Postal Rate Commission
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BEFORE THE
POSTAL RATE COMMISSION
WASHINGTON, D.C. 20268–0001

POSTAL RATE AND FEE CHANGES, 2006	Docket No. R2006–1

RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS
MARTIN CZIGLER TO INTERROGATORIES OF NATIONAL NEWSPAPER ASSOCIATION
NNA/USPS-T1-1-10

The United States Postal Service hereby provides the responses of witness Martin Czigler to the following interrogatories of the National Newspaper Association: NNA/USPS-T1-1-10, filed on June 20, 2006.

Each interrogatory is stated verbatim and followed by the response:

Respectfully submitted,

UNITED STATES POSTAL SERVICE

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RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS MARTIN CZIGLER TO INTERROGATORY OF NATIONAL NEWSPAPER ASSOCIATION

NNA/USPS-T1-1. On page 5 of your testimony (USPS-T-1) at lines 4-6, you state that "The amount of variation one could expect due to sampling alone is quantified by the coefficient of variation (CV)." With respect to this statement, please define what you mean by "amount of variation" in this statement and explain fully how this "amount of variation" is quantified in a CV.

RESPONSE:

The "amount of variation" is also known as sampling variation or sampling variance. The estimated sampling variance refers to the average of the squared deviation of the mean of the sample observations from the sample observation itself. Slightly different estimates could have been obtained if different samples had been taken during FY05 by, for example, using a different random number seed to determine which employees would be sampled. This sampling variance is estimated in the method described in USPS-LR-L-9, Appendix I, "Coefficients of Variation for IOCS-Based Cost Estimates". The coefficient of variation (CV) itself is defined as the ratio of the standard error of the estimate divided by the estimate itself. See Cochran, William G., Sampling Techniques (John Wiley and Sons, 1977), p. 54.

RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS MARTIN CZIGLER TO INTERROGATORY OF NATIONAL NEWSPAPER ASSOCIATION

NNA/USPS-T1-2. On page 5 of your testimony (USPS-T-1) at lines 4-6, you state that "The amount of variation one could expect due to sampling alone is quantified by the coefficient of variation (CV)." With respect to this statement, please confirm that, *all else equal*, statistical estimates that are based on samples with a higher amount of variation (as measured by the CV) are less reliable than statistical estimates that are based on samples with a lower amount of variation (as measured by the CV). Explain fully any answer other than a confirmation.

RESPONSE:

Confirmed that, all else equal, estimates having higher variation are less precise than estimates having lower variation.

RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS MARTIN CZIGLER TO INTERROGATORY OF NATIONAL NEWSPAPER ASSOCIATION

NNA/USPS-T1-3. On page 5 of your testimony (USPS-T-1) at line 6, you state that "CVs can be used to produce confidence intervals for estimates." With respect to this statement, please explain fully why you have used CVs to produce confidence intervals for the cost data by subclass that is shown in Tables, 1, 2 and 3 of USPS-T-1.

RESPONSE:

Confidence intervals are standard measures used to represent sampling variation.

RESPONSE OF UNITED STATES POSTAL SERVICE
WITNESS MARTIN CZIGLER TO INTERROGATORY OF
NATIONAL NEWSPAPER ASSOCIATION

NNA/USPS-T1-4. On page 5 of your testimony (USPS-T-1) at line 6, you state that "CVs can be used to produce confidence intervals for estimates." With respect to this statement, please explain fully why you have estimated 95% confidence intervals for the cost estimates by subclass that are shown in Tables, 1, 2 and 3 of USPS-T-1.

RESPONSE:

95 percent confidence intervals are a standard measure of reliability. If the full IOCS sampling procedure had been carried out twenty times in FY05, for example, we would expect that the true costs would fall outside the twenty confidence intervals one time, on average.

RESPONSE OF UNITED STATES POSTAL SERVICE
WITNESS MARTIN CZIGLER TO INTERROGATORY OF
NATIONAL NEWSPAPER ASSOCIATION

NNA/USPS-T1-5. On page 12 of your testimony (USPS-T-1) at lines 10-11, you state that, "Strong evidence of data quality improvement for IOCS comes from decreases in the coefficients of variation (CV) that measure the precision of the estimates." With respect to this statement, please explain fully why decreases in coefficients of variation provide "strong evidence of data quality improvement."

RESPONSE:

Decreases in CVs imply that the sampling variation has been reduced and therefore that the estimates are more precise.

RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS MARTIN CZIGLER TO INTERROGATORY OF NATIONAL NEWSPAPER ASSOCIATION

NNA/USPS-T1-6. On page 12 of your testimony (USPS-T-1) at lines 10-11, you state that, "Strong evidence of data quality improvement for IOCS comes from decreases in the coefficients of variation (CV) that measure the precision of the estimates." With respect to this statement, please define the term "precision" of the IOCS cost estimates as used in this sentence and explain how the coefficient of variation measures the "precision" of these estimates.

RESPONSE:

Precision refers to the size of deviations from the mean obtained by repeated application of the sampling procedure. See Cochran, William G., Sampling Techniques (John Wiley and Sons, 1977), p.16. The coefficient of variation is a relative measure of precision, computed as the ratio of the standard error of the estimate divided by the estimate itself.

RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS MARTIN CZIGLER TO INTERROGATORY OF NATIONAL NEWSPAPER ASSOCIATION

NNA/USPS-T1-7. In Table 1 on page 14 of your testimony (USPS-T-1) you show CVs by subclass for Cost Segment 3.1. The CV for Within County Periodicals is reported as 11.58% while the CV for Outside County Periodicals is reported as 1.56%. Please explain fully why the Within County CV shown in Table 1 is so much higher than the Outside County CV reported in the same table.

RESPONSE:

The reason that the CV for Within County Periodicals is higher than for Outside County is that the estimated level of costs is less. The estimated cost for Within County periodicals is $19.806M, only 0.16% of total costs in Cost Segment 3.1, while Outside County, at $869.487M and 6.84% of total costs, is over 40 times larger. In simple random sampling systems that measure proportions, the CV can be estimated as

$$\hat{CV}(p) = \frac{\hat{\sigma}_P}{p} = \frac{\sqrt{p(1-p)/(n-1)}}{p} = \sqrt{\frac{1-p}{(n-1)p}},$$

where p is the estimate of the proportion, σ_p is the standard error of the estimate, and n is the sample size. If IOCS were a simple random sampling system, then the ratio of the CVs of Within County to Outside County using the formula above would be 6.9. The ratio of the reported CVs is 7.4.

RESPONSE OF UNITED STATES POSTAL SERVICE
WITNESS MARTIN CZIGLER TO INTERROGATORY OF
NATIONAL NEWSPAPER ASSOCIATION

NNA/USPS-T1-8. In Table 1 on page 15 of your testimony (USPS-T-1) you show 95% Confidence Levels by subclass for Cost Segment 3.1. The 95% Upper Limit for Within County Periodicals is reported as $24,422,000, while the 95% Lower Limit for Within County Periodicals is reported as $15,429,000. Please confirm, that by this estimate, the USPS is 95% confident that in BY 2005, the actual cost (in Cost Segment 3.1) for Within County Periodicals lies somewhere between $15.4 million and $24.4 million. Please explain fully any answer other than a confirmation.

RESPONSE:

Confirmed. The 95 percent confidence interval for the cost estimate is $15,429,000 to $24,422,000.

RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS MARTIN CZIGLER TO INTERROGATORY OF NATIONAL NEWSPAPER ASSOCIATION

NNA/USPS-T1-9. In Table 2 on page 15 of your testimony (USPS-T-1) you show CVs by subclass for Cost Segment 6.1. The CV for Within County Periodicals is reported as 11.66% while the CV for Outside County Periodicals is reported as 2.65%. Please explain fully why the Within County CV shown in Table 2 is so much higher than the Outside County CV reported in the same table.

RESPONSE:

See the response to question NNA/USPS-T1-7. For Cost Segment 6.1, the estimated costs for Within County and Outside County Periodicals are 0.3 percent and 7.8 percent of the total costs respectively. If IOCS were a simple random sampling system, then the ratio of the estimated CVs of Within County to Outside County would be 5.3. The ratio of the reported CVs is 4.4.

RESPONSE OF UNITED STATES POSTAL SERVICE
WITNESS MARTIN CZIGLER TO INTERROGATORY OF
NATIONAL NEWSPAPER ASSOCIATION

NNA/USPS-T1-10. In Table 2 on page 15 of your testimony (USPS-T-1) you show 95% Confidence Levels by subclass for Cost Segment 6.1. The 95% Upper Limit for Within County Periodicals is reported as $11,905,000, while the 95% Lower Limit for Within County Periodicals is reported as $7,480,000. Please confirm, that by this estimate, the USPS is 95% confident that in BY 2005, the actual cost (in Cost Segment 6.1) for Within County Periodicals lies somewhere between $11.9 million and $7.5 million. Please explain fully any answer other than a confirmation.

RESPONSE:

Confirmed. The 95 percent confidence interval for the cost estimate is $7,480,000 to $11,905,000.