00	CAM *20TH MAIN CAMSHAFT ASSY	43A0401A20
AEBD01	CE	00	CAM *21ST MAIN CAMSHAFT ASSY	43A0401A21
AEBD01	CE	00	CAM *22ND MAIN CAMSHAFT ASSY	43A0401A22
AEBD01	CE	00	CAM *23RD MAIN CAMSHAFT ASSY	43A0401A23
AEBD01	CE	00	CAM *24TH MAIN CAMSHAFT ASSY	43A0401A24
AEBD01	CE	00	CAM *25TH MAIN CAMSHAFT ASSY	43A0401A25
AEBD01	CE	00	CAM *26TH MAIN CAMSHAFT ASSY	43A0401A26
AEBD01	CE	00	CAM *27TH MAIN CAMSHAFT ASSY	43A0401A27
AEBD01	CE	00	CAM *28TH MAIN CAMSHAFT ASSY	43A0401A28
AEBD01	CE	00	CAM *29TH MAIN CAMSHAFT ASSY	43A0401A29
AEBD01	CE	00	CAM *30TH MAIN CAMSHAFT ASSY	43A0401A30
AEBD01	CE	00	CAM *31ST MAIN CAMSHAFT ASSY	43A0401A31
AEBD01	CE	00	CAM *32ND MAIN CAMSHAFT ASSY	43A0401A32
AEBD01	CE	00	CAM *33RD MAIN CAMSHAFT ASSY	43A0401A33
AEBD01	CE	00	CAM *34TH MAIN CAMSHAFT ASSY	43A0401A34
AEBD01	CE	00	CAM *35TH MAIN CAMSHAFT ASSY	43A0401A35
AEBD01	CE	00	CAM *36TH MAIN CAMSHAFT ASSY	43A0401A36
AEBD01	CE	00	CAM *37TH MAIN CAMSHAFT ASSY	43A0401A37

GENERIC PART NO	BUCC	TYPE CODE	PATCO COMPONENT DESCRIPTION AND TYPE/USE 10/18/82	PROPERTY PART NUMBER
AEB001	CE	00	CAM *38TH MAIN CAMSHAFT ASSY.	43A0401A38
AEBD01	CE	00	CAM *39TH MAIN CAMSHAFT ASSY.	43A0401A39
AEBD01	CE	00	CAM *40TH MAIN CAMSHAFT ASSY.	43A0401A40
AEBD01	CE	00	CAM *41ST MAIN CAMSHAFT ASSY.	43A0401A41
AEBD01	CE	00	CAM *42ND MAIN CAMSHAFT ASSY.	43A0401A42
AEBD01	CE	00	CAM *43RD MAIN CAMSHAFT ASSY.	43A0401A43
AEBD01	CE	00	CAM *44TH MAIN CAMSHAFT ASSY.	43A0401A44
AEBD01	CE	00	CAM *45TH MAIN CAMSHAFT ASSY.	43A0401A45
AEBD01	CE	00	CAM *46TH MAIN CAMSHAFT ASSY.	43A0401A46
AEBD01	CE	00	CAM *47TH MAIN CAMSHAFT ASSY.	43A0401A47
AEBD01	CE	00	CAM *48TH MAIN CAMSHAFT ASSY.	43A0401A48
AEBD01	CE	00	CAM *49TH MAIN CAMSHAFT ASSY.	43A0401A49
AEBD01	CE	00	CAM *50TH MAIN CAMSHAFT ASSY.	43A0401A50
AEBD01	CE	00	CAM *51ST MAIN CAMSHAFT ASSY.	43A0401A51
AEBD01	CE	00	CAM *52ND MAIN CAMSHAFT ASSY.	43A0401A52
AEBD01	CE	00	CAM *53RD MAIN CAMSHAFT ASSY.	43A0401A53
AEBD01	SR	00	SHIM *CAM SPACING MN SHAFT.	43A0401A54
AEBD01	S7	00	SPRING *SPACER MN CMSHFT ASY.	43A0402
AEBD01	G2	00	COUPLING *RING MAIN CMSHFT ASY.	43A0403
AEBD01	3H	00	BUSHING *RUBBER MN CMSHFT ASSY.	43A0403A
AEBD01	SB	00	SCREW *CAP MAIN CMSHFT ASSY	43A0601
AEBD01	BV	00	BLOCK *COUPLING MN CMSHFT	43A0602
AEBD01	CF	AF	CAM SWITCH, ASSY *BLUE CAM CNTRLR	43A12
AEBD01	6R	00	CONTACT *BLUE SW.	43A1201A
AEBD01	SU	00	SHUNT *BLUE SW.	43A1201B
AEBD01	C3	AE	CHUTE, ARC *BLUE SW	43A1201C
AEBD01	AS	00	ARCHORN *BLUE SW	43A1201D
AEBD01	AS	00	ARCHORN *BLUE SW.	43A1201E
AEBD01	S7	00	SPRING *OPR ARM/SUPRT BL SW	43A1201F
AEBD01	S7	00	SPRING *OPR ARM/SPR GD BL SW.	43A1201G
AEBD01	AS	00	ARCHORN *STAT BLUE SW	43A1201H
AEBD01	5N	00	SUPPORT *CONTACT TIP BLUE SW.	43A1201J
AEBD01	BM	BC	BEARING, BALL *BLUE SW.	43A1201K
AEBD01	AT	00	ARM *W/BSHNG & PINS BL SW	43A1201L
AEBD01	3H	00	BUSHING *BLUE SW.	43A1201M
AEBD01	PM	00	PIN *SPRING BLUE SW	43A1201N
AEBD01	PM	00	PIN *RLLR/ARM BLUE SW	43A1201P
AEBD01	KC	00	KIT *LEVER PIN BLUE SW.	43A1201Q
AEBD01	4B	00	COIL *W/STAT CONT SUPRT SW.	43A1201R
AEBD01	PM	00	PIN *T HEAD BLUE SW	43A1201S
AEBD01	CN	00	CASE *SWITCH BLUE SW.	43A1201T
AEBD01	6Y	00	CORE *BLUE SW	43A1201U
AEBD01	3H	00	BUSHING *BLUE SW	43A1201V
AEBD01	CF	AF	CAM SWITCH, ASSY *REVERSER.	43A13

GENERIC PART NO	IUCC	TYPE CODE	PATCO 10/18/82 COMPONENT DESCRIPTION AND TYPE/USE	PROPERTY PART NUMBER
AEBD01	5N	00	SUPPORT *STAT PORTION REV SW.	43A1301
AEBD01	5N	00	SUPPORT *REV SW	43A1301A01
AEBD01	S7	CJ	SPRING, COMPRESSION *REV SW	43A1301A02
AEBD01	3F	00	BUS BAR *8.75 IN REV SW	43A1301B01
AEBD01	3F	00	BUS BAR *10 IN REV SW	43A1301B02
AEBD01	5N	00	SUPPORT *BUS BAR REV SW	43A1301C01
AEBD01	5N	00	SUPPORT *BUS BAR REV SW	43A1301C02
AEBD01	S7	CJ	SPRING, COMPRESSION *ARM/SPT R SW	43A1301F
AEBD01	S7	CJ	SPRING, COMPRESSION *LEV/FRM R SW	43A1301G
AEBD01	BV	ST	BLOCK, SUPPORTING *CONTACT R SW	43A1301H01
AEBD01	BV	ST	BLOCK, SUPPORTING *CONTACT R SW	43A1301H02
AEBD01	BV	ST	BLOCK, SUPPORTING *CONTACT R SW	43A1301H03
AEBD01	BV	ST	BLOCK, SUPPORTING *CONTACT R SW	43A1301H04
AEBD01	4B	00	COIL *REV SW	43A1301J
AEBD01	B0	00	BOLT *REV SW	43A1301J01
AEBD01	CE	00	CAM *W/BUSHING REV SW	43A1301K01
AEBD01	BM	BC	BEARING, BALL *REV SW	43A1301K02
AEBD01	PM	00	PIN *ARM RLLR/CAM REV SW	43A1301K03
AEBD01	PM	00	PIN *LNK/CNCTR ARM REV SW	43A1301K04
AEBD01	PM	00	PIN *RLLR/LVR REV SW	43A1301L
AEBD01	5R	00	SWITCH *CONTACT GRAY	43A1301M
AEBD01	RJ	00	REACTOR *CURR1 AMP MEASURING	43A17
AEBD01	SU	00	SHUNT *MOTOR MAIN CNTRL GRP	43A18
AEBD01	PH	00	PAWL, ASSY *MAIN CNTRL GRP	43A19
AEBD01	C5	00	CIRCUIT BREAKER *MAIN CONTROL GROUP	43A20
AEBD01	6R	00	CONTACT *UNIT F/OLCB	43A2001
AEBD01	C3	AE	CHUTE, ARC *W/POLE PCS & SUPRT	43A2001A
AEBD01	AS	00	ARCHORN *CONTACT UNIT	43A2001B
AEBD01	6R	00	CONTACT *CONTACT UNIT	43A2001C
AEBD01	S7	CJ	SPRING, COMPRESSION *LTCH/ADAPTR	43A2001D
AEBD01	SU	00	SHUNT *CONTACT UNIT	43A2001E
AEBD01	S7	CJ	SPRING, COMPRESSION *SUPRT/LVR	43A2001F
AEBD01	BE	00	BARRIER *W/INSRTS CNTCT UNIT	43A2001G
AEBD01	BE	00	BARRIER *W/INSRTS CNTCT UNIT	43A2001H
AEBD01	AT	AF	ARM, ASSY *CONTACT UNIT	43A2001J
AEBD01	0B	AF	OPERATOR, ASSY *OPERATING UNIT	43A2002
AEBD01	S7	LB	SPRING, LEAF *OPERATING UNIT	43A2002A
AEBD01	4B	00	COIL *OPERATING UNIT	43A2002B
AEBD01	6Y	CH	CORE, COIL *OPERATING UNIT	43A2002C
AEBD01	BM	RH	BEARING, ROLLER *LEVEL OPER UNIT	43A2002D
AEBD01	LK	CK	LINK, CONNECTING *OPER UNIT	43A2002E
AEBD01	4B	00	COIL *OPERATING UNIT	43A2002F
AEBD01	PM	00	PIN *TRIP UNIT STOP OP UNIT	43A2002G
AEBD01	PM	00	PIN *LVR/FRM OPER UNIT	43A2002H

GENERIC PART NO	IUCC	TYPE CODE	PATCO 10/18/82 COMPONENT DESCRIPTION AND TYPE/USE	PROPERTY PART NUMBER
AEBD01	PM	00	PIN *SPRNG POS OPER UNIT	43A2002J
AEBD01	LF	CK	LEVER, CONNECTING *PLATE OPR UNIT	43A2002K
AEBD01	SB	MJ	SCREW, MOUNTING *LEVER OPER UNIT	43A2002L
AEBD01	LK	00	LINK *OPERATING UNIT	43A2002M
AEBD01	LF	AF	LEVER, ASSY *OVRLD CKT BRKR	43A2002N
AEBD01	PV	00	PLATE *W/PINS OPER UNIT	43A2002P
AEBD01	S7	CJ	SPRING, COMPRESSION *LVR/FRM OPER	43A2002Q
AEBD01	S7	TD	SPRING, TENSION *LVR/PIN OPER	43A2002R
AEBD01	S7	TD	SPRING, TENSION *TRP/BKT OPER	43A2002S
AEBD01	S7	TD	SPRING, TENSION *OPER UNIT	43A2002S01
AEBD01	CE	00	CAM *CONTACT UNIT OPER UNIT	43A2002T
AEBD01	S7	TD	SPRING, TENSION *LVR/PLT OPER	43A2002V
AEBD01	S7	TD	SPRING, TENSION *LVR/PLT OPER	43A2002W
AEBD01	S7	CJ	SPRING, COMPRESSION *LTCH/PLT OPR	43A2002X
AEBD01	6R	AF	CONTACT, ASSY *MAIN CNTRL GRP	43A2201
AEBD01	6R	SN	CONTACT, STATIONARY *MAIN CNTRL GRP	43A2202
AEBD01	5R	00	SWITCH *CONTACT GRAY	43A23
AEBD01	SM	AF	SHAFT, ASSY *CAM UPPER W/C CAMS & COUPLING SW	43A24
AEBD01	BM	00	BEARING *MID FRAME CAMSHAFT	43A2401
AEBD01	R5	RF	RING, RETAINING *CAMSHAFT	43A2402
AEBD01	SM	AF	SHAFT, ASSY *CAM LOWER W/CAMS & COUPLING SW	43A25
AEBD01	BM	00	BEARING *END FRAME CAMSHAFT	43A2601
AEBD01	R5	RF	RING, RETAINING *UPPER BEARING	43A2602
AEBD01	CT	00	CATCH *COVER CAM CONTRLLR COVER	43A2801
AEBD01	LC	00	LATCH *COVER CAM CONTRLLR COVER	43A2802
AEBD01	9S	00	GUIDE *CAM CONTRLLR COVER	43A2803
AEBD01	SD	00	SEAL *CAM CONTRLLR COVER	43A2804
AEBD01	6V	RJ	CONTROLLER, ROTARY	43G
AECC00	FD	AC	FILTER, AIR *DISPOSABLE TRACTION MTR	44C0102
AECC00	FD	00	FILTER *IRISH LINEN CLOTH FOR SNOW FILTER	44C0102A
AECC00	FD	00	FILTER *SNOW TRACTION MTR	44C0102A01
AED000	SU	00	SHUNT *MOTOR	43G07
AED000	S2	00	SPACER *SHUNT SUPPORT	43G0701
AED000	S2	00	SPACER *SHUNT SUPPORT	43G0702
AED000	S2	00	SPACER *SHUNT SUPPORT	43G0703
AED000	BO	MJ	BOLT, MOUNTING *SHUNT	43G0704
AED000	MR	DA	MOTOR, DC *TRACTION MOTOR ASSY	44C
AED000	63	AF	COVER, ASSY *TOP INSPECTION & FILTER CASE	44C0101
AED000	63	00	COVER *CMPLT W/HINGE RIVET TOP INSPECTION	44C0101A
AED000	LF	00	LEVER *W/SPRING LINK	44C0101B
AED000	LF	00	LEVER *W/SPRING LINK CLAMPING	44C0101C
AED000	R7	00	RIVET *STEEL	44C0101D
AED000	HN	00	HINGE *COVER	44C0101E
AED000	63	00	COVER *BOTTOM INSPECTION TRACTION MTR	44C0103

GENERIC PART NO	UCC	TYPE CODE	PATCO COMPONENT DESCRIPTION AND TYPE/USE 10/18/82	PROPERTY PART NUMBER
AED000	C8	AF	CLEAT, ASSY *MOTOR	44C0111
AED000	PV	00	PLATE *CABLE	44C0112
AED000	T8	1D	TUBE, INSULATING *SLEEVE	44C0112A
AED000	18	1D	TUBE, INSULATING *SLEEVE	44C0112B
AED000	6N	00	CONNECTOR *TRACTION MTR	44C0117A
AED000	6N	00	CONNECTOR *TRACTION MTR SMALL LEAD	44C0117B
AED000	6N	00	CONNECTOR *TRACTION MTR LARGE HEAD	44C0117C
AED000	6N	00	CONNECTOR *THIRD RAIL BUSS 600V	44C0117D
AED000	PM	00	PIN *PIVOT CONNECTOR	44C0117E
AED000	G2	ZZ	COUPLING, MISC	41E
AED000	HV	00	HUB *MOTOR END	44E0101
AED000	HV	00	HUB *GEAR END	44E0102
AED000	6N	SF	CONNECTOR, SLEEVE	44E0103
AED000	NB	00	NUT	44E0104
AED000	0D	00	O-RING	44E0107
AED000	SD	0A	SEAL, OIL	44E0108
AED000	6N	SF	CONNECTOR, SLEEVE	44E0109
AEDA01	4B	AF	COIL, ASSY *FIELD	44C0108
AEDA01	4B	AF	COIL, ASSY *FIELD	44C0109
AEDA02	4B	AF	COIL, ASSY *FIELD	44C0110
AEDB00	AU	AF	ARMATURE, ASSY	44C0116
AEDC00	B9	AF	BRUSHHOLDER, ASSY	44C0113
AEDC00	T8	1D	TUBE, INSULATING *SLEEVE	44C0113A
AEDC00	S7	ZZ	SPRING, MISC *INCL PRESS ARM & SHUNT	44C0113B
AEDC00	PM	00	PIN *HINGE	44C0113C
AEDC00	5N	00	SUPPORT *BRUSHHOLDER	44C0114
AEDD00	B8	00	BRUSH *CARBON	44C0115
AEDF00	9A	00	GASKET *BRNG CPA/FRAME HEAD	44C0104
AEDF00	9A	00	GASKET *BRNG CAP/FRAME HEAD COMMUTATOR END	44C0105
AEDF00	BM	RH	BEARING, ROLLER *PINION END	44C0106
AEDF00	BM	BC	BEARING, BALL *COMMUTATOR END	44C0107

APPENDIX P

WMATA Generic Parts List

GENERIC PART NO	IUCC	TYPE CODE	WMATA 10/18/82 COMPONENT DESCRIPTION AND TYPE/USE	PROPERTY PART NUMBER
AE0000	00	00	PROPULSION SYSTEM	040000
AEAA00	6U	00	CONTROL *CAB	04A000
AEAA00	5R	AF	SWITCH, ASSY *OVER TRAVEL	04A103
AEAA00	5R	AF	SWITCH, ASSY *DEADMAN	04A106
AEAA00	5S	AF	SWITCHBOARD, ASSY	04A108
AEAA00	6V	AF	CONTROLLER, ASSY *MASTER	04A100
AEAA00	CE	AF	CAM, ASSY *SHAFT	04A107
AEAA00	HB	AF	HANDLE, ASSY	04A105
AEAA00	HE	ZZ	HARDWARE, MISC	04A199
AEAA01	5R	AF	SWITCH, ASSY *KEY	04A101
AEAA03	5R	AF	SWITCH, ASSY *MODE/DIRECTION	04A102
AEAC00	00	00	TRAINLINES SYSTEM	01B000
AEAC00	B2	JB	BOX, JUNCTION	01B200
AEAC00	C5	00	CIRCUIT BREAKER *T/L	01B101
AEAC00	HE	ZZ	HARDWARE, MISC	01B199
AEAC00	HE	ZZ	HARDWARE, MISC	01B299
AEAC00	PE	AF	PANEL, ASSY *T/L C/B	01B100
AEB000	5H	AC	STRAINER, AIR	04B201
AEB000	6U	00	CONTROL *MOTOR	04B000
AEB000	HE	ZZ	HARDWARE, MISC	04B299
AEB000	HE	ZZ	HARDWARE, MISC	01B399
AEB000	RT	AF	REGULATOR, ASSY *AIR PRESSURE	04B200
AEB000	RT	PH	REGULATOR, PRESSURE *AIR	04B202
AEB000	RX	AF	RESERVOIR, ASSY *AIR	04B300
AEBB00	1C	00	INDUCTOR	04B143
AEBB00	5R	SR	SWITCH, STEPPER *OVLD CONTR	04B147
AEBB00	64	AF	CRADLE, ASSY *LOGIC	04B126
AEBB00	HE	ZZ	HARDWARE, MISC	04B199
AEBB00	PE	MJ	PANEL, MOUNTING	04B101
AEBB00	PJ	00	PC BOARD *TIME DELAY A-13	04B138
AEBB00	RY	FC	RESISTOR, FIXED	04B146
AEBB00	TX	00	TRANSDUCTOR	04B145
AEBB04	PJ	00	PC BOARD *DYN BRK FDBK A-14	04B140
AEBB04	RU	0B	RELAY, OPEN FRAME *UT-123 BOL	04B121
AEBB06	PJ	00	PC BOARD *DECODE/MULTIPLEX A-5	04B131
AEBB07	PJ	00	PC BOARD *POWER SUPPLY	04B141
AEBB09	PJ	00	PC BOARD *INPUT ISOLATION A-3	04B130
AEBB09	PJ	00	PC BOARD *RELAY DRIVER A-11	04B137
AEBB10	PJ	00	PC BOARD *RATE ADJUST A-1	04B127
AEBB10	PJ	00	PC BOARD *CNTCT BIAS LOAD A-2	04B128
AEBB10	PJ	00	PC BOARD *SPD TAPER/LIMIT A-7	04B133
AEBB10	PJ	00	PC BOARD *CURRENT DECSN A-9	04B135

GENERIC PART NO	IUCC	TYPE CODE	WMATA 10/18/82 COMPONENT DESCRIPTION AND TYPE/USE	PROPERTY PART NUMBER
AEBB10	PJ	00	PC BOARD *NTCH-SPT-HLD A-10	01B136
AEBB10	RU	00	RELAY *2970A71	04B123
AEBB10	RU	0B	RELAY, OPEN FRAME *UGB-566	04B118
AEBB10	RU	0B	RELAY, OPEN FRAME *UGC-216	04B120
AEBB10	RU	0B	RELAY, OPEN FRAME *UT-173	04B122
AEBB10	RU	0B	RELAY, OPEN FRAME *227D846	04B125
AEBB10	TY	CN	TRANSFORMER, CURRENT	04B142
AEBC00	5R	KB	SWITCH, KNIFE	07B101
AEBC00	6N	PF	CONNECTOR, POWER *SHOP	07B102
AEBC00	6S	MA	CONTACTOR, MAGNETIC *UMD-125C	04B110
AEBC00	6U	00	CONTROL *PACKAGE UNIT ASSY	04B100
AEBC00	B2	AF	BOX, ASSY *KNIFE SWITCH	07B100
AEBC00	HE	ZZ	HARDWARE, MISC	07B199
AEBC02	6S	MA	CONTACTOR, MAGNETIC *FIELD SHUNT	04B102
AEBC02	6S	MA	CONTACTOR, MAGNETIC *UMA-34B	04B106
AEBC02	RY	FC	RESISTOR, FIXED *FIELD SHUNT	04B103
AEBC04	6S	PC	CONTACTOR, PNEUMATIC *UBP-55	04B105
AEBC04	RU	0B	RELAY, OPEN FRAME *UNA-66 LR	04B117
AEBC08	6V	BF	CONTROLLER, BIN *SCD-248-H PBC	04B112
AEBC09	R2	AF	REVERSER, ASSY *SCR-482	04B111
AEBC10	6S	MA	CONTACTOR, MAGNETIC *UMA-34F JR	04B108
AEBC11	6V	BF	CONTROLLER, BIN *SCD-248-K SPC	04B113
AEBC11	FV	00	FUSE *MAIN	07B200
AEBC11	HE	ZZ	HARDWARE, MISC	07B299
AEBD01	1F	00	INSULATOR	04B402
AEBD01	6V	RJ	CONTROLLER, ROT *SCD-248-J PCC	04B115
AEBD01	6V	RJ	CONTROLLER, ROT *XCD-248-T BKCC	04B116
AEBD01	FT	00	FRAME	04B403
AEBD01	HE	ZZ	HARDWARE, MISC	04B499
AEBD01	R9	TK	ROD, TIE	04B405
AEBD01	RY	AF	RESISTOR, ASSY *ACCEL/BRK	04B400
AEBD01	RY	FC	RESISTOR, FIXED	04B401
AEDD00	62	00	COUPLING *HUB	09A502
AEDD00	62	00	COUPLING *MOTOR FLANGE	09A505
AEDD00	62	AF	COUPLING, ASSY *MOTOR HALF	09A500
AEDD00	B4	AF	BRACKET, ASSY *FRONT SUSPEN	09A211
AEDD00	FT	AF	FRAME, ASSY	09A201
AEDD00	HE	ZZ	HARDWARE, MISC *TRACTION MOTOR	09A299
AEDD00	HE	ZZ	HARDWARE, MISC	09A599
AEDD00	HV	AF	HUB, ASSY *MOTOR	09A501
AEDD00	MR	DA	MOTOR, DC *TRACTION	09A200
AEDD00	PZ	00	POLE *MAIN	09A202
AEDD00	SD	AF	SEAL, ASSY *HOUSING	09A503
AEDA00	4B	00	COIL *MAIN FIELD	09A203
AEDA02	4B	00	COIL *COMMUTATING FIELD	09A206
AEDB00	AU	AF	ARMATURE, ASSY *TRACTION MOTOR	09A207
AEDB05	PZ	AF	POLE, ASSY *COMMUTATING	09A205
AEDC00	B9	AF	BRUSHHOLDER, ASSY *TRACTION MOTOR	09A208
AEDD00	B8	00	BRUSH *TRACTION MOTOR	09A210