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

SIX-DAY TO FIVE DAY STREET DELIVERY AND RELATED SERVICE CHANGES, 2010

Docket No. N2010-1

RESPONSES OF THE UNITED STATES POSTAL SERVICE TO QUESTIONS 1-3, 5-6 OF CHAIRMAN'S INFORMATION REQUEST NO. 8 (July 13, 2010)

The United States Postal Service hereby provides its responses to Questions 1-3, 5-6 of Chairman's Information Request No. 8, dated July 8, 2010. Answers were sought no later than today. Each question is stated verbatim and is followed by the response. A response to Question 4 will require special programming because of the amount of data involved, and thus could not be completed in the 3 business days allotted for this request. A response will be provided when available.

The responses are sponsored by witnesses in this docket as follows:

Questions 1-3 – Granholm (USPS-T-3)
Questions 5-7 – Bradley (USPS-T-6)

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorney:

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Question 1

The following table, prepared from data provided in the file "CHIR.S.Q.10.DOIS.Attach.xls," filed on May 14, 2010, appears to show a relationship between street time productivity and mail preparation. Monday has the highest street time productivity, the highest percentage of Delivery Point Sequenced (DPS) mail volume, and the lowest percentage of mailer sequenced volume. Saturday has the second highest street time productivity, the second highest percentage of DPS, and the second lowest percentage of mailer sequenced mail. Tuesday and Wednesday, which have relatively low street time productivity, rank 6th and 5th respectively in DPS volume and 1st and 2nd in mailer sequenced volume.

				RANK		
Weekday	**Street Productivity (Total Mail Volume/Street Hours)**	**Percentage of Daily Mail Volume that is Delivery Point Sequenced**	**Percentage of Daily Mail Volume That is Mailer Sequenced**	**Street Productivity**	**Percent Delivery Point Sequenced**	**Percent Mailer Sequenced**
Monday	451.0	67.5%	3.7%	1st	1st	6th
Tuesday	373.9	56.0%	13.2%	4th	6th	1st
Wednesday	361.1	56.3%	13.1%	6th	5th	2nd
Thursday	367.9	61.7%	8.0%	5th	4th	3rd
Friday	377.2	63.1%	7.3%	3rd	3rd	4th
Saturday	377.4	64.1%	5.1%	2nd	2nd	5th

a. Is the higher percentage of mailer sequenced mail delivered on Tuesday, Wednesday and Thursday due to deferral of mail that arrived at the delivery unit in time for delivery on Monday? If not, please explain.

b. Please discuss how, for a given day of the week, a change in the mix of DPS and mailer sequenced volume as percentage of delivered volume affects street productivity.

c. Please estimate, after the elimination of Saturday delivery, the distribution of volume by mail type for each day of the week.

RESPONSE OF POSTAL SERVICE WITNESS GRANHOLM
TO CHAIRMAN'S INFORMATION REQUEST NO. 8

RESPONSE:

[a] It is not possible to determine a direct correlation between mail deferred to Tuesday and street times.

[b] I believe there is minimal impact, if any.

[c] I have been informed that the Postal Service has assumed that as much as 75 percent of each mail type shown in the table may possibly shift to Monday and as much as 25 percent of the volume may shift to Friday.

**RESPONSE OF POSTAL SERVICE WITNESS GRANHOLM
TO CHAIRMAN'S INFORMATION REQUEST NO. 8**

Question 2

According to the data provided in USPS-LR-N2010-1/3, approximately 10,000 routes were eliminated during FY 2009.

a. What are the inputs to the Carrier Optimal Routing (COR) and Joint Alternate Route Assessment Process route restructuring models?

b. How does the route restructuring process, and the COR model in particular, accommodate delivery days with higher volumes; for example, peak load volume on Mondays?

c. What additional mail processing costs are associated with route restructuring; for example, processing Carrier Route mail on an Incoming Secondary sort until mailers adjust their presort schemes to the new route schemes?

d. Please provide for each district:

   i. The number of routes that were eliminated during FY 2009; and

   ii. The number of routes that have been eliminated year to date for FY 2010.

RESPONSE:

[a] Carrier Optimal Routing (COR) uses evaluated office and street times from a mail count and route inspection. These time are determined based on Chapter 2 of the *Handbook M-39 Management of Delivery Services* and include the evaluated office and street times, including mail volumes during mail count and allied street times from the day of the route inspection (PS Form 3999).

When the Joint Alternate Route Assessment Process is used in place of the mail count and route inspection, the same data elements are used. However, the information is determined through a review of DOIS workhour and volume information to establish the evaluated office and street values. Allied street times are applied based on route inspection (PS Form 3999) information which have been collected during normal street management of the routes.

[b] The Postal Service and the National Association of Letter Carriers, AFL-CIO (NALC), have over time developed procedures for determining the value of the city carrier assignments, using averages from the week of a Mail Count and Route Inspection as outlined in Chapter 2 of the *Handbook M-39 Management of Delivery Services.* In addition the parties have recently entered into a Memorandum of Understanding - Joint Alternate Route Assessment Process, which uses averages from an extended period of time -- normally a 2 month period -- to determine the value of the assignments. COR uses the information provided from these evaluation processes to assist the parties in making route adjustments.

[c] I cannot speak to additional mail processing costs associated with route restructuring. However, once mail is received at a delivery unit, even if it is addressed to the previous route designation, we strive to deliver it to the customer in a timely manner. Generally after an adjustment, the carriers separate out Carrier Route mail by gaining route and hand it off to the gaining carrier. This minimizes clerical rehandling and distribution costs and enables the mail to get to the customer in a timely manner. There is no adjustment period needed for automated letters and flats, and manual clerks will sort to the new scheme beginning with the implementation date.

[d] I have been informed that the Postal Service is compiling the requested data, and will file a response to this subpart once it has completed that task.

**RESPONSE OF POSTAL SERVICE WITNESS GRANHOLM
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Question 3

Please provide a detailed explanation of the process used to restructure routes. If the process used to restructure routes varies from district to district, please provide a detailed explanation of the process used to restructure routes for each district.

RESPONSE:

Please see my response to question 2, subparts [a] and [b] of this Chairman's Information Request.

5. Please refer to CHIR No. 5, question 10 where the system-wide delivery cost function of the form $C(V, N, Z)*k = C(V*k, N*k, Z)$ is described. This function shows that system-wide delivery costs vary in the same proportion as volume, V, and delivery frequency N. The proportionality factor in the expression is K. Thus if volume and delivery frequency both increase by 20 percent ($k = 1.2$), then according to this formulation, total delivery costs would also increase by the same percent. Notice that if both sides are differentiated by the proportionality factor k, then one obtains $C = (\partial C/\partial V)*V + (\partial C/\partial N)*N$ and dividing by C yields $1 = (\partial C/\partial V)*V/C + (\partial C/\partial N)*N/C$. The last expression shows that the sum of the volume variability $(\partial C/\partial V)*V/C$ and the delivery frequency variability $(\partial C/\partial N)*N/C$ is one. Therefore the delivery frequency variability is one less the volume variability or:

$$(\partial C/\partial N)*N/C = 1 - (\partial C/\partial V)*V/C. \qquad (1)$$

Notice that a first order estimate of the cost impact following a change in delivery frequency can be shown as $\Delta C \approx (\partial C/\partial N)*\Delta N$. Using (1), this can be restated as $\Delta C \approx$

$$C*(1 - (\partial C/\partial V)*V/C)*\Delta N/N, \text{ or}$$

$$\Delta C \approx (C - VVC)*\Delta N/N, \qquad (2)$$

where system level volume variable cost, VVC, equals $(\partial C/\partial V)*V$. In this last form, the cost savings estimate from changing the delivery frequency by the fraction, $\Delta N/N$, is equal to the product of institutional costs, C – VVC, and this fraction. Please also refer to the delivery cost function $C = N*\theta*D + a(Z)*V^{\varepsilon}N^{(1-\varepsilon)}$, described in the response to CHIR No. 5, question 12.

a. Please confirm that this function exhibits the proportionality assumption described above. If not, please explain.

b. If you confirm a., please confirm that if $\varepsilon = 1$, the function is linear and therefore the estimate provided by (2), using this function, is exact. If not, please explain.

c. If you confirm a., please confirm that if $0 < \varepsilon < 1$, the function is non-linear (exhibiting declining marginal costs with respect to volume), and therefore the estimate provided by (2), using this function, is a strict approximation. If not, please explain.

Question 5 Response:

a. In working through the mathematical conditions, it became apparent that the ability to confirm depends upon the nature of the unspecified a(Z) term. If that term is independent of changes in both volume and delivery days, then the assumption of proportionality will hold. Specifically, proportionality requires

$\partial Z/\partial V = \partial Z/\partial N = 0$. This would occur, for example, if a(Z) were a constant. If a(Z) is not independent of changes in both volume and delivery days, in this sense, then proportionality will not hold. With the condition, it is easy to prove proportionality using the total derivative of the function:

$$dC = [\theta D + (1-\varepsilon)(a(Z)V^{\varepsilon}N^{-\varepsilon})]dN + [\varepsilon(a(Z)V^{\varepsilon-1}N^{1-\varepsilon})]dV + [V^{\varepsilon}N^{1-\varepsilon}a'(Z)]dZ$$

Using the above condition and dividing by C yields:

$$\frac{dC}{C} = \frac{[\theta D + (1-\varepsilon)(a(Z)V^{\varepsilon}N^{-\varepsilon})]}{[N\theta D + a(Z)V^{\varepsilon}N^{1-\varepsilon}]}dN + \frac{[\varepsilon(a(Z)V^{\varepsilon-1}N^{1-\varepsilon})]}{[N\theta D + a(Z)V^{\varepsilon}N^{1-\varepsilon}]}dV.$$

This can be conveniently rewritten as:

$$\frac{dC}{C} = \left\{\frac{[N\theta D + (1-\varepsilon)(a(Z)V^{\varepsilon}N^{1-\varepsilon})]}{[N\theta D + a(Z)V^{\varepsilon}N^{1-\varepsilon}]}\right\}\frac{dN}{N} + \left\{\frac{[\varepsilon(a(Z)V^{\varepsilon}N^{1-\varepsilon})]}{[N\theta D + a(Z)V^{\varepsilon}N^{1-\varepsilon}]}\right\}\frac{dV}{V}.$$

Proportionality requires:

$$\frac{dN}{N} = \frac{dV}{V}.$$

So:

$$\frac{dC}{C} = \left\{\frac{[N\theta D + (1-\varepsilon)(a(Z)V^{\varepsilon}N^{1-\varepsilon}) + \varepsilon(a(Z)V^{\varepsilon}N^{1-\varepsilon})]}{[N\theta D + a(Z)V^{\varepsilon}N^{1-\varepsilon}]}\right\}\frac{dN}{N}.$$

But the term in brackets equals one.

b. Subject to the condition articulated in the answer to part a., use of the first derivative would be exact.

c. First, note that the approximation can be simplified by noting that $(C\text{-}VVC)/N = \partial C/\partial N$, so the approximation is just $dC = (\partial C/\partial N)\, dN$. In other words, the approximate change in cost is just the "marginal cost with respect to delivery days" times the change in delivery days. The applicability of the approximation thus depends upon the applicability of the assumptions of marginal analysis and the accuracy of first order approximation.

6. Consider the quadratic function $C = N*\theta*D + a(z)*V + b(z)*V^2/N$ where $b(z) \neq 0$. Please confirm that this function also exhibits the described proportionality properties and can therefore be used to provide a first order approximation to cost savings according to (2), identified in question 5, above. If not, please explain.

Question 6 Response:

Subject to the caveats expressed in the response to question 5 of this Information Request, both proportionality and the first order approximation would hold for this particular function. However, I would note that this is not the standard quadratic function that has been used to estimate carrier cost equations. If a partial quadratic equation were to be specified then the typical quadratic equation would be given by: $C = N*\theta*D + a(z)*V + b(z)*V^2$, for which proportionality does not hold. More generally, the full quadratic would be given by:

$C = \gamma_0 + \gamma_1 ND + \gamma_2 (ND)^2 + \gamma_3 V + \gamma_4 V^2 + \gamma_5 NDV$. Proportionality does not hold for this function either.

Finally, I would caution that the specific function "can therefore be used to provide a first order approximation to cost savings "only if the assumed proportionality holds in reality and not just as an assumption.

7. Please confirm that any linear or non-linear function exhibiting the described proportionality properties can be used to provide a first order estimate of cost savings according to (2), identified in question 5, above. If you cannot confirm, please provide and describe a counter-example with the described proportionality properties showing that the first order estimate given by (2) does not apply.

Question 7 Response:

In thinking about generalizing the condition, it occurred to me that at least one additional restriction is required on the function. Specifically, not only must one impose the proportionality restriction, but also one must impose that it holds for the entire range of the function. For example consider the following restricted translog cost function:

$$\ln C = \beta_1 \ln\left(\frac{V}{\bar{V}}\right) + \beta_2 \ln\left(\frac{V}{\bar{V}}\right)^2 + (1-\beta_1)\ln\left(\frac{N}{\bar{N}}\right) + \beta_3 \ln\left(\frac{N}{\bar{N}}\right)^2 + \beta_4 \ln\left(\frac{V}{\bar{V}}\right) \ln\left(\frac{N}{\bar{N}}\right)$$

One can demonstrate that proportionality holds at the mean values for both volume and delivery days by taking the total derivative of the function in log space:

$$d\ln C = \beta_1\, d\ln V + (1-\beta_1)\, d\ln N$$

.

Also, in the area of the means the approximation holds:

$$VVC = C\left[\frac{\partial \ln C}{\partial \ln V}\right]$$

so:

$$C - VVC = (1 - \beta_1)\,C,$$

and:

$$dC \approx (1 - \beta_1)\,C\frac{dN}{N}.$$

However as soon as one applies this to an actual discrete change in delivery days, one is no longer at the means so the total derivative becomes:

$$d\ln C = [\beta_1 + \beta_4(\ln N - \ln\bar{N})]\,\mathrm{d}\ln V + [(1 - \beta_1) + 2\beta_3(\ln N - \ln\bar{N})]\,\mathrm{d}\ln N$$

This indicates the approximation no longer holds.