

BEFORE THE
POSTAL RATE COMMISSION
WASHINGTON, D.C. 20268-0001

POSTAL RATE AND FEE CHANGES

Docket No. R2006-1

RESPONSE OF THE UNITED STATES POSTAL SERVICE TO
PRESIDING OFFICER'S INFORMATION REQUEST NO. 4,
QUESTIONS 4-12
(September 22, 2006)

The United States Postal Service hereby provides the responses to Presiding Officer's Information Request (POIR) No. 4, Questions 4 - 12, issued June 1, 2006. The following witnesses are sponsoring the identified responses to this POIR:

Witness Kelley (USPS-T-30)	Question 4
Witness Stevens	Questions 5-10, 12
Witness Bradley (USPS-T-14)	Question 11

Each question is stated verbatim and is followed by the response.

Several pleadings explaining the status of these responses have been filed since the POIR was first issued in June.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

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September 22, 2006

Response of Postal Service Witness Kelley to Presiding Officer's Information Request Number 4

4. Please address how the resolution of sampling issues discussed by witness Kelley in USPS-T-16, Docket No. R2005-1, compares with the resolution of those issues in the 2004 data witness Stevens mentioned above. The answers should include comparisons with respect to such things as sample design, stratification, sample selection, sample size determination, and sampling precision.

Response

The 2004 survey that collected volume and time information about city letter carrier street activities utilized the same sample design as the 2002 study (CCSTS). To avoid confusion, I will refer to the later survey as the 2004 survey and the previous study as CCSTS. The 2004 survey employed a stratified systematic design to choose the ZIP Codes that were selected for the survey. Stratification, based on the number of city letter routes per ZIP Code, was used to reduce the variance. A systematic selection methodology was used, after sorting each stratum by ZIP Code, to ensure geographic dispersion within each stratum. These methods were also used to choose the sample for the CCSTS.

The frame for the 2004 survey consisted of all ZIP Codes with city letter routes. Conceptually, this is the same frame that was used for the CCSTS, however a more recent version was used to reflect changes in the sizes of ZIP Codes between the two time periods. Eligible ZIP Codes (those that had city letter routes) were classified into one of three strata. ZIP Codes with less than eleven city letter routes were placed in stratum one. ZIP Codes with more than ten but less than sixty-one city letter routes were placed in stratum two. ZIP Codes with more than sixty city letter routes were placed in stratum three. These are the same stratum boundaries that were used for the CCSTS.

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One-hundred and twenty-two ZIP Codes were selected for the 2004 survey. The attached worksheet comparisons of sample sizes and expected coefficients of variation between the two studies. Due to the forty-five fewer ZIP Codes that were selected in conjunction with the 2004 survey, the expected coefficient of variation rose from 4.9 percent to 6.1 percent – still well under the targeted ten percent that was discussed in my direct testimony during R2005-1 (USPS-T-16 page 8 line 16).

2002 CCSTS									
Strata	N_h	N	n_h	$(N_h - n_h)$	Mean Daily Volume ¹	S_h^2	$1 - f_h$	Variance ²	
1	5793	11588	29	5764	13,765	100,002,400	0.99499	857,477.93	
2	5747	11588	128	5619	64,477	1,522,319,266	0.97773	2,860,085.59	
3	48	11588	10	38	165,423	2,214,670,895	0.79167	3,008.27	
								3,720,572	
Average volume across all strata					39,544				
Standard Deviation					1,929				
CV					4.88%				
2004 SURVEY									
Strata	N_h	N	n_h	$(N_h - n_h)$	Mean Daily Volume ³	S_h^2	$1 - f_h$	Variance ²	
1	5880	11624	20	5860	13,438	98,545,329	0.99660	1,256,521.11	
2	5703	11624	76	5627	61,632	1,305,810,496	0.98667	4,080,709.20	
3	41	11624	26	15	161,675	4,587,217,441	0.36585	803.05	
								5,338,033	
Average volume across all strata					37,606				
Standard Deviation					2,310				
CV					6.14%				
¹ Data from CCCS tests FY2000									
² Cochran, William G. <u>Sampling Techniques 3rd Edition</u> (John Wiley & Sons, 1977) p. 92									
³ Data from CCCS tests FY2003									

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5. Using the 2004 survey data, please provide files that correspond to the following files included in LR-K-79 in Docket No. R2005-1:
 - a. COSTPOOL2.FINAL.xls
 - b. MDCD.CPSUM.FINAL.xls

In doing so, please provide all data with corresponding date, ZIP Code, and route number identifiers. Also please provide a data dictionary with descriptions of all variables.

Response:

Please see USPS-LR-L-179.

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6. Using the 2004 survey data, please provide files that correspond to the following files included in LR-K-81 in Docket No. R2005-1:
 - a. Density MDATA.prn
 - b. LFVolume MDATA.prn
 - c. PAVolume MDATA.prn
 - d. Timepool MDATA.prn

In doing so, please provide a data dictionary with descriptions of all variables.

Response:

Please see USPS-LR-L-179.

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7. Please provide a file that cross-walks masked ZIP Codes in all files submitted in response to questions 4 through 6, and any file submitted in LR-K-79 and LR-K-81 in Docket No. R2005-1.

Response:

Seven ZIP Codes are in both the 2002 and 2004 datasets. The following table provides a cross-walk of the masked ZIPs for those offices.

Masked Zip Code, 2004 Dataset	Masked Zip Code, 2002 Dataset
47421	6566657
78829	7253903
88309	8027588
78846	9785658
57785	2330822
44401	5692981
47392	275455

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8. Please describe any differences between the 2002 and the 2004 surveys in the Postal Service's efforts to train data collectors and verify the accuracy of the data collected.

Response:

The selection and training of local Study Coordinators were the same as in 2002. Also, as in 2002, the study coordinators had the responsibility to train the affected carriers and other local coordinators at their site. However, the 2004 data collection did not replicate the 2002 surveys in all aspects. One goal of the new study was to see if a smaller sample would suffice. Another goal was to simplify the role of the data collectors by making more use of existing data sources. To that end study coordinators were not asked to verify DOIS data. They were required only to provide the DOIS outputs for their units. Similarly, collection mail volumes were not measured in feet and inches but provided in containers. Parcel and Accountable mail counts, on the other hand, were still required, in order to be consistent with the CCSTS definition of these items.

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9. Please describe any differences in the mail volume data collection methods used in 2002 and 2004. For example, were mail volume data for the 2004 survey collected by carriers and their supervisors, or were volume data obtained from the Delivery Operations Information System (DOIS)?

Response:

Please refer to my response to item 8 of this POIR, and USPS-LR-L-179. Parcel, SPR, and Accountable volumes were recorded in 2004 as in 2002. Collected mail volumes were recorded by the carriers using container measures rather than converted at the local level to feet and inches. DOIS reports were used to provide the other mail volume data. DOIS mail counts that were inputs into CCSTS were not verified as they had been in 2002.

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10. With respect to route pivots, where more than one carrier might deliver mail on the same route on a given day, please describe any differences in the Postal Service's data collection methods in the 2002 and 2004 surveys.

Response:

Please refer to USPS-LR-L-179, page 8. "In the 2002 CCSTS, the carrier was instructed to Clock Off Street (046) when changing routes, and then Clock To Street (018) when starting a new route. In the 2004 Survey, new barcode scans were added to specifically indicate a route pivot while on the street. The carrier was instructed to scan Change Route/Clock Off Survey (841) when completing a route, and then Change Route/Clock On Survey (858) upon beginning the delivery of another route."

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12. Has the Postal Service collected city carrier time and volume data that are similar to the data collected in FY 2002 or FY 2004 described above from any other time period?

Response:

No, the Postal Service has not collected any city carrier letter route time and volume data from any other time period that are similar to the data collected in FY 2002 or FY 2004.

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11. Please run the carrier street time cost variability model described in USPS-T-14 in Docket No. R2005-1 using the time and volume data collected in the 2004 survey, and provide the output and the log of the run.

Response:

The requested output and log of the run (as well as the program) are presented in Library Reference LR-L-180. However, several factors should be kept in mind when considering the results.

First, as explained in Library Reference LR-L-179, this data collection effort by the Postal Service was not designed as a replication of the 2002 study, and involved some important differences in data collection methods. In fact, the data collection effort was in part experimental, in the sense that resource-saving collection methods were being tested to see if they could provide similar quality data as was collected in the 2002 study. For example, the sample size is smaller in 2004 than in 2002, resulting in a much smaller regression data set. In addition, as detailed in Library Reference LR-L-179, the method of recording volumes for collection mail was changed to an easier method. Instead of linear measurements of collection mail as was done in 2002, the 2004 study attempted to obtain collection mail information through counting the number of containers of collection mail the carrier brought back to the delivery unit. It is an open question how accurate this method turned out to be. Finally, the 2002 study emphasized recounting and verifying the mail counts that would be placed into DOIS. That is, the mail was to be counted carefully and accurately for the study, apart from any use it had in the DOIS system. In the 2004 study the DOIS counts were used for DPS, cased letters, cased flats, and sequenced mail.

These changes were associated with some different volume patterns in the 2004 data as compared with the 2002 data. A comparison of the means of the data used for estimating the regular delivery time equation is given in the following table. The

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reduction in cased letter and corresponding increase in DPS letters reflects that deployment of DPS technology between 2002 and 2004 throughout many parts of the delivery network.

**Mean Values per Zip Code Day
Regular Delivery Time Analysis**

	2002 Data Set	2004 Data Set	% Change
Delivery Time (Seconds)	222,595.3	258,724.2	16.2%
All Letters	36,008.0	38,414.5	6.7%
Cased Flats	11,799.2	14,178.1	20.2%
Sequenced	3,528.4	3,641.9	3.2%
Collection	4,969.5	6,251.4	25.8%
Small Parcels	373.3	379.8	1.7%
Del. Points	9,462.3	9,921.2	4.9%
DPS Letters	23,849.7	28,292.7	18.6%
Cased Letters	12,158.3	10,121.9	-16.7%

Second, with the further deployment of delivery point sequencing, the Postal Service city carrier operations are moving towards a “three bundle” approach, in which city carriers employ three bundles on the street. In this environment, the cost drivers of delivery might be considered to be pieces organized into three bundles, rather than the previous configuration for delivery: letters, flats, small parcels, and sequenced mail. While this is an issue that requires further consideration before a final decision is reached, it seems appropriate to take a first step at this point and investigate a version of the equation which uses DPS letters as one cost driver, cased letters, flats, and small parcels as a second cost driver, sequenced mail as a third cost driver, and collection mail as a fourth cost driver. This specification also has the salutary effect of reducing

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the number of right-hand-side variables and thus helping mitigate the multicollinearity problem.

Third, to the extent possible in a short period of time, the Postal Service has attempted to apply the some of the recommendations the Commission provided in it latest Opinion and Recommended Decision for future econometric work in this area. The Postal Service has made a good faith effort to accommodate the suggestions of the Commission within the structure of this POIR, but does not intend this as a complete response and plans to address the Commission's concerns more fully in future research. For example, some of the Commission's recommendations go to data collection issues, but because the 2004 data were collected before the Commission's Opinion and Recommended Decision was issued, those types of suggestions can not be addressed with that data set.

One of issues that could be addressed comes from the Commission's expressed concern that the Postal Service's method of dealing with non-applicable or "error" time which occurs when carriers recorded invalid scan pairs. In particular, the Commission suggested that this N/A time is correlated with delivery time and thus the Postal Service's "piggyback" method of dealing with it could cause bias in the cost pool proportions and econometric equations. It highlighted its concern with reference to Parcel/Accountable delivery time:¹

The "piggyback" calculation is presented in USPS-LR-K-79. Step 1 shows that parcel/accountable delivery time, including the time spent "deviating" to make such deliveries, is 4.37 percent of the total. When the Postal Service tabulated the 10 scan pairs that generated the most invalid time, however, it can be seen that invalid time involving

¹ See, PRC Op., Docket No. R2005-1, at 62.

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parcels and accountables constituted 39 percent of that time. Tr. 6/1878-79. This suggests that scan pairs involving parcel and accountable delivery were much more likely to be misinterpreted or misapplied by the carrier than other scan pairs. If so, the parcel/accountable accrued cost pool would be misestimated, and therefore, the attributable cost of delivering parcel and accountables would be misestimated. This aspect of the CCSTS data warrants further investigation.

In response, as described in Library Reference LR-L-179, the Postal Service undertook an extensive analysis of the "invalid" scan pairs in the 2004 data to see if more could be assigned to the delivery time pools. This indeed was the outcome of the effort with both the regular delivery and the parcel/accountable delivery time pools growing and, as the Commission suggested, the effect was pronounced for the parcel/accountable cost pool in for which the average time per ZIP CODE day was increased by about 50 percent over the 2002 data.

**Mean Values per Zip Code Day
Parcel/Accountable Delivery Time Analysis**

	2002 Data Set	2004 Data Set	% Change
PA Delivery Time (seconds)	18,352.60	27,306.01	48.8%
Large Parcels	141	149.687	6.2%
Accountables	58.1	57.4325	-1.1%
Delivery Points	8,179.30	8,832.15	8.0%

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The Commission also indicated that it found my approach to dealing with multicollinearity to be too broad, and that a selective, more focused approach would be preferred:²

A potentially more effective approach would have been to examine the Variance Inflation Factor values displayed in Table 4 of witness Bradley's testimony, to determine which terms are most highly correlated, to selectively remove them, and to test the improvement in multicollinearity. USPS-T-14 at 37. As an illustration of what might be done along these lines, the Commission asked witness Bradley to estimate the proposed model with only the cross-products that involve small parcels removed.

In estimating the restricted quadratic model, I followed this approach. I reviewed the Variance Inflation Factors from the full quadratic model and that review showed that most (but not all) of the cross product terms with large VIFs included possible deliveries as one of the variables. I thus eliminated just the cross product terms including possible deliveries. This target elimination leads to a substantial reduction in the Variance Inflation Factors for the remaining variables, but removed many fewer terms than the broader approach I used previously.

One final issue to consider in using the 2004 data arises from a review of the patterns of data collected. This review suggested that the 2004 data set may be subject to significant variations in two important delivery characteristics, non-motorized delivery and business deliveries. Zip Codes with a lot of non-motorized delivery could require more delivery time to delivery equal amounts of volume than equally sized Zip Codes with mostly all motorized delivery. To account for the possibility that this non-volume caused variation in delivery time is in the data, I consider an alternative specification

² See, PRC Op., Docket No. R2005-1, at 68.

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that includes the ratio of non-motorized (foot and park and loop) delivery points. Similarly, Zip Codes with a high proportion of business delivery points may be characterized by low levels of DPS letters and sequenced mail. To account for this possibility, I also include the ratio of business delivery points.

In sum, I estimated six specifications of the regular delivery equation:

- (1) Docket No. R2005-1 Specification, Full Quadratic;
- (2) Docket No. R2005-1 Specification, Full Quadratic Including non-motorized and business delivery ratios;
- (3) Docket No. R2005-1 Specification, Restricted Quadratic Including non-motorized and business delivery ratios;
- (4) Three Bundle Specification, Full Quadratic;
- (5) Three Bundle Specification, Full Quadratic Including non-motorized and business delivery ratios; and
- (6) Three Bundle Specification, Restricted Quadratic Including non-motorized and business delivery ratios.

I also estimated one specification (full quadratic) for the parcel/accountable delivery equation.

Complete results of estimating these equations are given in Library Reference LR-L-180, but a summary of the variability results are provided below.

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Regular Delivery Time Equation

Docket No.2005-1 Specification

	Full Quadratic	Full Quadratic w/ Non-Motorized & Business Ratios	Restricted Quadratic w/ Non-Motorized & Business Ratios
Letters	23.57%	17.62%	17.42%
Flats	10.51%	11.47%	11.55%
Sequenced	0.60%	1.38%	1.35%
Collection	0.78%	0.75%	1.80%
Small Parcels	9.57%	7.56%	8.18%

"Three Bundle" Specification

	Full Quadratic	Full Quadratic w/ Non-Motorized & Business Ratios	Restricted Quadratic w/ Non-Motorized & Business Ratios
DPS	27.33%	25.17%	19.11%
Cased LFP	15.08%	10.93%	14.43%
Sequenced	0.30%	1.18%	1.37%
Collection	1.48%	1.69%	1.88%

P/A Delivery Time Equation

Docket No.2005-1 Specification

	Full Quadratic
Large Parcels	33.36%
Accountables	18.78%

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon all participants of record in this proceeding in accordance with section 12 of the Rules of Practice.

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