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

EVOLUTIONARY NETWORK DEVELOPMENT SERVICE CHANGES, 2006	Docket No. N2006-1

RESPONSES OF THE UNITED STATES POSTAL SERVICE
TO QUESTIONS 2, 3, 5, 6, 8 AND 9
OF PRESIDING OFFICER'S INFORMATION REQUEST NO. 7

The United States Postal Service hereby files its responses to the above-listed

Questions Presiding Officer's Information Request No. 7, dated August 15, 2006. Each

question is stated verbatim and followed by the response.

Responses to Questions 1 and 4 were filed on August 21, 2006. A response to

Question 7 is forthcoming.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

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2.   The END Independent Verification & Validation (IV&V) Team Draft Report, says
[o]ther than an assumption made with respect to the cost per
square foot of expanding a facility, the Optimization Model does not
take into consideration the capital investments that may be required
for any new equipment, relocation of assets, or retrofitting of
facilities. These investment decisions will need to be weighed
against potential savings as part of the normal capital investment
process.

Supplemental Response of the United States Postal Service to Presiding
Officer's Information Request No. 4, Question 6.c., states,
The End models look at total network costs/savings that result from
the systemic network change prescribed by the concept being
modeled, not individual components of that concept. The estimated
savings that could be attributed to the theoretical network … is
approximately $ 750 million.

a.   Is this estimated savings amount net of all costs incurred to convert
the current network to the future network?
b.   Does this amount represent a one-time or an annual savings?
c.   How was the $ 750 million figure derived? For example, is it the sum of
estimated savings for each individual mail processing operation at each
facility that undergoes consolidation?

RESPONSE:

a. No, as previously stated in response to POIR 4 Question 6(c), any capital

investment would be required to follow existing procedures for approval.

b. Annual savings.

c. No. The $750 million is the difference between the total operating cost of the

existing and proposed future networks.

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3. During the hearing on July 18, 2006, witness Shah said, "[t]he 100 [possible Regional Distribution Centers (RDCs)] is an upper boundary range based on the constraints the organization faces in terms of capital." Tr. 2/173.

      a.   How much capital does the Postal Service estimate would be required to convert 100 facilities to RDCs?

      b.   Is there a difference between the estimated average cost of converting a P&DC to an RDC and the estimated average cost of converting a BMC to an RDC? If so, what is the difference?

RESPONSE:

a. To clarify that response, the capital constraints may require the Postal Service to have more, not fewer RDCs than those modeled. If capital constraints limit investments, the number of RDCs will increase, reducing the level of consolidation to allow the operations to fit in existing space.

b. While the Postal Service does not have estimates of the cost of converting P&DCs to RDCs, it would be safe to assume that, in most cases the BMC conversion would cost more, given the size and type of fixed equipment in BMCs. However, much of the BMC revitalization work would be required whether or not the BMC was converted to an RDC or not.

5. Please provide a detailed audit trail (i.e., a step-by-step process, including cites to sources) showing how the Postal Service derived the three linear cost equations for the AFSM-100, and the three linear cost equations for the manual flats operation, provided in response to Presiding Officer's Ruling No. N2006-1/23, from the corresponding equations at pages 42-44 of witness Bozzo's testimony in Docket No. R2005-1. Please provide a similar audit trail for the three linear equations for the APPS operation that was provided in response to Presiding Officer's Ruling No. N2006-1/23. Please identify the datasets that were used, how the TPH cut-offs for small, medium, and large operations were determined, and how the costs in dollars were estimated.

RESPONSE

A.   THE STEP BY STEP PROCESS FOR CALCULATING THREE PIECE LINEAR APPROXIMATION FOR THE AFSM 100 EQUATION

Step 1: Obtain estimated coefficients for the equation.

The estimated coefficients for the AFSM 100 nonlinear equation were obtained from

witness Bozzo in a document entitled, "NIA-Results.doc." They are reproduced below:

Variable	Coefficient
lnTPH	-1.08399
lnTPH SQ	0.044006
TREND	0.069896
TREND SQ	-1.14E-03
ln DEL. POINTS	17.3708
ln DEL.PONTSS SQ	-0.627112
ln CAPITAL	0.179482
ln CAPITAL sq	0.05302
ln WAGE	2.9987
ln WAGE SQ	0.172177
lnTPH * TREND	-4.64E-03
lnTPH * ln DEL. POINTS	0.061612
lnTPH * LN CAPITAL	0.025865
lnTPH * ln WAGE	-0.199126
TREND * ln DEL. POINTS	9.11E-03
TREND * LN CAPITAL	-6.63E-03
TREND * ln WAGE	-0.025366
ln DEL. POINTS * ln CAPITAL	-0.11992
ln DEL. POINTS * ln WAGE	0.089783
ln CAPITAL * LN WAGE	-0.123631
QTR2	8.35E-03
QTR3	2.64E-03

QTR4	-7.29E-03
lnTPH -1	-0.826931
lnTPH -2	0.688921
lnTPH -3	0.332239
lnTPH -4	0.022793
lnTPH SQ -1	0.046321
lnTPH SQ -2	-0.031016
lnTPH SQ -3	-0.013082
lnTPH SQ -4	-6.72E-04

Step 2: Calculate form of the equation in levels.

The form of the AFSM 100 equation estimated by witness Bozzo is translog. This means the equation has following general form:

$$\ln y = \ln \alpha + \beta_1 \ln x + \beta_2 \ln x^2 + \beta_3 \ln z + \beta_4 \ln z^2 + \beta_5 \ln x \ln z.$$

Where y is hours, x is piece handlings and z represents the other non-workload variables. Note that deriving the linear approximation requires using only those variables that involve workload. In addition, the END model is in levels, not logs, so the translog equation must be expressed in levels using anti-logs. Thus, the initial expressions required for deriving the linear approximation is given by:

$$y = e^{(\ln \alpha + \beta_1 \ln x + \beta_2 \ln x^2 + \beta_5 \ln x \ln z)}.$$

Using the rules for the exponential function allows one to simplify the expression:

$$y = e^{(\ln \alpha)} e^{(\beta_1 \ln x + \beta_2 \ln x^2)} e^{(\beta_5 \ln x \ln z)},$$

or:

$$y = \alpha x^{\beta_1} x^{(\beta_2 \ln x)} x^{(\beta_5 \ln z)}.$$

No documents were used in this step.

Step 3: Identify ranges for each of the 3 approximations.

The ranges for the "small," "medium," and "large" operations are based upon the

MODS data for 2004 for the operation. The average quarterly values for piece

handlings for the MODS facilities included in the END model were arrayed from smallest

to largest. Then the 5%, 25%, 50%, 75% and 95% values were identified. Those

values are provided below:

Distribution Point	Value
5%	9,046.7
25%	13,928.6
50%	24,587.6
75%	41,511.4
95%	71,797.3

The three ranges are then defined as follows:

"Small"   5% to 25%

"Medium"   25% to 75%

"Large"   75% to 95%

No documents were used in this step.

Step 4: Calibrate equation to operational data.

The AFSM 100 equation has the following nonlinear form, in levels, in the workload

variable:

$$y = \alpha \, x^{\delta_1} \, x^{\delta_2 \ln x} \, x^{\delta_3 t} \, \prod_{i=1}^{4} x^{(\delta_{i+3} \ln z_i)}.$$

Where x is piece handlings, t is the time trend and the components of the z vector are wages, capital, delivery points, and the manual ratio. Once the form of the equation is established, it can be calibrated. The first step in the calibration is to center the overall equation on the 2004 workload data for the operation.   This is done by entering mean values for the various z variables and the median value for piece handlings into the equation and computing the implied value for hours. This implies a corresponding value for productivity (x/y).

Calibration then requires adjusting the value for α until the projected productivity at the median level of piece handlings closely approximates the value of productivity found by taking the ratio of median x to median y. Of course, this provides a projected value for y which is quite close to median y.

No documents were used in this step.

Step 5: Calculate variable coefficients for each of the three ranges.

A linear approximation, by definition, has a constant slope. That slope measures how time and, therefore, cost varies with workload. Thus, a single value must be calculated for the slope of the linear approximation. That value is termed the "variable" coefficient. To calculate the variable coefficient, a level of granularity for each range must be established. A granularity of twenty steps was chosen. This means the calculation of the overall variable coefficient will depend upon the calculation of the marginal time for twenty changes in values within each range. Note that marginal times can only be calculated for <u>changes</u> in piece handlings, by definition. The twenty individual steps are

calculated in the same way for each range. They are calculated according to the

following formula:

$$\sigma_i = \frac{Max_j - Min_j}{20}$$

This formula produced the following steps for each of the ranges:

Range	σ
Small	244.1
Medium	1,379.1
Large	1,514.3

Once the steps have been calculated, the marginal times can then be calculated for all

three ranges. In other words, twenty marginal times were calculated for the small

range, 20 marginal times were calculated for the medium range, and 20 marginal times

were calculated for the large range. The variable coefficient for a range is simply the

average of the twenty calculated marginal times within that range. Below are the

calculated coefficients for each of the three ranges for the AFSM 100 equation:

Range	Variable Coefficient
Small	0.3272
Medium	0.2363
Large	0.1825

These coefficients measure marginal hours per additional 1000 piece handlings.

No documents were used in this step.

Step 6: Calibrate the core coefficient for each range.

Once the variable coefficients have been calculated, the "intercept" or core coefficient

must be calibrated for each of the three approximations. This calibration is done in a

manner similar to the initial calibration of the overall nonlinear equation. Within each

range, the total hours associated with the various levels of piece handlings were

projected by using the variable coefficient. Then, for the central value of piece

handlings for each range, this projected value (based upon the linear approximation)

was compared with the value projected from the nonlinear equation. The difference

between the two was used to establish the core coefficient. Note that core coefficients

were required to end in either a "0" or a "5" to emphasize the fact that these are

calibrated values that have no foundation apart from what is already embodied in the

nonlinear equation. The calibrated core coefficients for the AFSM 100 are given below:

Range	Core Coefficient
Small	5,160
Medium	6,525
Large	8,460

No documents were used in this step.

Step 7: Convert Time Values to Dollar Values.

The analysis so far has been done in terms of hours. To convert it to dollars, a rate of

$35 per hour was used. In addition, the core coefficients are quarterly and were

multiplied by four to convert to an annual basis. This final step produces the coefficients

provided in response to Presiding Officer's Ruling No. N2006-1/23.

		Small		**Medium**		**Large**	
		Core	Variable	Core	Variable	Core	Variable
AFSM 100	Hours	5160	0.3272	6525	0.2363	8460	0.1825
	Dollars	$722,400	$11.45	$913,500	$8.27	$1,184,400	$6.39

No documents were used in this step.

B.   THE STEP BY STEP PROCESS FOR CALCULATING THREE PIECE LINEAR
        APPROXIMATION FOR THE MANUAL FLATS EQUATION

Step 1: Obtain estimated coefficients for the equation.

The estimated coefficients for the manual flats nonlinear equation were obtained from

witness Bozzo in a document entitled, "NIA-Results.doc."   They are reproduced below:

Variable	Coefficient
C	2.39327
ln TPH	0.903388
TREND	-8.26E-03
ln DEL. POINTS	-0.05812
ln CAPITAL	0.019999
ln WAGE	-0.043835
QTR2	0.068513
QTR3	0.019071
QTR4	0.042686
FY00	-0.044893
FY01	-0.051313
FY02	-0.015997
FY03	-3.40E-03
FY04	0
TECH05	1.71E-03
TECH06	0.05197
TECH39	0.044936

Step 2: Calculate form of the equation in levels.

The form of the manual flats equation estimated by witness Bozzo is "double log." This

means the equation has following general form:

$$\ln y \;=\; \ln \alpha \;+\; \beta_1 \ln x \;+\; \beta_3 \ln z \quad .$$

Note that there is only one term in workload, x. This makes calculation of the equation

in levels straightforward:

$$y = \alpha \, x^{\beta_1} \quad .$$

No documents were used in this step.

<u>Step 3: Identify ranges for each of the 3 approximations.</u>

The ranges for the "small," "medium," and "large" operations are based upon the

MODS data for 2004 for the operation. The average quarterly values for piece

handlings for the MODS facilities included in the END model were arrayed from smallest

to largest. Then the 5%, 25%, 50%, 75% and 95% values were identified. Those

values are provided below:

Distribution Point	Value
5%	202.7
25%	859.9
50%	1,642.7
75%	2,897.8
95%	7,683.1

The three ranges are then defined as follows:

"Small"   5% to 25%

"Medium"   25% to 75%

"Large"   75% to 95%

No documents were used in this step.

<u>Step 4: Calibrate equation to operational data.</u>

The manual flats equation has the following nonlinear form, in levels, in the workload

variable:

$y = \alpha\, x^{\delta_1}$.

Here, x represents piece handlings. Once the form of the equation is established, it can

be calibrated. The first step in the calibration is to center the overall equation on the

2004 workload data for the operation.   This is done by entering the median value for

piece handlings into the equation and computing the implied value for hours. This

implies a corresponding value for productivity (x/y). Calibration then requires adjusting

the value for α until the projected productivity at the median level of piece handlings

closely approximates the value of productivity found by taking the ratio of median x to

median y. Of course, this provides a projected value for y which is quite close to

median y.

No documents were used in this step.

Step 5: Calculate variable coefficients for each of the three ranges.

A linear approximation, by definition, has a constant slope. That slope measures how

time and, therefore, cost varies with workload. Thus, a single value must be calculated

for the slope of the linear approximation. That value is termed the "variable" coefficient.

To calculate the variable coefficient, a level of granularity for each range must be

established. A granularity of twenty steps was chosen. This means the calculation of

the overall variable coefficient will depend upon the calculation of the marginal time for

twenty changes in values within each range. Note that marginal times can only be

calculated for <u>changes</u> in piece handlings, by definition. The twenty individual steps are

calculated in the same way for each range. They are calculated according to the

following formula:

$$\sigma_i = \frac{Max_j - Min_j}{20}$$

This formula produced the following steps for each of the ranges:

Range	Step
Small	32.9
Medium	101.9
Large	239.3

Once the steps have been calculated the marginal times can then be calculated for all three ranges. In other words, twenty marginal times were calculated for the small range, 20 marginal times were calculated for the medium range and 20 marginal times were calculated for the large range. The variable coefficient for a range is simply the average of the twenty marginal times within each range. Below are the calculated coefficients for each of the three ranges for the manual flats equation:

Range	Variable Coefficient
Small	2.1361
Medium	1.8913
Large	1.7051

These coefficients measure marginal hours per additional 1000 piece handlings.

No documents were used in this step.

Step 6: Calibrate the core coefficient for each range.

Once the variable coefficients have been calculated, the "intercept" or core coefficient must be calibrated for each of the three approximations. This calibration is done in a

manner similar to the initial calibration of the overall nonlinear equation. Within each

range, the total hours associated with the various levels of piece handlings were

projected by using the variable coefficient. Then, for the central value of piece

handlings for each range, this projected value (based upon the linear approximation)

was compared with the value projected from the nonlinear equation. The difference

between the two was used to establish the core coefficient. Note that core coefficients

were required to end in either a "0" or a "5" to emphasize the fact that these are

calibrated values that have no foundation apart from what is already embodied in the

nonlinear equation. The calibrated core coefficients for the manual flats operation are

given below:

Range	Core Coefficient
Small	110
Medium	335
Large	880

No documents were used in this step.

Step 7: Convert Time Values to Dollar Values.

The analysis so far has been done in terms of hours. To convert it to dollars, a rate of

$35 per hour was used. In addition, the core coefficients are quarterly and were there

multiplied by four to convert to an annual basis. This final step produces the coefficients

provided in response to Presiding Officer's Ruling No. N2006-1/23.

		Small		Medium		Large	
		Core	Variable	Core	Variable	Core	Variable
Manual Flats	Hours	110	2.1361	335	1.8913	880	1.7051
	Dollars	$15,400	$74.76	$46,900	$66.20	$123,200	$59.68

No documents were used in this step.

C.   THE STEP BY STEP PROCESS FOR CALCULATING THREE PIECE LINEAR
         APPROXIMATION FOR THE APPS EQUATION

Step 1: Obtain estimated coefficients for the equation.

Because it was a new technology, the Postal Service did not have sufficient experience

with the APPS operation to permit witness Bozzo to estimate an equation for the

operation. Thus, a proxy had to be selected.   The SPBS operation was selected.

According to witness Bozzo's Docket No. R200**5**-1 testimony (USPS-T-12 at 49), the

variability for the SPBS operation was 0.77. This value was applied to APPS operation.

Step 2: Calculate form of the equation in levels.

Because it uses the least number of borrowed coefficients and requires the fewest

assumptions about coefficients, the form of the APPS equation is assumed to be double

log. This means the equation has following general form:

$$\ln y \quad = \quad \ln \alpha \quad + \quad \beta_1 \ln x \quad + \quad \beta_3 \ln z \quad .$$

Note that there is only one term in workload, x. This makes calculation of the equation

in levels straightforward:

$$y = \alpha \, x^{\beta_1}$$

No documents were used in this step.

Step 3: Identify ranges for each of the 3 approximations.

The ranges for the "small," "medium," and "large" operations could not based upon the

MODS data for 2004 for the APPS operation, as it was a new technology. Instead, the

ranges were based upon the operations that were assumed to move to the APPS

operation: the manual Priority operation, the SPBS Priority operation, and the manual

parcel operation. The ranges were based upon the sums of the piece handlings for

these operations. The average quarterly values for piece handlings for the MODS

facilities included in the END model were arrayed from smallest to largest. Then, the

5%, 25%, 50%, 75% and 95% values were identified. Those values are provided

below:

Distribution Point	Value
5%	136.6
25%	630.6
50%	1,433.4
75%	3,381.9
95%	13,110.2

The three ranges are then defined as follows:

"Small"   5% to 25%

"Medium"   25% to 75%

"Large"   75% to 95%

No documents were used in this step.

Step 4: Calibrate equation to operational data.

The APPS equation has the following nonlinear form, in levels, in the workload variable:

$$y = \alpha \, x^{\delta_1} \,.$$

Here, x represents piece handlings. Once the form of the equation is established, it can

be calibrated. The first step in the calibration is to center the overall equation on the

2004 workload data for the operation.   This is done by entering the median value for

piece handlings into the equation and computing the implied value for hours. This

implies a corresponding value for productivity (x/y). Calibration then requires adjusting

the value for α until the projected productivity at the median level of piece handlings

closely approximates the value of productivity found by taking the ratio of median x to

median y. Of course, this provides a projected value for y which is quite close to

median y.

No documents were used in this step.

Step 5: Calculate variable coefficients for each of the three ranges.

A linear approximation, by definition, has a constant slope. That slope measures how

time and, therefore, cost varies with workload. Thus, a single value must be calculated

for the slope of the linear approximation. That value is termed the "variable" coefficient.

To calculate the variable coefficient, a level of granularity for each range must be

established. A granularity of twenty steps was chosen. This means the calculation of

the overall variable coefficient will depend upon the calculation of the marginal time for

twenty changes in values within each range. Note that marginal times can only be

calculated for <u>changes</u> in piece handlings, by definition. The twenty individual steps are

calculated in the same way for each range. They are calculated according to the

following formula:

$$\sigma_i = \frac{Max_j - Min_j}{20}$$

This formula produced the following steps for each of the ranges:

Range	Step
Small	494.0
Medium	2,751.3
Large	9,728.3

Once the steps have been calculated, the marginal times can then be calculated for all three ranges. In other words, twenty marginal times were calculated for the small range, 20 marginal times were calculated for the medium range and 20 marginal times were calculated for the large range. The variable coefficient for a range is simply the average of the twenty marginal times within each range. Below are the calculated coefficients for each of the three ranges for the APPS equation:

Range	Variable Coefficient
Small	2.1759
Medium	1.6588
Large	1.2314

These coefficients measure marginal hours per additional 1000 piece handlings.

No documents were used in this step.

Step 6: Calibrate the core coefficient for each range.

Once the variable coefficients have been calculated, the "intercept" or core coefficient must be calibrated for each of the three approximations. This calibration is done in a

manner similar to the initial calibration of the overall nonlinear equation. Within each range, the total hours were associated with the various levels of piece handlings were projected by using the variable coefficient. Then, for the central value of piece handlings for each range, this projected value (based upon the linear approximation) was compared with the value projected from the nonlinear equation. The difference between the two was used to establish the core coefficient. Note that core coefficients were required to end in either a "0" or a "5" to emphasize the fact that these are calibrated values that have no meaning apart from what is already embodied in the nonlinear equation. The calibrated core coefficients for the APPS operation are given below:

Range	Core Coefficient
Small	410
Medium	1,010
Large	2,735

No documents were used in this step.

Step 7: Convert Time Values to Dollar Values.

The analysis so far has been done in terms of hours. To convert it to dollars, a rate of $35 per hour was used. In addition, the core coefficients are quarterly and were multiplied by four to convert to an annual basis. This final step produces the coefficients provided in response to Presiding Officer's Ruling No. N2006-1/23.

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		Small		Medium		Large	
		Core	Variable	Core	Variable	Core	Variable
APPS	Hours	410	2.1759	1010	1.6588	2735	1.2314
	Dollars	$57,400	$76.15	$141,400	$58.06	$382,900	$43.10

No documents were used in this step.

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6.   Supplemental Response of the United States Postal Service to Presiding
Officer's Information Request No. 4, Question 6.d., states that the theoretical
network "could result in the upgrade of 2,507 and downgrade of 2,701 First-Class
pairs. Recognizing that this number is theoretical and subject to change, please
provide the aggregate volume associated with the upgraded pairs and the
aggregate volume associated with the downgraded pairs.

RESPONSE:

The total aggregated First-Class Mail Single Piece Letter volume estimate for the

upgrade of 2,507 First-Class Mail origin-destination pairs is 183,863,687 out of

approximately 42 billion pieces and the total aggregated First-Class Mail Single Piece

Letter volume estimated for the downgrade of 2,701 origin-destination pairs is

834,527,579 pieces out of approximately 42 billion pieces.

8.   Library Reference 17, at pages 4-5, lists cost functions for 14 direct sorting operations and five allied operations that the END optimization model individually models. It linearizes these cost functions, and assigns a size category to each operation at each facility covered by the model. For a given 3-digit ZIP area, the model purports to separately assign each operation to the facility where the operation can be performed at least cost. Many of these operations, however, appear to be interdependent. For example, it would appear infeasible to assign outgoing letter-shaped processing operations (AFCS, OCR, and DBCS) that are of different sizes to different facilities.

     a.   Does the END model constrain the separate assignment of operations that are interdependent?

     b.   Library Reference 17, at page 5, says "the model does not contemplate 'consolidating' facing and canceling operations. These operations will thus stay in the P&DCs." If outgoing OCR and BCS operations are consolidated, but facing and canceling operations are not, could this result in inadequate capacity in the facing and canceling operation at the gaining facility?

RESPONSE:

     a.   Yes. The distribution concept defines which operations must be assigned together. For example, the RDC concept assigns DBCS operations to one Originating Facility, Originating Concentrator, Destinating Disperser, Destinating Facility.   All of the OF roles are assigned by the model, not just 1 operation. The role is assigned to a facility type by shape depending on the concept modeled. For example, OF-LTTR-DBCS would be assigned to a Local Processing Center; whereas, OC-LTTR-DBCS would be assigned to an LPC based on how the network design was modeled.

     b.   The statement in USPS Library Reference N2006-1/17 was addressing the fact that there are some operations that are small and do not have much impact on the overall network. What this example is referring

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RESPONSE to Question 8 (continued):

to is the facing and canceling operations that take place outside of the

AFCS, such as micro-marks, hand cancellation and facing operations.

The model does include these costs indirectly as stated on page 5 of the

Model Requirements Report (USPS-LR-N2006-1/17) more simply by

utilizing a ratio approach. The model does contemplate consolidating

AFCS cancellation operations, and a cost function was developed and

provided for the AFCS operation.

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9. Library Reference 18, at page iv, says

[e]very scenario used to stress the model … generates results showing that over 100 campuses could be closed (the v3.7 model run validated by the IV & V team shows almost 150 campuses being closed). The Postal Service will have to formulate a plan to deal with the impact of such closures.

    a.   In determining the cost of the future network against which the Postal Service would validate an AMP if it were initiated today, does the END optimization model include fixed facility costs for facilities that are not assigned volume for any modeled operations?

    b.   Has the END optimization model been modified in this regard since it was evaluated by the IV &V team?

RESPONSE:

    a.   The $750 million estimated savings associated with the proposed future network does not include the fixed cost savings of facilities which do not have mail processing assigned. While fixed cost is modeled, the ultimate use of a given facility (which did not have mail assigned) is unknown at this time, and therefore the savings of fixed cost was not included.

b.   The model continues to use three cost inputs. The first is an operational cost that is the operation cost by size. The second cost input into the optimization model is the facility fixed costs, that is those costs associated with the facility infrastructure that do not change regardless of the amount of mail processed, such as lease costs. The third cost element input into the optimization model is

RESPONSE to Question 9 (continued):

the costs associated with transporting mail between ZIP and facility,

as well as facility to facility.