UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM

500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDICES

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Prepared By

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UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDICES

TABLE OF CONTENTS

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX A

PREPARERS AND PERSONS CONTACTED

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX A

PREPARERS AND PERSONS CONTACTED

TABLE OF CONTENTS

APPENDIX A

PREPARERS AND PERSONS CONTACTED

A.1 PREPARERS

- Dr. J. Ivor John, Ryerson, Master and Associates, Inc.
- Derek Markolf, Ryerson, Master and Associates, Inc.
- William Master, Ryerson, Master and Associates, Inc.
- Gary W. Wissman, RMA Associate
- Wendy Wittl, RMA Associate

A.2 POSTAL SERVICE REVIEWERS

- Han Dinh, Program Manager for Vehicles, USPS Engineering
- Marguerite Downey, Environmental Management Policy
- Jacquelynn Estes, Manager Vehicle Operations
- Jacqueline Johnson, Delivery Vehicle Operations
- Brad Suchy, USPS Engineering
- Wayne Corey, Delivery Vehicle operations

A.3 PERSONS CONTACTED

A.3.1 Postal Service

POSTAL SERVICE

Contact	Information Provided
Jacqueline Johnson Engineer USPS Engineering (703) 280-7667	Directed project
Jon Martin VMF Manager Huntington Beach VMF (714) 848-9994	Provided feedback on ECRV performance in Southern California
Gerard Koontz Supervisor, Vehicle Supplies Santa Ana District (714) 848-9994	Provided VMAS information and technical input for vehicles serviced by Huntington Beach VMF

APPENDIX A

PREPARERS AND PERSONS CONTACTED

POSTAL SERVICE

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Mildred Ruiz VMAS Vehicle Clerk, Long Beach VMF (562) 494-2364	Provided VMAS information for ECRVs serviced by Long Beach VMF
Frank Carcich VMAS Manager, La Puente VMF (626) 968-1404	Provided comments on ECRVs serviced by La Puente VMF
Steve Pacceco VMF Manager, San Diego VMF 858 674-0313	Provided VMAS information for ECRVs serviced by San Diego Midway VMF
Linda Yu, Carolin Lee VMAS, San Mateo (650) 377-1085	Provided VMAS data for all Postal Service locations with ECRVs
Ms. Hargathy Supervisor, Lamond Riggs P.O. (202) 842-2042	Information on ECRVs at Lamond Riggs P.O..
Steve Schmidt Administration Manager (202) 529-6844	Assistance with electricity bills for Lamond Riggs P.O.
Patrick O'Conner White Plains P.O., Postmaster (914) 287-2525	Provided information on ECRVs at White Plains P.O.
Jerry Barletta Maintenance (914) 287-2513	Provided information on ECRVs at White Plains P.O.

A.3.2   Other Contacts

OTHER CONTACTS

Contact	Information Provided
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APPENDIX A

PREPARERS AND PERSONS CONTACTED

OTHER CONTACTS

Contact	Information Provided
Kenneth Stwertnik Ford Motor Company (714) 572-8856	Provided copies of Ford's Concern Reports for ECRV repairs. Information on ECRV performance and reliability.
Dianna Mireles Southern California Edison (909) 942-8108	Provided electricity cost data for SCE sites
Dante Santiago Los Angeles Department of Water and Power (213) 367-3447	Provided electricity cost data for LADWP sites
Jesse Sandoval San Diego Gas & Electric (858) 654-1245	Provided electricity cost data for SDG&E
Joe Semerad San Diego Gas & Electric (858) 654-1105	Provided electricity cost data for SDG&E sites
Summer Harris Pacific Gas & Electric (800) 743-5000	Provided electricity cost data for PG&E sites
Sharon Kennedy Pacific Gas & Electric (408) 299-1084	Provided electricity cost data for PG&E sites
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Gloria Gee Sacramento Municipal Utility District 916-732-5712	Provided electricity cost data for SMUD sites

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX B

ANALYSIS OF ENERGY EFFICIENCY

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX B

ANALYSIS OF ENERGY EFFICIENCY

TABLE OF CONTENTS

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX B

ANALYSIS OF ENERGY EFFICIENCY

B.1   ECRV DAYS USED AND MILES DRIVEN

APPENDIX B

ANALYSIS OF ENERGY EFFICIENCY

B.2   ECRV ELECTRICITY USE AND COST

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX C

MAINTENANCE AND REPAIR DATA

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX C

MAINTENANCE AND REPAIR DATA

TABLE OF CONTENTS

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX C

MAINTENANCE AND REPAIR DATA

C.1   FORD ECRV CONCERN REPORTS

**UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT**

APPENDIX C

MAINTENANCE AND REPAIR DATA

C.2   POSTAL SERVICE VMAS DATA

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX D

ANALYSIS OF BATTERY DATA

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX D

ANALYSIS OF BATTERY DATA

TABLE OF CONTENTS

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX D

ANALYSIS OF BATTERY DATA

D.1   FORD CRs FOR SELECTED INCIDENTS INVOLVING BATTERY INCIDENTS

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX D
ANALYSIS OF BATTERY DATA

D.2   DAIS DATA FOR VEHICLES WITH BATTERY INCIDENTS

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX E

CARRIER SATISFACTION SURVEY APRIL 2003

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX E

CARRIER SATISFACTION SURVEY APRIL 2003

TABLE OF CONTENTS

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX E

CARRIER SATISFACTION SURVEY - APRIL 2003

E.1 SURVEY OBJECTIVES AND METHODOLOGY

In April 2003, a questionnaire was designed and distributed to the Post Office Managers and Letter Carriers at the 22 sites with Electric Carrier Route Vehicles (ECRVs). More than 100 Carriers were randomly selected (out a total of 500). The questionnaires were distributed with a Self Addressed Envelope (SAE) so the Carriers could return the completed questionnaires directly to Ryerson, Master and Associates, Inc. This approach was used to ensure the Carriers had the opportunity to provide candid comments on the performance of the ECRVs without being concerned about having statements and remarks attributed directly to them.

The questionnaires for the Managers and the Carriers included a list of statements relevant to the vehicle performance. Respondents were asked to circle the number that best indicates the extent to which they agreed or disagreed with each statement using the following guide:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

The statements were intentionally designed to solicit feedback on vehicle performance (operational and maintenance) rather than to request opinions about the ergonomics. This was intentional, because Carriers have expressed concerns about the vehicle height (driver platform and rear cargo bay) in previous interviews and surveys, including the Customer Acceptance Test.

Post Office Managers were also asked to provide additional feedback on the features of the vehicle that they liked and disliked, and on the types of comments made by customers about the ECRVs.

Responses were obtained from 12 Managers and 44 Carriers. Section E.2 provides a complete list of the comments received from the Carriers (E.2.1) and the Managers (E.2.2). Section E.3 provides a summary of the questionnaire ratings for the Carriers (E.3.1) and the Managers (E.3.2). To analyze the results, the number of responses in each rating category (1-5) were totaled for each statement. To provide a consistent way of interpreting the average ratings, the ratings for "negatively" phrased questions were reversed and an "adjusted score". Results were then expressed as percentages with favorable and unfavorable responses.

Observations and conclusions concerning the survey are included in Section 4.3 of the main report.

APPENDIX E

CARRIER SATISFACTION SURVEY - APRIL 2003

E.2   SURVEY COMMENTS

E.2.1   CARRIER COMMENTS

The following is a list of comments provided by the Carriers in their questionnaire responses:

"The ECRV is too high for a drive rte., lacks power going up hill, and is a safety hazard. It is too quiet, people walking can't hear you coming and walk out in front of you. There is no need for a window in the back compartment (anti-theft device?)."

"It's not a good vehicle for delivering mail. It's too high and is not good for a mail truck.

"Vehicle sits too high. Cannot step up into rear cargo area. Distance with charge is horrible. I cannot complete a collection on full charge, which is 1-1/2 hours straight with approximately 30 stop and starts."

"For the two years I've driven the vehicle, the only problem I've had was with the brake booster going bad and that was after having it for about two years"

"ECRV need some type of sound when turn on so people around you can know you are moving. I think this is extremely important to add to this vehicle. I've had some incidents when taller people cross my path and I start moving. It would be very hard to see a toddler from an ECRV because it is so high. Battery for ECRV needs more improvement for longer routes."

"Defroster doesn't work very well in cold rainy weather. You end up having to wipe windows to see. Rear bumper makes it difficult to access cargo from rear door."

"No hills."

"For customer safety I think a back up noise should be made to let customers know that vehicle is on. Vehicle is very quiet and most people outside the vehicle do not know that vehicle is on."

"I have had no problems with my ECRV. I like the ECRV much better than gas. I like the bigger size and better shocks. The ECRV is also much easier to drive with more visibility (back window)."

"Only one tow needed in 5,600 miles. I prefer the ECRV over gas types. Very positive reaction by the public. Only drawback is the step down height."

"The "distance to empty" gage says 60 miles, but I don't think it can go for 60 miles without needed charging."

APPENDIX E

CARRIER SATISFACTION SURVEY - APRIL 2003

"My personal opinion I would not buy or use this type of vehicle."

"In the winter times, this vehicle is not good."

"Re #15-#18: During the winter months, the use of heat, even for a short period of time, causes the vehicle's performance to deteriorate faster than normal. This is a problem because of low temperatures and the way the battery works."

"Re #14, sometimes you think it's running but it's not. You have to put in park and start again."

"Because the ECRV is very quiet, I would like to install back up warning horn. It would help on residential streets."

"Heater runs the batteries down very quickly! Sometimes worry about making it back!"

"I really enjoy driving the ECRV, knowing the USPS is not polluting the air."

"Better than gas powered heat."

"Whoever ordered these vehicles, has no idea what they're doing!"

"This vehicle is the best thing to hit the P.O. since the Pony Express. I love it."

"Best postal vehicle since I been in the Post Office 30 years."

APPENDIX E

CARRIER SATISFACTION SURVEY - APRIL 2003

E.2.2   POSTMASTER / STATION MANAGER / OIC COMMENTS

The following is a list of comments provided by the Managers in their questionnaire responses. The comments are grouped under each of the four questions included in the Manager questionnaire.

What are the main complaints, if any, you get from your Carriers about the ECRV?

"No complaints. Carriers are satisfied with electric vehicles."

"The cargo area is too high, difficult to load and unload heavy and big parcels on winter and raining the battery dies at the end of the route."

"Battery packs don't stay charged for long periods of time."

"Carriers worry about using them on their routes and then calling"

"Difficult to determine when charging connection is properly attached. Visibility of rear is not as good."

"Break down too often."

"Battery life too short"

"Charge."

"Dismount delivery more difficult because of vehicle height, in and out of rear of vehicle, seat belt is difficult, no adjustable tray."

"Carriers are upset that they might loose [sic] their vehicles (ECRV)"

"Increase heat output during winter period."

What aspects of the ECRV do your Carriers most like?

"The side window."

"No noise, no gas smell, cargo area is big."

"The speed, cleanliness and size."

"Don't have to go to gasoline station as gasoline LLVs"

APPENDIX E

CARRIER SATISFACTION SURVEY - APRIL 2003

"No fueling time/cost"

"Engine tune."

"Not having to refuel."

"Not having to put gas and it being quiet."

"Smooth handling, quiet - lower noise level."

What kind of feedback, if any, do you get from your Post Office customers about the ECRVs?

Some postal customers are surprised that we have electric vehicles."

"Surprise to see electric vehicle."

"None."

"They don't like the height of the vehicle - ground to cargo bed."

"None"

"None"

"N/A"

"Very quiet while running. Great for the environment. Positive image for the Postal Service."

Other Comments

"We can not use vehicle on long route. Battery did not last."

"Overall the carriers love the ECRVs when they work. They are out of service too much and when they fix them, the same problems resurface."

"The height of the vehicle presents a potential safety hazard for shorter people."

APPENDIX E

CARRIER SATISFACTION SURVEY - APRIL 2003

E.3   SUMMARY OF SURVEY RESULTS

E.3.1   CARRIER RATINGS

APPENDIX E

CARRIER SATISFACTION SURVEY - APRIL 2003

E.3   SUMMARY OF SURVEY RESULTS (CONTINUED)

E.3.2 POSTMASTER / STATION MANAGER / OIC RATINGS

APPENDIX E

CARRIER SATISFACTION SURVEY - APRIL 2003

E.4   COMPLETED SURVEYS

E.4.1 CARRIER SURVEYS

APPENDIX E

CARRIER SATISFACTION SURVEY - APRIL 2003

E.4   COMPLETED SURVEYS   (CONTINUED)

E.4.2   POSTMASTER / STATION MANAGER / OIC SURVEYS

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX F

ANALYSIS OF DAIS DATA

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

APPENDIX F

ANALYSIS OF DAIS DATA

TABLE OF CONTENTS

UNITED STATES POSTAL SERVICE
ELECTRIC CARRIER ROUTE VEHICLE PROGRAM
500 VEHICLE FLEET DEPLOYMENT REPORT

F.1   INTRODUCTION

This appendix includes the results from running the DAIS data Report Generator to analyze the DAIS data collected by the 25 ECRVs with DAIS units. The DAIS system and the Report Generator are described in Chapter 5 of this report. The data span for the DAIS reports is from vehicle deployment date to the end of 2002. In most cases this represents more than one year since the DAIS units were placed in operation. The DAIS vehicles located at each of the five sites are as follows:

Fountain Valley	Linda Vista	La Mirada	Royal Oaks	Alameda
016	198	233	357	362
029	210	236	358	378
030	232	245	402	383
031	312	306	407	396
033	314	308	412	416

Reports were generated for a range of variables derived from the DAIS data. Observations and conclusions from these reports are included in Chapters 3 and 5 of the main report. An explanation for each type of report is included in the pages immediately following this introduction. The following reports were generated:

All 5 sites (25 DAIS Vehicles):
- Miles Driven – days used and miles driven per day
- Drive/Charge Time – average hours driven and hours on charge per day
- Wall Energy – energy flow to the vehicle from the off-board charger
- Charge Profile – duration and time of charging (maintenance current and full charge)
- Pack Energy – energy flow in and out of the battery
- Vehicle Energy Use – pack energy used per mile driven
- Ambient Temperature Ranges – average hours in specified ranges
- Pack Temperature Ranges – average hours in specified ranges
- Ambient Temperatures – minimum, maximum and average temperatures (C)
- Pack Temperatures – minimum, maximum and average temperatures (C)

Site Averages (Fountain Valley, Linda Vista, La Mirada, Royal Oaks Station, Alameda Main):
- Miles Driven – days used and miles driven per day
- Drive/Charge Time – average hours driven and hours on charge per day
- Charge Profile – duration and time of charging (maintenance current and full charge)
- Pack Energy – energy flow in and out of the battery
- Vehicle Energy Use – pack energy used per mile driven
- Pack Temperature Ranges – average hours in specified ranges
- Pack Temperatures – minimum, maximum and average temperatures (C)

Report Title	Miles driven
Information Provided	Total miles, number of days driven in the period selected, average miles/day
Notes:	A drive file is created by the DAIS on any day when the vehicle is driven. No drive file is created if the vehicle is not used. Data are recorded to the drive file whenever the vehicle is turned on, but not when the vehicle ignition is off. The monthly report gives the number of days driven for each calendar month included in the data range selected.

Report Title	Drive/Charge Time
Information Provided	Number of hours each day the vehicle was "on-hook" (connected to the Power Control Station), being driven, or not used.
Notes:	Number of hours not used is estimated by subtracting the hours driven and the hours on-hook from 24 hours. If there is an error in the DAIS data files such that records were generated for the same time steps in the charge and drive files, then the value for hours not used could become negative, indicating a problem with the data recorded for that day.

Report Title	Pack Energy
Information Provided	Total kWhr delivered to battery by regeneration while being driven (positive drive kWhr), total kWhr supplied by the battery while being driven (negative kWh), the net energy demand (net drive kWhr), and the total energy delivered to the battery while being charged (charge kWhr). Dividing the charge kWhr in this report by the wall energy in the Wall Energy report will provide an indication of charger efficiency.
Notes:	In this table a zero value indicates a very small value, which has been rounded to zero. Days with no values in the database are shown as blanks (null values). Because all data are analyzed using a 24-hour clock (midnight to midnight), the charge energy and the drive energy are not expected to be correlated on a daily basis. However, there will be a correlation in the monthly data and the summary data for the entire period.

Report Title	Charge profile
Information Provided	Number of hours when the wall current is greater than 19 Amps, and number of hours between the wall current is between 1 Amp and 19 Amps. Number of hours when the wall current is greater than 1 Amp at specified time ranges through the day.
Notes:	Report indicates how long the vehicle was on charge in any particular day. Note that the time "on-hook" (see Drive/Charge Time report) may be greater than the sum of times in this report because on-hook will include times when wall current is less than 1 Amp. The time ranges can be used to provide an indication of whether the charging occurred during on-peak or off-peak times. The time periods in the database were based on midnight to 8 am, 8 am to 8 pm, and 8 pm to midnight. Note that these ranges may need to be adjusted for different utility rate structures.

Report Title	Wall energy
Information Provided	Total and daily average of wall energy (kWhr)
Notes:	Days with no charging are shown as null values, as they are not used in the averaging. This ensures that the averages provide data only for days when charging occurred.

Report Title	Vehicle energy use
Information Provided	Average energy use (kWhr/mile).
Notes:	The vehicle energy use is calculated by dividing the wall energy by the miles driven over the selected period. There is no detailed report available for this parameter because the daily charge and drive data are not correlated (since the database uses a 24-hour clock to develop the daily data).

Report Title	Ambient temperature ranges
Information Provided	Number of hours and percent of time that temperatures were within pre-established ranges.
Notes:	Report includes temperature data for each vehicle and for charge and drive files separately. The reports sometimes show days with temperatures of zero. Often these appear to be incorrect because there is no data for the next range. The zero values are not rejected in the error screening because zero could be a legitimate temperature value.

Report Title	Pack temperature ranges
Information Provided	Number of hours and percent of time that temperatures were within pre-established ranges.
Notes:	Report includes temperature data for each vehicle and for charge and drive files separately. The reports sometimes show days with temperatures of zero. These appear to be based on incorrect data records, because there is usually no data for the next data range in the record. The zero values are not rejected in the error screening because zero could be a legitimate temperature value.

Report Title	Ambient temperatures
Information Provided	Minimum, maximum and average temperatures.
Notes:	Report includes temperature data for each vehicle and for charge and drive files separately. The reports sometimes show days with temperatures of zero. These appear to be based on incorrect data records, because there is usually no data for the next data range in the record. The zero values are not rejected in the error screening because zero could be a legitimate temperature value.

Report Title	Pack temperatures
Information Provided	Minimum, maximum and average temperatures.
Notes:	Report includes temperature data for each vehicle and for charge and drive files separately. The reports sometimes show days with temperatures of zero. These appear to be based on incorrect data records, because there is usually no data for the next data range in the record. The zero values are not rejected in the error screening because zero could be a legitimate temperature value.