



OFFICE OF INSPECTOR GENERAL UNITED STATES POSTAL SERVICE

Highlights

Background

The Postal Accountability Enhancement Act of 2006 (PAEA), Section 3652, requires the U.S. Postal Service to "analyze costs, revenues, rates, and quality of service" and submit an *Annual Compliance Report* to the Postal Regulatory Commission (PRC) no later than 90 days after the end of each year.

The PAEA also requires the Postal Service to annually report costs, revenue, volumes, and quality of service to the PRC. The PRC uses the information in these reports, including the *International Cost and Revenue Analysis* (ICRA) report for international products, to determine whether the Postal Service complied with the statute.

The Postal Service maintains a product costing system designed to comply with the PAEA, develop product costs, and generate information to support management decisions.

Because Postal Service accounting systems do not provide all required product information for reporting purposes, the Postal Service employs various statistical systems and special studies to generate the ICRA.

The Postal Service relies primarily on the In-Office Cost System (IOCS) for ICRA data collection for mail processing. The international mail tallies obtained from the IOCS generate international mail processing and acceptance costs. Other inputs are produced from a variety of source data, including certain accrued cost totals and distribution keys (used to assign volume related costs to products) that derive from operating and administrative functions. These various data sources are presented in the ICRA report as international costs associated with mail processing, delivery, and administration (non-transportation).

Domestic transportation costs for the ICRA are developed from the accrued costs obtained from the books of account for the various transportation modes (air, rail, or highway) on the basis of volume statistics. The volume statistics are obtained from the Transportation Cost System, which is a field data collection system operated for this purpose.

Our objective was to assess the accuracy and completeness of non-transportation processing and domestic transportation costs for Inbound Single-Piece First-Class Mail International as reported in the ICRA report for fiscal years 2014 and 2015.

What the OIG Found

The Postal Service accurately reported non-transportation processing and domestic transportation costs for Inbound Single-Piece First-Class Mail and determined the costs were complete.



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The Postal Service needs
to strengthen the current
documentation used in developing
the ICRA report by integrating
the core documents used to
produce the ICRA report into a
consolidated ICRA user guide.

However, the Postal Service needs to strengthen the current documentation used in developing the ICRA report by integrating the core documents used to produce the ICRA report into a consolidated ICRA user guide.

The Postal Service believed it had sufficient documentation to prepare the ICRA report because the NP-5 document (an overview and technical description of the ICRA) included process flow charts and descriptions of the various calculation spreadsheets.

Without a consolidated ICRA user guide that integrates and links the two components of the NP-5 document with the 22 internal sheets (tabs) in the ICRA report, it is difficult for the Postal Service to ensure that strong, complete ICRA documentation is available to prevent the risk of miscalculations, inaccuracies, and inconsistencies in the ICRA report.

In addition, the Postal Service's distribution approach for its 600,000 annual IOCS employee samples does not efficiently capture costs in all categories, resulting in oversampling by at least 30 percent. A more efficient approach would save the Postal Service about \$3.8 million annually in labor costs without significantly changing its sampling results.

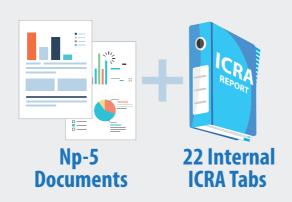
What the OIG Recommended

We recommended management develop a detailed, documented, and consolidated user manual to consistently prepare the ICRA report and prevent loss of institutional knowledge. We also recommended management revise its sample distribution approach to more efficiently capture all costs.

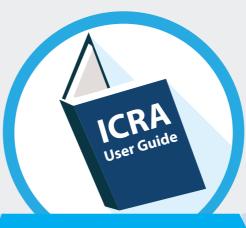


OFFICE OF INSPECTOR GENERAL UNITED STATES POSTAL SERVICE

International Cost and Revenue Analysis Report What the OIG Recommended



Integrates and Links the Two Components of the Np-5 Document with the 22 Internal Sheets (Tabs) in the ICRA Report



Create an ICRA
User Guide

Prevent Miscalculations



Prevent the Risk of Miscalculations, Inaccuracies, and Inconsistencies in the ICRA Report



Reduce Oversampling by up to 30%



Revise Sample Distribution Approach



Save About \$3.8 Million Annually in Labor Costs

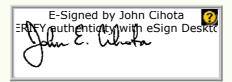
Transmittal Letter



December 19, 2016

MEMORANDUM FOR: SHARON D. OWENS

VICE PRESIDENT, PRICING AND COSTING



FROM: John E. Cihota

Deputy Assistant Inspector General for Finance, Pricing, & Investments

SUBJECT: Audit Report – International Cost and Revenue

Analysis Report (Report Number CP-AR-17-005)

This report presents the results of our audit of the U.S. Postal Service's International Cost and Revenue Analysis Report (Project Number 16BG017CP000).

We appreciate the cooperation and courtesies provided by your staff. If you have any questions or need additional information, please contact Sherry Fullwood, director, Cost, Pricing, and Investments, or me at 703-248-2100.

Attachment

cc: Corporate Audit Response Management

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Findings

We selected and reviewed non-transportation processing costs per piece of \$0.436 in FY 2014, and \$0.482 in FY 2015; domestic transportation costs per piece of \$0.150 in FY 2014, and \$0.129 in FY 2015; and volume variable costs of about \$249 million in FY 2014 and \$348 million in 2015.

Introduction

This report presents the results of our self-initiated audit¹ of the U.S. Postal Service's *International Cost and Revenue Analysis* (ICRA) report (Project Number 16BG017CP000). Our objective was to assess the accuracy and completeness of non-transportation processing and domestic transportation costs for Inbound Single-Piece First-Class Mail (FCM) International as reported in the ICRA report for fiscal years (FY) 2014 and 2015. We selected and reviewed non-transportation processing costs per piece of \$0.436 in FY 2014, and \$0.482 in FY 2015; domestic transportation costs per piece of \$0.150 in FY 2014, and \$0.129 in FY 2015; and volume variable costs² of about \$249 million in FY 2014 and \$348 million in 2015. See Appendix A for additional information about this audit.

Under the PAEA, the Postal Service is required to report annual costs, revenue, volumes, and quality of service to the Postal Regulatory Commission (PRC). The PAEA also requires that market-dominant products not subsidize competitive products and that each competitive product cover its attributable costs. Prices must be high enough to ensure that the revenue generated by a product exceeds the costs attributable to that product. To meet this legal requirement, the Postal Service continually collects information about the revenue, volume, weight, and costs of the mail. However, Postal Service accounting systems do not provide all the information by product and extra service.

Because Postal Service revenue and accounting systems do not provide all of the required product information for reporting purposes, the Postal Service employs various statistical systems and special studies to generate the annual *Cost Revenue Analysis* (CRA) report for domestic products and the ICRA report for international products. The ICRA report provides the costs and revenue for all classes of international mail. The Postal Service prepares the CRA and ICRA reports annually as part of its reporting requirements under the PAEA. The CRA report identifies all international mail costs in a single line item. The ICRA details line items in terms of international product categories, such as Priority Mail International, International Expedited Services, First-Class Package International Service, and International Negotiated Service Agreements (NSA).³

The Postal Service uses data collected by the statistical program tests to develop new rates, prepare budgets, conduct management studies, support management decisions in transportation and operations regarding mail flow and transit time, measure Postal Service workload and productivity, and develop NSAs. ICRA data collection for mail processing relies primarily on the In-Office Cost System (IOCS).⁴ These data are input for presentation into the ICRA report as international costs associated with mail processing, delivery, and administration (non-transportation). Domestic transportation costs for the ICRA are developed from the accrued costs obtained from the books of account for the various transportation modes – air, highway, and rail – on the basis of volume statistics. Volume statistics are obtained from the Transportation Cost System (TRACS), which is a field data collection system operated for this purpose.

¹ We performed this audit as part of our mandate under the Postal Accountability and Enhancement Act of 2006 (PAEA) to audit the data collection systems and procedures the Postal Service uses in its rate-making process.

² Volume variable costs are those that change proportionally to a change in the volume of a product or activity.

A customized and mutually beneficial contractual agreement between the Postal Service and a specific mailer (customer or organization). An NSA provides for customized pricing, prices, and classifications under the terms and conditions established in the NSA and may include modifications to current mailing standards and other Postal Service requirements.

⁴ IOCS is the primary probability sampling system used to distribute the labor costs of clerks, mail handlers, city carriers, and supervisors to the activities carried out by those employees, particularly activities related to the handling of mail.

Without a consolidated ICRA
user guide that integrates and
links the two components of
the NP-5 document with the 22
internal sheets (tabs) in the ICRA
report, it could be difficult for
the Postal Service to ensure the
availability of strong, complete
ICRA documentation that prevents
the risk of miscalculations,
inaccuracies, and inconsistencies
in the ICRA report.

Summary

The Postal Service accurately reported non-transportation processing and domestic transportation costs for Inbound Single-Piece FCM and determined the costs were complete. However, the Postal Service could strengthen the current documentation used in developing the ICRA report by integrating the core documents used to produce the report into a consolidated ICRA user guide. The Postal Service believed it had sufficient documentation to prepare the ICRA report because the NP-5 document (an overview and technical description of the ICRA) included process flow charts and descriptions of the various calculation spreadsheets. Without a consolidated ICRA user guide that integrates and links the two components of the NP-5 document with the 22 internal sheets (tabs) in the ICRA report, it could be difficult for the Postal Service to ensure the availability of strong, complete ICRA documentation that prevents the risk of miscalculations, inaccuracies, and inconsistencies in the ICRA report.

We also found that the Postal Service's distribution approach for its 600,000 annual IOCS employee samples does not efficiently capture costs in all categories, resulting in oversampling by at least 30 percent. A more efficient approach would save the Postal Service about \$3.8 million in labor costs annually without significantly changing its sampling results.

Consolidated International Cost and Revenue Analysis User Guide

We reviewed and validated the non-transportation processing and domestic transportation costs for Inbound Single-Piece FCM and found that the Postal Service accurately and appropriately reported both costs. However, the Postal Service could strengthen the documentation it currently uses to develop the ICRA report by integrating the three core documents used to produce the report into a consolidated ICRA user guide.

We found three core documents that need to be integrated when creating the ICRA user guide for preparing the ICRA report are as follows:

- The USPS-FY15 NP5: Part 1: FY 2015 International Cost Revenue Analysis (ICRA) Overview.
- The USPS-FY15 NP5: Part 2: FY 2015 International Cost Revenue Analysis (ICRA) Technical Description.
- The FY15 Unified Excel ICRA Report: All 22 internal sheets (tabs) that are imbedded in ICRA report. These internal sheets (tabs) are cost formulas and links that are interconnected in the ICRA report, which calculates and displays the various international cost by mail category.

The NP-5 document contains the following ICRA documentation:

- Part 1 is a summary and functional description of the six areas which constitute development of the ICRA report: domestic processing, international mail volume, domestic transportation, international transportation, settlement charges, and foreign-origin mail.
- Part 2 contains technical descriptions and computational details of the same six development areas, technical descriptions of the System for International Revenue and Volume/Outbound (SIRVO-IODIS) data systems, and a users guide to the files that are used as inputs to the ICRA report.

The NP-5 document includes process flowcharts, where parts 1 and 2 give a detailed overview of the various cost and technical explanations of the calculation spreadsheets. The NP-5 document discusses, in detail, the components of the various input calculation workbooks; however, the NP-5 does not explain how those input calculations workbooks are linked to the ICRA report's 22 internal sheets (tabs). These internal sheets distribute various cost segment information to the main sources of the mail classes of the ICRA report.

If the NP-5 document was linked to the actual 22 internal sheets (tabs) imbedded in the ICRA report, the Postal Service would have a consolidated ICRA user guide detailing the complete process of generating the ICRA report.

The Postal Service believed it had sufficient documentation to prepare the ICRA report because the NP-5 document included process flowcharts and descriptions of the various calculation spreadsheets. Additionally, it stated that the table of contents imbedded in the ICRA report, which outlines and names of the 22 internal sheets (tabs) imbedded in ICRA report, further explains the calculations.

However, if the NP-5 document was linked to the actual 22 internal sheets (tabs) imbedded in the ICRA report, the Postal Service would have a consolidated ICRA user guide detailing the complete process of generating the ICRA report.

The International Accounting Branch provides numerous reports covering quarterly and fiscal year data about international mail. Additionally, production of the ICRA depends on data from numerous sources, including Postal Service sampling systems and departmental reports:

- SIRVO-IODIS provides the volume pieces, weight, and revenue statistics for most outbound U.S. mail.
- The PostalOne! system provides revenue, pieces, and weight data for a variety of business products.
- The CRA provides most domestic processing cost data.
- The Postal Service accounts provide quarterly and annual book and payment figures on international costs, revenue, and settlements.
- Finance provides purchased transportation cost and TRACS data.
- Other pertinent information is gathered from individual Postal Service staff sources.

These sources of data are obtained as mainframe computer files, computer spreadsheets, and hard copy forms (printouts), and consolidated (downloaded, copied, linked, or manually entered) into the Excel Inputs workbook. The Excel inputs are:

- Express Mail Service & Global Express Guaranteed Calcs.xls
- Domestic Tran Calcs.xls
- Outbound Calcs.xls
- Inbound Calcs.xls
- International Customized Mail Costing

Strong documentation leads to strong internal controls, which are made up of policies (management statements of what should be done) and procedures (actions to implement what should be done). Without a consolidated ICRA user guide that integrates and links the two components of the NP-5 document with the 22 internal sheets (tabs) in the ICRA report, it could be difficult for the Postal Service to ensure the availability of strong, complete ICRA documentation that prevents the risk of miscalculations, inaccuracies, and inconsistencies in the ICRA report.

A user guide that links the key workbooks (and calculations) to output reports (data worksheets) can mitigate control risks by:

- Providing clarity around roles and responsibilities;
- Promoting consistency in practices, policies, and procedures;
- Communicating and preserving the who, what, when, where, and why of control execution;
- Taining new employees (or providing a refresher for existing employees);
- Providing evidence of the conduct of internal controls.

In a broader sense, a user guide would sustain institutional knowledge, which would help the organization focus on objectives such as improved performance, competitive advantage, innovation, and sharing lessons learned. As noted in a U.S. Postal Service Office of Inspector General (OIG) report,⁵ the Postal Service is at risk of losing extensive knowledge as a result of downsizing and the retirement eligibility of about 31 percent of its workforce.

In-Office Cost System Oversampling

We believe the Postal Service can reduce IOCS sampling by at least 30 percent. Currently, the Postal Service takes about 600,000 IOCS samples each year to estimate the cost of the activities of clerks, mail handlers, city carriers, and supervisors. However, the distribution of samples currently over samples some cost categories and under samples others, resulting in an inefficient use of labor hours in data collection.

The IOCS is the primary probability sampling system used to distribute the labor costs of clerk, mail handler, city carrier, and supervisor activities, particularly those related to handling mail. An IOCS reading consists of:

- Observing a selected employee, such as a carrier, at a designated time in the employee's workday.
- Recording an employee's assignment and the activity being performed (for example, a mail carrier delivers mail but is presently casing mail).
- Recording the characteristics of any mail (such as a letter, postcard, or parcel) or mail transportation equipment (such as a pouch, tray, or pallet) that the sampled employee is handling.

⁵ Postal Service Knowledge Management Process (Report Number DP-AR-14-002, dated March 7, 2014).

Additionally, management uses cost estimates from the IOCS as input into the ICRA report and the IOCS sampling plan documents the statistical design for and estimation of in-office labor costs. It also presents coefficients of variation⁶ and confidence intervals⁷ for the estimates.

In our review of the IOCS sampling plan, we tested increasingly smaller sample sizes to determine at what point, if any, the Postal Service could conduct fewer IOCS interviews and get the same results. Given a 95 percent confidence level, any point above the 5 percent horizontal line is statistically the same. We found the Postal Service could perform about 65 percent of the current sample size (564,810 tests for FY 2014 and 572,030 tests for FY 2015) without a significant difference in results. Therefore, the Postal Service could reduce its sample by about 35 percent and get the same results. Because we only analyzed 2 years worth of data, we concluded that a more conservative 30 percent reduction is reasonable. Conducting fewer samples could save the Postal Service \$15,499,622 in labor costs from 2014 through 2017.

Figure 1 shows the probabilities of getting the same results with fewer samples in tests of FY 2014 and 2015 data. See Appendix B for the detailed methodology.

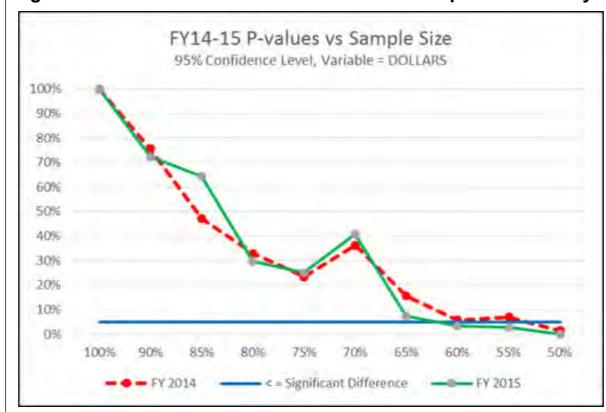


Figure 1. FY 2014 and 2015 P-values Versus Sample Size Overlay

Source: Postal Service data and OIG analysis.

⁶ The ratio of the standard deviation to the mean (or its absolute value). It shows the extent of variability in relation to the mean of the population.

In this instance, when we state, "we are 95 percent confident that the true value of the parameter is in our confidence interval," we are expressing that 95 percent of the hypothetically observed confidence intervals will hold the true value of the parameter.

⁸ The P-value indicates the probability of seeing a value equal to or greater than the test result if the null hypothesis were true. The null hypothesis in these tests was there is no difference between the original and test samples.

Recommendations

We recommend the vice president, Pricing and Costing:

- 1. Develop a detailed, documented, and consolidated user guide for consistently preparing the *International Cost and Revenue*Analysis report to prevent loss of institutional knowledge by capturing experiential knowledge for present and future employees.
- 2. Direct the manager, Cost Systems and Analysis, to revise the sample distribution approach to more efficiently capture costs in all categories.

Management's Comments

Management disagreed with the recommendations and monetary impact.

Management stated that it is pleased that, at the conclusion of a 4-month effort, the OIG reviewed and validated the non-transportation processing and domestic transportation costs for Inbound Single-Piece FCM and found that the Postal Service accurately and appropriately reported both costs.

Regarding recommendation 1, management noted that the ICRA is documented in detail. They added that the recommendation suggested that additional documentation would help prevent the loss of institutional knowledge, but the team did not inquire about the succession plan.

Management stated that it finds little value that the Postal Service needs to strengthen the current documentation used in developing the ICRA report. Specifically, they did not agree that consolidating the ICRA user guide with components of the NP-5 document with the 22 internal sheets (tabs) in the ICRA report would prevent the risk of miscalculations, inaccuracies, and inconsistencies in the ICRA report. Management believes that it has sufficient documentation to prepare the ICRA report because the NP-5 document (an overview and technical description of the ICRA) included process flow charts and descriptions of the various calculation spreadsheets.

Management did admit that although it could consolidate Parts 1 and 2 of the NP-5 document, it would result in an enormously large file, adding no value. Management also agreed, in general, with the report that strong documentation leads to strong internal controls. However, they noted that the audit team failed to recognize that the Postal Service does not create a new ICRA each year. Finally, management noted that while the ICRA appears to be complicated, it is not; it is actually a group of many calculations. They insisted it is not difficult to follow, using the self-documenting nature of Excel.

Regarding recommendation 2, management agreed with the principle that data systems should be designed to estimate costs as efficiently as possible. However, they disagreed that the IOCS is oversampling.

Management stated they do not create a new ICRA report each year and they must adhere to the methodologies litigated, established, documented, and approved by the PRC. Management also stated the analysis that the OIG conducted was inappropriate for determining the sample size IOCS should use, and the OIG used a variable from an intermediate data set produced by the Management Operating Data System (MODS)⁹ mail processing cost model in a way that averaged over both

⁹ MODS is a systematic approach to gathering, storing, and reporting workload, workhours, and machine use. The operational data is entered into MODS, compiled, and communicated in reports to Postal Service facilities for planning mail processing activities and projecting workhours and mail volumes.

products and mail handling categories internal to the model. Also, they stated this approach fails to reflect that sample size reduction will degrade the cost estimates for individual products, in particular low-volume products whose cost estimates already have relatively high sampling standard errors at existing sample sizes.

Management agreed that substantial resources are needed to implement IOCS and reiterated that it is a critical system for product costing. Additionally, they stated they are actively exploring ways to improve data quality while limiting data collection costs through new initiatives and by researching the use of automated collection systems to distribute costs.

Regarding monetary impact, management stated it appeared that the OIG assumed that data collection costs can be reduced in proportion to the number of samples. Also, they stated that since they use the same data collectors for multiple data systems and the randomness inherent in scheduling IOCS readings, the number of data collectors will decline less than proportionately than the number of samples, even if reduction in samples occurred.

Finally, management noted our report did not accurately discuss the responsibilities of the Cost Attribution group (as noted in footnote 1 of its management comments). Management noted that in the process of developing the CRA and ICRA reports, the Cost Attribution group does assemble data from the systems cited; however, it is not responsible for the development or production of the data.

See Appendix C for management's comments in their entirety.

Evaluation of Management's Comments

The OIG considers management's comments unresponsive to the recommendations in the report. Our review of the Postal Service's costing systems and reports are mandated by PAEA. These reviews are conducted to support postal operations and increase efficiencies. The OIG reports provide an opportunity to highlight accuracies in postal operations as well as provide findings on areas where efficiencies and operations could be enhanced.

In response to recommendation 1, the OIG stated clearly that the Postal Service believed it had sufficient documentation to prepare the ICRA report. However, as discussed in the report; we believe that if the NP-5 document was linked to the actual 22 internal sheets (tabs) imbedded in the ICRA report, the Postal Service would have a consolidated ICRA user guide detailing the complete process of generating the ICRA report. For example, of the 22 tabs imbedded in the ICRA report, five of those are pivot table tabs. Since the source of those pivot table tabs are delinked, there is no way to ensure that sources are actually pulling from the calculation spreadsheets or to ascertain whether there are strong internal controls to prevent miscalculations.

We believe the value in a detailed, documented, and consolidated user guide helps to ensure that tasks are completed in a consistent and repeatable way, and to facilitate transfer of institutional knowledge. Specifically, a consolidated user guide will enable management to identify gaps (for example, a need for appropriate checks and controls, or where there is a lack of familiarity or co-ordination between different functional groups).

Regarding recommendation 2, we acknowledge the inherent risks assumed in sampling, and that true assessment is only possible by measuring every value and not sampling at all. While we believe that sample size reduction will result in the data collection savings indicated, we defer to management's expertise to optimize the sample distribution to more closely balance coefficients of variation (CV) to achieve the reduction. The widely dispersed CV referenced in management's response is evidence the current

system is not efficient. We continue to believe opportunities exist to reduce overall sample size through more judicious distribution of resources, thus minimizing risk through efficiency rather than oversampling brute force.

We recognize management does not create a new ICRA report each year and must adhere to the methodologies litigated, established, documented, and approved by the PRC. However, we believe the PRC would be in agreement that a detailed, documented, and consolidated user guide would help address the diversity of user experience. This would, in turn, mitigate "what appears to be complicated but is actually a combination of many calculations."

Also, the analysis that the OIG conducted was appropriate for determining the sample size IOCS should use. The variable used in the analysis reflects costs that included International as well as other mail products. This variable is appropriate because management interviews indicated that once international mail passes through the international service center, it enters the general mail stream and incurs normal mail processing costs. The recommended sample size reduction is not suggested to be an across-the-board cut, but rather part of a rebalancing and optimization of the distribution. This will focus reductions where they are most effective while not adversely affecting volume-sensitive products.

Management disagreed with our sampling analysis and labor savings estimates. We recognize that sampling analysis and labor saving estimates rely on assumptions, variances, and professional judgment. As such, the results may vary and no single model will forecast with accurate precision in every circumstance. However, we believe our sampling analysis and labor savings estimates remain valid and believe the Postal Service has an opportunity to decrease its IOCS sample size and generate additional savings.

The OIG agrees that the report should state International Accounting Branch instead of Cost Attribution group as referenced in footnote 1 of management's comments, and the two sentences of concern have been transposed in the report.

The purpose of this report was to determine whether the Postal Service accurately and completely reported non-transportation processing and domestic transportation costs for Inbound Single-Piece FCM. Accordingly, we view the disagreements on the recommendations as unresolved but do not plan to pursue them through the formal audit resolution process. We consider the recommendations closed, but not implemented.

Appendices

Click on the appendix title to the right to navigate to the section content.

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Appendix A: Additional Information

Background

The Postal Service prepares the annual ICRA report covering the period October 1 through September 30. The ICRA report was created to help meet the statutory requirement under Title 39 of the U.S. Code: that "each class of mail or type of mail service bear the direct and indirect costs attributable to that class or service...."

PAEA Section 3652 requires the Postal Service to "analyze costs, revenues, rates, and quality of service" and submit an *Annual Compliance Report*¹⁰to the PRC no later than 90 days after the end of each year. The PAEA also requires the Postal Service to annually report costs, revenue, volumes, and quality of service to the PRC. The PRC uses information in these reports to determine whether the Postal Service complied with the statutory requirement.

The Postal Service maintains a product costing system designed to meet these requirements, develop product costs, and provide information to support management decisions. Because Postal Service revenue and accounting systems do not provide all of the required product information for reporting purposes, the Postal Service employs various statistical systems and special studies to generate the ICRA report for international products.

ICRA data collection for mail processing relies primarily on the IOCS. The IOCS is a work sampling system used to estimate the amount of mail processing, retail, carrier in-office and special delivery functions labor time by class and rate category. In addition, IOCS, along with payroll and expense data, identifies the share of labor costs associated with each of the major functions.

Employees are selected from payroll records for sampling. Some tests cannot be used because employees are not working on the sample date; are transferred, detailed, terminated, or unavailable (for example, at lunch); or the test failed the editing and consistency checks.

After developing the percentage of labor time by class and rate categories from the test data, data collectors edit and conduct consistency checks and then link labor costs to the classes and categories. The data are used to distribute about \$30 billion in volume-variable costs¹¹ to mail products. The international mail tallies obtained from the IOCS data collection provide international mail processing and acceptance costs. Other inputs are produced from a variety of source data, including certain accrued cost totals and distribution keys that derive from operating and administrative functions. These data are input for presentation in the ICRA report as international costs associated with mail processing, delivery, and administration (non-transportation).

The Postal Service spends about \$6 billion each year for purchased transportation, such as, commercial airlines, network air, and trucking routes. TRACS samples air, highway, and rail transportation and determines the proportion of space used by various mail classes in each of these modes. Since purchased transportation varies significantly by mode, TRACS uses separate sampling systems to collect highway and rail (TRACS Surface) and air (TRACS Air) data. For each mode, TRACS observes and records the space that is occupied. Domestic transportation costs for the ICRA are developed from the accrued costs obtained from the books of account for the various transportation modes on the basis of volume statistics obtained from the TRACS.

¹⁰ The Postal Service files an Annual Compliance Report on the costs, revenue, rates, and quality of service associated with its products each fiscal year.

¹¹ Volume-variable costs are calculated by multiplying the total volume of the class or product by the change in unit costs resulting from a change in its volume alone, when the volumes of other products remain constant.

Objective, Scope, and Methodology

Our objective was to assess the accuracy and completeness of non-transportation processing and domestic transportation costs for Inbound Single-Piece FCM International as reported in the ICRA report for FYs 2014 and 2015. To accomplish our objective we:

- Reviewed process, guides, handbooks, manuals, and checklists for how data is obtained, calculated, and validated.
- Reviewed data collection systems procedures and criteria in Handbook F-45, *Data Collection User's Guide for In-Office Cost System*, related to the IOCS, and Handbook F-85, *International Revenue, Volume, and Performance Measurement Systems*, related to Inbound Single-Piece FCM International.
- Interviewed Cost Attribution, Cost Systems and Analysis, and Statistical Programs managers and other relevant Postal Service personnel.
- Assessed controls in place to detect miscalculations and actions to mitigate them.
- Reviewed and validated the IOCS and TRACS cost attribution for non-transportation processing and domestic transportation costs for Inbound Single-Piece FCM International.
- Reviewed and evaluated the IOCS sampling plan for reasonableness.

We conducted this performance audit from June through December 2016, in accordance with generally accepted government auditing standards and included such tests of internal controls as we considered necessary under the circumstances. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for

our findings and conclusions based on our audit objective. We discussed our observations and conclusions with management on November 3, 2016, and included their comments where appropriate.

We did not assess the reliability of computer-generated data and accepted the IOCS Computerized On-Site Data Entry System software as sufficiently reliable to use the Statistical Analysis System to pull samples from annual IOCS test data for the purposes of this report.

Prior Audit Coverage

We did not identify any prior audits or reviews related to the objective of this audit.

Appendix B: Office of Inspector General Analysis of In-Office Cost System Sample Size

Summary

The Postal Service could reduce the size of its annual IOCS sample of employee activity by as much as 35 to 40 percent while maintaining the same fidelity of results, although more conservative reductions could be in the 15 to 30 percent range. Analysis of tests of FY 2014 and 2015 nationwide IOCS samples shows no statistically significant difference in the DOLLARS variable at those reduction levels. This and other variables are used to generate annual reports for the PRC to verify that mail classes cover their attributable costs.

Background

The IOCS is a year-round sampling program to estimate costs of activities of clerks, mail handlers, city carriers, and supervisors. The sample data, used with the accounting system and the MODS produce detailed estimates of attributable costs for various activities. Specifically, IOCS estimates are used to distribute volume variable costs to products for cost segments 3 (clerk/mail handlers in Cost Ascertainment Group (CAG¹²) A-J post offices), 4 (Clerks in CAG K post offices) and 6 (city carrier, in-office¹³). The data are generally tabulated at the "cost pool"¹⁴ level for costing purposes.

Analytical Approach

The area of interest for this analysis is international service center (INTL ISC) costs. This category is a subset of Cost Segment 3, which is a further subset of all cost segments mentioned above. A top-down approach was developed in which progressively smaller simple random samples of the annual sample results would be tested to determine at what point, if any, results from the smaller samples would differ significantly from the original, using a 95 percent confidence level.

The Postal Service conducted 572,030 samples of employees in FY 2015, and 564,810 in FY 2014. Results are processed by the Statistical Analysis System (SAS). Cost Segment 3, of which INTL ISC is a part, is processed through five general steps:

Step 1 partitions IOCS tallies into three facility groups based on finance numbers.

Step 2 assigns tallies to Cost Segment 3 functions and mail processing cost pools, constructs subclass distribution keys, and identifies groups of tallies to which the distribution keys would apply.

Step 3 distributes mixed mail handling tallies to subclasses.

Step 4 distributes "not-handling" tallies and special pool costs to subclasses.

Step 5 makes special adjustments to Allied Cost pools.

Individual SAS programs are clustered into four program groups: MODS1&2, NDCS, NONMODS, and ADMIN/WINDOW

¹² Method that classifies post offices according to volume of revenue generated. Each year, the *Postal Bulletin* publishes the number of revenue units for each classification. CAG A–G-offices have 950 or more revenue units. CAG H-J-offices have between 190 and 949. CAG K-offices have between 36 and 189, and CAG L-offices have less than 36

¹³ Carrier in-office activity consists mainly of preparing mail for delivery before leaving the office for street work. In addition, it includes maintaining operational records and performing administrative duties.

A cost pool is a distinct unit that can be linked to a measurable activity. Cost pool definitions allow statistical methodologies such as IOCS to be apportionment tools that measure and link the level of labor activities to products and services by sampling instances of employee work time with particular products and developing estimates of the proportions of an employee's time spent on various activity unit functions while processing categories of mail.

SERVICES. An initial Step 0 program ties the IOCS data file for the given year with encrypted finance numbers. A total of 28 SAS programs are used to process all categories. The first nine in that series produce the first MODS and Exempt costs. The MODS file lists costs by pool, of which INTL ISC is one. Given that this is our target of concern, all tests were conducted on this output file.

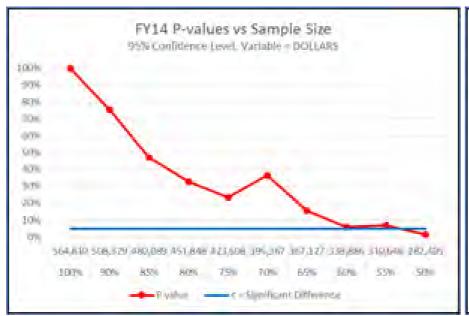
The testing approach was to run the first nine programs on the total annual sample to generate a baseline mods data file (mods. sas7bdat). A SAS program was written to draw simple random samples of decreasing proportions for testing. A second SAS program was written to export the POOL, FREQUENCY, and DOLLAR columns to Microsoft Excel. The DOLLAR variable was chosen for testing as the most relevant for our objective. Two-Sample T tests were used to test the null hypothesis that the difference between the data in the sub-sample and the baseline is zero (statistically the same).

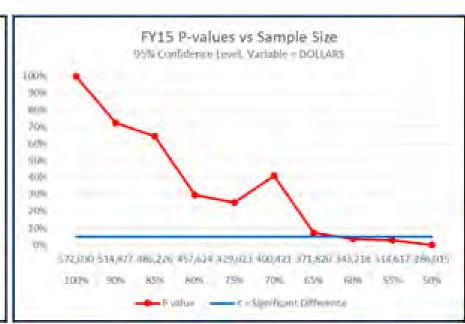
Two-Sample T tests were conducted at the 90, 85, 80, 75, 70, 65, 60, 55, and 50 percent of original sample levels, each comparing the DOLLAR variable distribution in the original and test samples. This series was conducted on FYs 2014 and 2015 IOCS data using a 95 percent confidence level and their P-values recorded. The P-value indicates the probability of seeing a value equal to or greater than the test result if the null hypothesis were true. The null hypothesis in these tests was there is no difference between the original and test samples ($\mu_{\text{Original}} - \mu_{\text{Test}} = 0$). Finally, a Paired T Test was conducted on the P-values from the FY 2014 and 2015 test series to determine if the two observation distributions were the same.

Test Results

Figures 2 and 3 plot the P-values from the FY 2014 and 2015 test series.

Figure. 2 Figure. 3





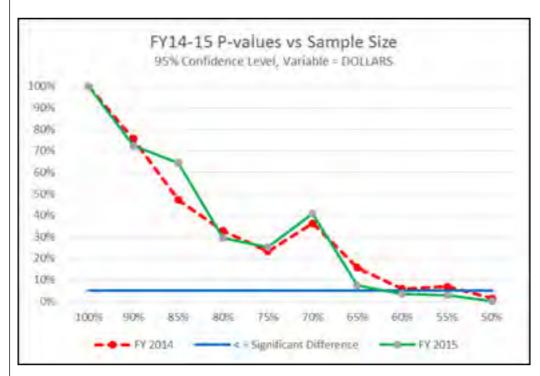
The horizontal line at 5 percent indicates the threshold above which there is likely no significant difference between the original and test samples. In both test series, the plot crosses the 5 percent level at about 60 percent of the original sample size, although a conclusion of significant difference is not definitive until about the 50 percent reduction level.

As we are interested in how much the Postal Service could reduce its sample size and still get essentially the same results, the conservative conclusion from this data is a 30 percent reduction (to the 70 percent level) is reasonable. More risk-averse approaches could be to select as little as a 15 percent reduction.

Comparing the FY 2014 and 2015 average of original sample sizes with those of the test samples, a 30 percent reduction would lower the average of 568,420 samples to 397,894, a 170,526 reduction. At the 40 percent reduction level, the number of samples would be 227,368 fewer, or a total of 341,052.

A Paired T Test was used to determine if the two annual test distributions are statistically the same. Figure 4 shows a plot with the two distributions overlaid, followed by the test results.¹⁵

Figure. 4



Paired T-Test and CI: FY15 t, FY14 t

	N	Mean	StDev	SE Mean
FY15 t	10	0.346	0.344	0.109
FY14 t	10	0.345	0.322	0.102
Difference	10	0.0014	0.0698	0.0221

95% CI for mean difference: (-0.0485, 0.0513)

T-Test of mean difference = 0 (vs not = 0): T-Value = 0.06 P-Value = 0.951

¹⁵ All statistical analyses conducted with Minitab 16.

The resulting P-value of 0.951 overwhelmingly suggests no significant difference. Additionally, the resulting 95 percent confidence interval was (-0.0485, 0.0513). Since this interval includes zero, the conclusion is the two distributions are statistically the same.

The SAS sample parameters are as follows:

FY 2015

100%		
Input Data Set	PRCNPUB15 100	
Random Number Seed	988269001	
Sampling Rate	1	
Sample Size	572030	
Selection Probability	1	
Sampling Weight	1	
Output Data Set	PRCNPUB15 1	

70%		
Input Data Set	PRCNPUB15 100	
Random Number Seed	425139000	
Sampling Rate	0.7	
Sample Size	400421	
Selection Probability	0.7	
Sampling Weight	1.428571	
Output Data Set	PRCNPUB15 70	

90%		
Imput Data Set	PRCNPUB15 100	
Random Number Seed	58420001	
Sampling Rate	0.9	
Sample Size	514827	
Selection Probability	0.9	
Sampling Weight	1.111111	
Output Data Set	PRCNPUB15 90	

65%		
Input Data Set	PRCNPUB15 100	
Random Number Seed	59488000	
Sampling Rate	0.65	
Sample Size	371820	
Selection Probability	0.650001	
Sampling Weight	1.538459	
Output Data Set	PRCNPUB15 65	

85%		
Input Data Set	PRCNPUB15 100	
Random Number Seed	422094001	
Sampling Rate	0.85	
Sample Size	486226	
Selection Probability	0.850001	
Sampling Weight	1.176469	
Output Data Set	PRCNPUB15 85	

60%		
Input Data Set	PRCNPUB15 100	
Random Number Seed	305245000	
Sampling Rate	0.6	
Sample Size	343218	
Selection Probability	0.6	
Sampling Weight	1.666667	
Output Data Set	PRCNPUB15 60	

80%		
Input Data Set	PRCNPUB15 100	
Random Number Seed	16964000	
Sampling Rate	0.8	
Sample Size	457624	
Selection Probability	0.8	
Sampling Weight	1.25	
Output Data Set	PRCNPUB15 80	

PRCNPUB15 100
311032000
0.55
314617
0.550001
1.818179
PRCNPUB15 55

75%		
Input Data Set	PRCNPUB15 100	
Random Number Seed	180592001	
Sampling Rate	0.75	
Sample Size	429023	
Selection Probability	0.750001	
Sampling Weight	1.333332	
Output Data Set	PRCNPUB15 75	

50%		
Input Data Set	Not Captured	
Random Number Seed	Not Captured	
Sampling Rate	0.5	
Sample Size	286015	
Selection Probability	Not Captured	
Sampling Weight	Not Captured	
Output Data Set	PRCNPUB15 50	

FY 2014

100%	
Input Data Set	PRCNPUB14
Random Number Seed	880746000
Sampling Rate	1
Sample Size	564810
Selection Probability	1
Sampling Weight	1
Output Data Set	PRCNPUB14 1

70%	
Input Data Set	PRCNPUB14
Random Number Seed	11659001
Sampling Rate	0.7
Sample Size	395367
Selection Probability	0.7
Sampling Weight	1.428571
Output Data Set	PRCNPUB14 70

90%	
Input Data Set	PRCNPUB14
Random Number Seed	218625000
Sampling Rate	0.9
Sample Size	508329
Selection Probability	0.9
Sampling Weight	1.111111
Output Data Set	PRCNPUB14 90

65%	
Input Data Set	PRCNPUB14
Random Number Seed	140731000
Sampling Rate	0.65
Sample Size	367127
Selection Probability	0.650001
Sampling Weight	1.538459
Output Data Set	PRCNPUB14 65

050/	
85%	
Input Data Set	PRCNPUB14
Random Number Seed	176845001
Sampling Rate	0.85
Sample Size	480089
Selection Probability	0.850001
Sampling Weight	1.176469
Output Data Set	PRCNPUB14 85

60%	
Input Data Set	PRCNPUB14
Random Number Seed	787217001
Sampling Rate	0.6
Sample Size	338886
Selection Probability	0.6
Sampling Weight	1.666667
Output Data Set	PRCNPUB14 60

80%	
Input Data Set	PRCNPUB14
Random Number Seed	125537000
Sampling Rate	0.8
Sample Size	451848
Selection Probability	0.8
Sampling Weight	1.25
Output Data Set	PRCNPUB14 80

55%	
Input Data Set	PRCNPUB14
Random Number Seed	942788001
Sampling Rate	0.55
Sample Size	310646
Selection Probability	0.550001
Sampling Weight	1.818179
Output Data Set	PRCNPUB14 55

75%	
Input Data Set	PRCNPUB14
Random Number Seed	62098001
Sampling Rate	0.75
Sample Size	423608
Selection Probability	0.750001
Sampling Weight	1.333332
Output Data Set	PRCNPUB14 75

50%	
Input Data Set	PRCNPUB14
Random Number Seed	945345001
Sampling Rate	0.5
Sample Size	282405
Selection Probability	0.5
Sampling Weight	2
Output Data Set	PRCNPUB14 50

Appendix C: Management's Comments

Sharon Owens Vice President, Pricing & Costing



December 7, 2016

Lori Lau Dillard Director, Audit Operations

SUBJECT: International Cost and Revenue Analysis Report (Report Number CP-AR-17-DRAFT)

Management is pleased that, as the conclusion of a four-month effort, the Office of Inspector General audit team, "reviewed and validated the non-transportation processing and domestic transportation costs for Inbound Single-Piece FCM and found that the Postal Service accurately and appropriately reported both costs." (Draft report at page 2.)

Management finds little value to be gained from the audit team's finding that the "Postal Service needs to strengthen the current documentation used in developing the ICRA report by integrating the core documents used to produce the International Cost and Revenue Analysis (ICRA) report into a consolidated ICRA user guide." (Draft report in Highlights and at page 2.) Management disagrees with the audit team's conclusion that,

Without a consolidated ICRA user guide that integrates and links the two components of the NP-5 document with the 22 internal sheets (tabs) in the ICRA report, it is difficult for the Postal Service to ensure that strong, complete ICRA documentation is available to prevent the risk of miscalculations, inaccuracies, and inconsistencies in the ICRA report.

Draft report in Highlights and at page 2.

The draft report notes that "Part 1 [of USPS-FY15-NP5] is a summary and functional description of the six areas which constitute development of the ICRA report" (draft report at page 3) and "Part 2 contains technical descriptions and computational details of the same six development areas, technical descriptions of the System for International Revenue and Volume/Outbound (SIRVO-IODIS) data systems, and a users [sic] guide to the files that are used as inputs to the ICRA report." (Ibid)

Thus, the audit team acknowledges that the Postal Service has a description of the areas of the ICRA, a flowchart for the analytical processes, technical descriptions and computational details, and a users' guide. But the team is concerned that "NP-5 does not explain how those input calculations workbooks are linked to the ICRA report's 22 internal sheets (tabs)." (Draft report at page 3.) As the draft audit report notes,

The Postal Service believed it had sufficient documentation to prepare the ICRA report because the NP-5 document (an overview and technical description of the ICRA) included process flow charts and descriptions of the various calculation spreadsheets.

Draft report in Highlights and at page 2.

Management first notes that both Part 1 and Part 2 are in the same folder, USPS-FY15-NP5. Part 1 is an overview and Part 2 is an in-depth set of instructions for running the models.

475 L'ENFANT PLAZA SW WASHINGTON DC: 20260-5200 WWW.USPS.COM Could those files be "consolidated"? Yes, by simply appending Part 2 to the end of Part 1, resulting in an enormously large file and adding no value whatsoever. Similarly, the resulting large Word file could be appended in some way to the large Excel file in which the calculations actually occur, but adding no value. Management also notes that the audit team was shown the comments at the top of each tab of the Excel file that provide descriptions of the activities occurring in that tab. The idea that tabs within the same spreadsheet required additional documentation in order to follow calculations from one tab of the spreadsheet to another, and from other files to the Excel file in use is nonsensical. The audit team's conclusion was apparently founded upon lack of familiarity with the properties of the self-documenting nature of Excel software.

At page 4, the draft report states: "Strong documentation leads to strong internal controls, which are made up of policies (management statements of what should be done) and procedures (actions to implement what should be done)." In a generic sense, Management does not disagree, but the audit team fails to recognize that the Postal Service does not create a new ICRA, whole cloth, each year. By Postal Regulatory Commission rules, the Postal Service must adhere to the methodologies litigated, established, documented and approved by the Commission. Thus, what the audit team refers to as "policies" and "procedures" are well-established and, aside from following proper processes to request and obtain Commission permission for changes, do not change from Annual Compliance Report to Annual Compliance Report (ACR). The Commission's rules and the unchanging nature of the models themselves provide the safety net that the audit team mistakenly believes would be created through what it perceives to be better documentation.

Among the benefits that the audit team identifies on page 5 as accruing from the documentation changes, is "Training [sic] new employees (or providing a refresher for existing employees)".

Management notes that while the ICRA appears to be complicated, it is not; it is actually an amalgam of many calculations that rely upon extremely simple algebra. The algebra is extended to calculations for roughly 200 countries, but is not difficult to follow, using the self-documenting nature of Excel. The existing documentation has been adequate for the Postal Service analysts and the Commission analysts working with the ICRA. These analysts are comfortable with Excel and the nature of the calculations being performed.

Management strongly disagrees with the most egregious finding of the team, the remarkable assertion that:

The Postal Service's distribution approach for its 600,000 annual IOCS employee samples does not efficiently capture costs in all categories, resulting in oversampling by at least 30 percent. A more efficient approach would save the Postal Service about \$3.8 million annually in labor costs without significantly changing its sampling results.

Draft report in Highlights and at page 2, with additional detail on page 5. Such an astonishing conclusion regarding the totality of the In-Office Cost System (IOCS) sampling design – not just for international products reported in the ICRA, the ostensible subject of review in this audit, but for all postal products – reflects inadequate review and comprehension of the IOCS system based on the most cursory inquiry into the system.

¹ The draft report is in error when, on page 4, it states that the Cost Attribution group provides numerous reports including SIRVO-IODIS; revenue, pieces, and weight data from PostalOne!; the CRA; quarterly and annual book and payment figures on international costs, revenue, and settlements; purchased transportation cost and TRACS. In fact, only the CRA itself is produced by the Cost Attribution team. The other data cited come from other groups within Regulatory Reporting and Cost Analysis or other functional groups altogether. In the process of developing the CRA and ICRA, Cost Attribution does assemble data from the systems cited, but is not responsible for the development or production of the data from the other sources cited at page 4 of the draft report.

The analysis that the audit team conducted is inappropriate for determining the sample size that IOCS should use. It does not reflect an understanding of the costing methodology, nor how IOCS data is used. The audit team's sample size analysis inappropriately used a variable from an intermediate dataset produced by the MODS mail processing cost model in a way that averaged over both products and mail handling categories internal to the model.²

Critically, the audit team's analysis does not assess the effects of reducing sample size on statistical data quality for cost estimates for any individual products, let alone International Mail costs reported in the ICRA. Fundamentally, their approach fails to reflect that sample size reductions will degrade the cost estimates for individual products, in particular low-volume products whose cost estimates already have relatively high sampling standard errors at existing sample sizes.

As a general matter, reducing IOCS sample size would not affect the sampling means of the cost estimates, but it would increase the sampling variability of all the IOCS-based estimates. The audit team did not appear to understand that the correct approach to assessing whether sample size is adequate involves evaluating the precision of the estimates for *each product*, not the variability of all costs in total, or some hypothetical average product. Every year as part of the Annual Compliance Report to the Postal Regulatory Commission, estimates of precision called coefficients of variation (CVs) are provided for <u>every</u> product. Although the audit team was aware of these CVs³, they did not use them when evaluating the adequacy of IOCS sample size, and did not explain the apparent omission.

Further, even though this audit is purportedly about the International Cost and Revenue Analysis, it is not clear that the audit team analyzed the IOCS cost estimates for international products. The audit team did not seem to be aware that IOCS currently oversamples at International Service Centers (ISCs) in an effort to improve the sampling precision of the cost estimates of International Mail products. They were informed that CVs for many small International Mail products are currently quite large, despite the ISC oversampling, with the obvious implication that they would become even larger if sample sizes were reduced.

Generally, the CVs for IOCS-based cost estimates would be expected to scale approximately with the inverse of the square root of the sample size. Thus, the recommendation to reduce sample size by 30 percent would cause increases in the cost CVs of about 20 percent for all products. An increase of that magnitude, in fact any significant decrease in sample size, cannot be undertaken unilaterally by the Postal Service but would first have to be approved by the Commission.

Management agrees that substantial resources are needed to implement IOCS, but it is a critical data system for product costing. We are actively exploring ways to improve data quality while limiting data collection costs through such initiatives as IOCS-Cluster and by researching the use of automated data collection systems to distribute costs.

However, Management strongly disagrees with the conclusion that:

The Postal Service could reduce its sample by about 35 percent and get the same results. Because we only analyzed 2 years worth of data, we concluded that a more conservative 30 percent reduction is reasonable. Conducting fewer samples could save the Postal Service \$15,499,622 in labor costs from 2014 through 2017.

² In effect, the analysis could be viewed as assessing the effects of reducing the IOCS sample size on the IOCS-based estimate of total MODS mail processing costs. However, MODS mail processing costs in total are based on payroll and MODS/TACS workhour data, not IOCS.

International Cost and Revenue Report, CP-AR-17-DRAFT, p. 6.

Draft report at page 6. Management disagrees that the proposed reduction in sample size could "get the same results" and it disagrees with the estimate of the potential financial savings. The audit team appears to assume that data collection costs can be reduced in proportion to the number of samples. However, because of the synergies of using the same data collectors for multiple data systems and because of the randomness inherent in the scheduling of IOCS readings, the number of data collectors will decline less than proportionately than the number of samples, even if reductions in samples occurred

The draft report's Recommendations for the Vice President of Pricing and Costing, and Management's responses to each are below:

Recommendation 1:

Develop a detailed, documented, and consolidated user guide for consistently preparing the International Cost and Revenue Analysis report to prevent loss of institutional knowledge by capturing experiential knowledge for present and future employees.

Management Response/Action Plan:

Management disagrees with this recommendation.

As described above, the ICRA is documented in detail. USPS-FY15-NP5 provides technical guidance, an overview and flow diagram of the processes. The specific recommendation to merge Part 1 and Part 2 of the same folder would add no value, nor would appending the merged document to the Excel file. Furthermore, the actual recommendation above suggests this additional documentation would be for the purpose of preventing loss of institutional knowledge, but the team did not inquire about the succession plan.

Recommendation 2:

Direct the manager, Cost Systems and Analysis, to revise the sample distribution approach to more efficiently capture costs in all categories.

Management Response/Action Plan:

Management disagrees with this recommendation.

Management agrees with the principle that data systems should be designed to estimate costs as efficiently as possible, but strongly disagrees with the audit team's finding that the In-Office Cost System (IOCS) is oversampling.

Sharon Owens,

Vice President of Pricing and Costing

cc: Maura McNerney, Controller
Jennifer Xie, Manager, Cost Systems & Analysis
Virginia Mayes, Manager, Cost Attribution
Sally Haring, Manager, Corporate Audit Response Management



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