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

PERIODIC REPORTING

Docket No. RM2009-5

RESPONSES OF THE UNITED STATES POSTAL SERVICE TO CHAIRMAN'S INFORMATION REQUEST NO. 2
(August 20, 2009)

The Postal Service hereby files its responses to questions 1-4 of Chairman's Information Request No. 2, filed on August 6, 2009. Each question is stated verbatim, and followed by the response.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

Daniel J. Foucheaux, Jr.
Chief Counsel, Pricing & Product Support

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Eric P. Koetting

475 L'Enfant Plaza West, S.W.
Washington, D.C. 20260–1137
(202) 268-2992, FAX: -5402
August 20, 2009

RESPONSE OF THE UNITED STATES POSTAL SERVICE
TO CHAIRMAN'S INFORMATION REQUEST NO. 2

1. Please identify the stratification criteria for the ODIS-RPW.

RESPONSE:

Strata are determined using predicted First-Class Mail letter volume, Priority Mail reference volume, BRM/accountable mail reference volume, flat/IPP reference volume, parcel reference volume, and combined ODIS-RPW test and travel time. This has been documented in R2006/LR-L-14, Section IV.1.a.

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2. a. Please confirm that (i) Mail Exit Points (MEPs) are the primary sampling units for the ODIS-RPW, (ii) MEP–days are second stage sampling units, and (iii) mailpieces within sampled MEP-days are sampled at the third stage. If not confirmed, please explain.
b. At what stage of the sampling procedure is the proposed 20% sample reduction expected to be implemented?

RESPONSE:

a. Not confirmed. The MEP-day is the primary sampling unit. The container is the secondary sampling unit if container subsampling is performed within an ODIS-RPW 'test.' The mailpiece is the tertiary sampling unit if container subsampling is performed, but otherwise it is the secondary sampling unit.

b. The reduction will be taken in MEP-days.

3. Please provide the mathematical expression for the variance estimator associated with the estimated coefficients of variation given in Tables 1 and 2 of Proposal One.

RESPONSE:

Let *y* denote either revenue, pieces, or weight, and let *z* denote residual trial balance revenue. Also, let *g* denote a sample area index and *h* denote a stratum index within the area. The RPW estimator $\hat{y}'$ is obtained in four steps. For a given area *g* and stratum *h*, the initial three steps involves expansion of y_{ijk}, *k*th mailpieace in *j*th container on *i*th MEP-day, to receptacle level, to MEP-day level, and to strata level to obtain strata level expansion estimators $\hat{y}_{gh}$. Strata level expansion estimators are summed over all strata and sample area to obtain the national level total revenue, pieces, or weight,

$$\hat{y} = \sum_g \sum_h \hat{y}_{gh} .$$

The final step involves further improvement of revenue, pieces, or weight estimator by multiplying $\hat{y}$ by a ratio of the actual to the estimated residual trial balance revenue,

$$\hat{y}' = \frac{Z}{\hat{z}} \hat{y} .$$

Here Z is the actual residual trial balance revenue and $\hat{z}$ is the estimated residual trial balance revenue from the sample.

The variance of the RPW estimator $\hat{y}$ above is of the form,

$$V(\hat{y}') = \sum_g \sum_h \frac{N_{gh}^2}{n_{gh}} \left(V\left(\hat{y}_{gh}\right) + R^2 V\left(\hat{z}_{gh}\right) - 2R \times C\left(\hat{y}_{gh}, \hat{z}_{gh}\right) \right),$$

where $R = y/z$. $V(\hat{y}_{gh})$ is the variance of an RPW expanded estimator for area *g* and stratum *h*, which account for three sources of variations: variation due to sampled pieces being expanded to the receptacle level (third-stage variation), variation due to the receptacle estimator being expanded to the test level (second-stage variation), and variation due to the test level estimator being expanded to strata level (first-stage variation). Similarly, $V(\hat{z}_{gh})$ is the variance of estimated residual trial balance revenue, and $C(\hat{y}_{gh}, \hat{z}_{gh})$ is the covariance between $\hat{y}_{gh}$ and $\hat{z}_{gh}$. We ignored the finite population correction factors, 1 – sample fraction, in the variance estimator above at all three stages. Therefore, the estimator provides conservative variance estimates in comparison with the same estimator with the finite population correction.

Then, the estimator of the variance is

$$\hat{V}(\hat{y}') = \sum_{g}\sum_{h} \frac{N_{gh}^2}{n_{gh}} \left(\hat{V}(\hat{y}_{gh}) + \hat{R}^2 \hat{V}(\hat{z}_{gh}) - 2\hat{R} \times \hat{C}(\hat{y}_{gh}, \hat{z}_{gh}) \right),$$

where $\hat{V}(\hat{y}_{gh})$, $\hat{V}(\hat{z}_{gh})$, $\hat{R}^2$, and $\hat{C}(\hat{y}_{gh}, \hat{z}_{gh})$ are estimators of $V(\hat{y}_{hg})$, $V(\hat{z}_{gh})$, R^2, and $C(\hat{y}_{gh}, \hat{z}_{gh})$, respectively.

Then the coefficient of variation is estimated by

$$CV(\hat{y}') = \frac{\sqrt{\hat{V}(\hat{y}')}}{\hat{y}'}.$$

Please refer to Section VII titled 'Estimation' in R2006/USPS-LR-L-14/page 12 for a more detailed explanation.

4. Please identify the resultant sample allocation scheme which minimizes the impact of the proposed sample reduction on report volume and revenue coefficients of variation.

RESPONSE:

The current ODIS-RPW is designed to make the best use of available resources for a given level of sample size from two key perspectives: stratification and allocation. Ward clustering algorithm forms strata of MEPs such that within-strata variations are minimized, which make variances of estimators to be smaller compared to variances without a proper stratification. Within-strata variations are made as small as possible by the clustering, but between-strata (among-strata) variations are quite different from stratum to stratum. Chromy's algorithm allocates sample to strata such that more sample is allocated to strata with larger variations (to make variances of estimators smaller) and target level of CVs set for subclass are achieved.

CERTIFICATE OF SERVICE

I hereby certify that I have this date served the foregoing document in accordance with Section 12 of the Rules of Practice and Procedure.

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Eric P. Koetting

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Washington, D.C. 20260–1137
(202) 268-2992, FAX: -5402
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