Postal Regulatory Commission
Submitted 12/5/2011 2:45:42 PM
Filing ID: 78313
Accepted 12/5/2011

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

Mail Processing Network Rationalization
Service Changes, 2012 Docket No. N2012-1

DIRECT TESTIMONY OF

EMILY R. ROSENBERG

ON BEHALF OF THE

UNITED STATES POSTAL SERVICE

USPS-T-3

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Autobiographical Sketch

My name is Emily R. Rosenberg. I am the Manager of Network Analytics, within the Network Operations group at United States Postal Service headquarters. My office is responsible for applying advanced analytics to aid Network Operations and other management groups in making strategic, tactical, and operational decisions.

I joined the Postal Service as a Network Modeling Specialist in January 2007 to work on mail processing plant consolidation initiatives. In 2008, I was promoted to Network Operations Research Analyst. In that position, my focus was the identification of mail processing network facility consolidation opportunities.

Prior to the joining the Postal Service, I performed economic and social policy research at the Federal Reserve Board, the Urban Institute, and International Business Machines (IBM). I earned a Bachelor of Arts degree in Economics from Washington University in St. Louis and a Masters of Science degree in Operations Research from the University of North Carolina.

I. Purpose of Testimony

The purpose of my testimony is to provide an overview of the systematic steps used to evaluate and model the Postal Service's mail processing network in support of the initiative to rationalize the network and propose related service standard changes described in the Direct Testimony of David Williams on Behalf of the United States Postal Service (USPS-T-1). My testimony will discuss both the current network and the modeling methodology used in determining the network concept on which the proposed service standard changes are based. I am sponsoring the following public USPS Library References that are associated with my testimony: USPS-LR-N2012-1/13 through USPS-LR-N2012-1/18 and USPS-LR-N2012-1/34 through USPS-LR-N2012-1/37. I also am sponsoring the following non-public USPS Library References associated with my testimony: USPS-LR-N2012-1/NP2 through USPS-LR-N2012-1/NP4.

II. Current Network Capacity

The processing and distribution network is a logistical plan for the sortation and movement of product-specific units of mail, from origin to destination, through an intricate system of interconnected transportation lanes based on defined distribution requirements. Excluding the 21 Network Distribution Centers, the postal mail processing and distribution networks are, to a great extent, set up to support the overnight First-Class Mail service standard. As explained in the Direct Testimony of David Williams on Behalf of the United States Postal Service (USPS-T-1), the overnight service standard requires that delivery point sequencing (DPS) of letter mail take place within a very short window of time. There are approximately four hours between when the last volume assigned for next day delivery arrives around 01:30 AM and the DPS second pass clearance time required to meet the dispatch of value.[1] This short window is directly related to the amount of Delivery Bar Code Sorter (DBCS) equipment needed to process the mail. To process approximately 400 million pieces per day during a four-hour time span requires more DBCS equipment than would otherwise be necessary if there were a larger window within which to DPS the mail. Moreover, most DBCS equipment is utilized for DPS only. Since DCBS is only used during this window, DBCS machines are idle the remaining hours of each operating day. This downtime creates unused capacity in the network which can only be reduced through the relaxation of service standards (and corresponding relaxation of the four-hour DPS processing window). The First-Class Mail overnight standard also creates underutilized surface transportation. Between mail processing plants that are overnight First-Class Mail partners to one another, there are numerous daily truck trips scheduled and operated in order to achieve that service standard irrespective of the degree to which each truck's capacity is utilized.

III. Process Utilized to Analyze Operational Changes

This portion of my testimony describes the process employed to develop an operating plan that would allow the Postal Service to use its equipment and facilities more efficiently. As my testimony will show, we worked towards developing an operating plan and associated service standards that would allow for significantly more

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[1] Dispatch of value is the last dispatch of the day that is loaded on transportation in time to meet the service standard for the mail class or destination.

efficient mail processing and transportation networks. Below, I describe the roadmap used to develop the network rationalization concept. The first two steps were theoretical. The first step was to build a tool for determining operating windows to test the feasibility of the concept. The second step, using an optimization model, created a theoretical mail processing network structure. The remaining steps were more tactical and involved meeting with operational experts to complete site-specific equipment and space analyses. The model results were then shared with Area and District level postal managers to obtain local, expert knowledge regarding processing operations, facilities, and network infrastructure. The local officials used this information to refine the list of study sites. This was an iterative process where a strategic, high level model was developed and vetted through multiple rounds of local input to determine the facilities to move forward in studying. The outputs include the number of mail processing nodes and each node's mail processing responsibilities by 3-digit ZIP Code. These strategic estimates of network potential were transformed into facility-specific Area Mail Processing consolidation studies,[2] each of which is designed to determine the feasibility of local consolidation opportunities.

A. Approach Used to Define the Mail Processing Operating Window

As described above, DPS is the operation that provides letter carriers with mail in the sequence needed for delivery, based upon the line of travel on each carrier route. DPS is a machine-intensive operation; the needs of each local DPS operation dictate the number of Delivery Bar Code Sorters required to execute both sortation runs in the

[2] These are discussed further in the Direct Testimony of Frank Neri on Behalf of United States Postal Service (USPS-T-4).

current four-hour early morning DPS time window. To perform the DPS operation, each piece of letter mail is sorted twice. In the first pass, the mail is sorted to bins based on the delivery point.[3] If the mail is being DPS'd to 100 bins, bin 1 would receive all mail for delivery points 1, 101, 201, 301, etc. The second pass takes this mail and redistributes it in walk sequence for each carrier's route. The second pass cannot begin until all volume expected to be dispatched for delivery for the sort scheme has been processed though its corresponding first pass. This means that late arriving mail from a destinating plant's overnight originating partners ultimately constrains the DPS processing window at the destinating plant. The end time of the DPS processing window is fixed by current service standards, since mail must leave the plant by a certain time to be transported to the carrier stations for delivery that day to meet the overnight delivery standard. Thus, the later the second DPS pass is started, the more equipment the destinating plant needs on hand to complete the operation in time, since machine throughputs are a constant. Since letters make up the majority of mail volume, letter processing machines comprise the greater part of the mail processing equipment inventory. In addition, the DBCS is the Postal Service's most underutilized fleet of equipment. Together, these two facts dictated that initial network modeling efforts focus on the processing of letter volume when considering the establishment of a more efficient set of operating windows under new service standards.

To develop the new operating windows associated with new service standards, a scoring tool was built in Microsoft Excel to evaluate the costs and benefits of expanding the operating windows and travel time between the collection points, mail processing

[3] A delivery point is a single mailbox or other place at which mail is delivered.

centers, and delivery units. With the elimination of overnight service standards, an additional twenty-four hours of processing and/or transportation time can be added to the time between induction of First-Class Mail into the network and its delivery. This time can be allotted to mail processing only, transportation only, or both components of the network. If all the additional time added were allotted to transportation, there would be no reduction in the DBCS equipment count, since the arrival time of volume assigned for next-day delivery at the destination processing plant and the DPS second pass clearance time would not change; *i.e.*, the limiting factor would remain constant and all final sortation would still have to be completed in the four hour window.

Likewise, if all additional time were assigned to processing of delivery point sequencing, there would be no additional opportunity to consolidate origin processing sites because the volume from the collection sites would still need to arrive at the origin processing plant and be processed in its existing operating window to meet the network transportation dispatch times. Consolidation of origin processing sites would generate additional transportation efficiencies.

The Microsoft Excel scoring tool takes a very general approach that allows the Postal Service to find efficiencies across many different mail processing operations, as well as transportation. The tool can be viewed as a giant calculator. It iterates through a combination of assumptions and outputs the final feasible computations into another worksheet that allows the modeler to compare several scenarios at once. The quick computational time allowed for the modeler to run many scenarios. The scoring tool is provided in library reference USPS-LR-N2012-1/14 and USPS-LR-N2012-1/NP3.

Specifically, the Excel calculator evaluates each scenario by spreading the additional twenty-four hours to the time allotted for completing each processing step, as well as providing additional travel time between post offices and processing centers. For each scenario, the model provides a proposed cancellation operating window, a proposed outgoing primary operating window, a proposed incoming primary operating window, and a proposed delivery point sequencing window (including both first and second passes). Then the model "scores" each scenario based upon hypothetical transportation, labor, overhead, and administrative costs. These hypothetical costs are used for scoring purposes only, to compare the different scenarios and should not be misinterpreted as cost savings estimates associated with any particular network scenario. Each assumption and input into the Excel tool will be described in detail in this section of the testimony.

In applying the Excel scoring tool, I assumed national standardization of mail processing. In other words, I assumed that the start-time and end-time for each step in the sort process is exactly the same for all mail processing sites. This approach provided feasible operating windows for each process step to be completed. To execute this, Fiscal Year 2010 Management Operating Data System (MODS) workload was spread evenly across the 3,119,884.69 square miles[4] of the 48 contiguous states of the United States.

The operating window for each stage of processing was a decision variable of the Microsoft Excel tool. Based on the tool results, the number of facilities was

[4] Together, the 48 contiguous states and the District of Columbia have an area of 3,119,884.69 square miles. Of this, 2,959,064.44 square miles are land, comprising 83.65 percent of U.S. land area. Officially, 160,820.25 square miles are water, comprising 62.66 percent of the nation's water area.

determined and the required equipment set was compared to today's equipment. Workload was divided by the machine run-time and national throughputs in order to determine the facility square footage required to process the workload. The national throughputs were calculated using pieces sorted on a machine and the machine's run-time from End of Run (WebEOR). These data were used as a benchmark to set throughput expectations that would occur under the new operating environment where all mail volume is available prior to initiation of a sorting operation.

As stated previously, the tool was a scoring tool. It compared the impacts of traveling farther distances in fewer processing sites and traveling shorter distances and processing in more locations. Each scenario evaluated the transportation and mail processing impacts. The impacts for each scenario combined the mail processing resource use and the associated transportation resource use to establish a practical balance to use those resources efficiently. The average number of origin trips was calculated separately from the average number of destination trips.[5] To ensure all aspects of transportation were included, both network transportation and post office to plant transportation were included in the model.[6]

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[5] An origin trip is defined as transporting unprocessed collection mail from the Post Office to the origin plant. A destination trip is defined as transporting processed mail from destination processing plant to delivery unit.

[6] The Fiscal Year 2010 Transportation Contract Support System (TCSS) recorded 19,636 Post Office collection to cancellation processing site trips and 18,022 destination processing plant to delivery unit trips, while the Enterprise Data Warehouse reported a total of 27,559 Post Offices. The fact that there were fewer trips than Post Offices indicates that there were multiple stops per trip. To calculate the number of stops per mail collection trip, all TCSS routes/trips that traveled from 5-digit ZIP Code to a plant and which occurred between 12:25 p.m. and 09:00 p.m. were totaled. The number of stops per route/trip was the summed per route/trip and then divided by the total count of route/trips. The average stops for collection to cancellation was 3.1 stops per trip. A similar methodology was used for destination plant to delivery unit. The average stops for destination plant to delivery was 2.76 stops per trip for all trips between destination processing plant and 5-digit that occurred between the hours of 03:00 a.m. and 09:00 a.m. based on Fiscal Year 2010 TCSS. *See* library reference USPS-LR-N2012-1/35.

To test the feasibility of the proposed operating windows, one must determine if the volume requiring processing is available during the time allotted to process it. To estimate mail volume arrival profile and availability, the following limits were applied to the model: the first collection trip was scheduled to leave at 4:00 p.m. and the last collection trip was scheduled to leave at 6:00 p.m. The first delivery trip was scheduled to leave the destination processing plant at 8:00 a.m. If a network alternative led to collection volume arriving after the collection processing window ended, that alternative was deemed infeasible. In addition, if an alternative resulted in mail still being processed after its delivery trip left, that alternative was also deemed infeasible.

A consolidated network would result in collection and delivery points farther from their respective processing plants than today. The scoring tool allowed for all collection and delivery points over 66 miles away to consolidate at an intermediate location or hub, where the mail would be combined and loaded on fewer trucks, then dispatched to the processing plant.[7] To account for hub work hours, an additional 30 minutes per person was added to work hours in the scoring tool to approximate loading time. Although the hub concept was incorporated into the initial modeling, decisions regarding how to route local transportation will be made at the local level through the Area Mail Processing (AMP) analysis utilizing USPS Handbook PO-408. In today's environment, standard practice is to allot fifteen minutes for unloading and fifteen minutes for loading a truck.

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[7] The distance of 66 miles was determined by analyzing distance thresholds based on a sensitivity analysis for minimum building size, the minimum trip cost, and tour length. This distance is the preferred distance when operating tours are 8 hours, the minimum trip cost is $0.00, and the minimum building size is set at 21,265 square feet. It should be emphasized that these scoring tool assumptions are not steadfast rules being employed in the final network design.

For network transportation, it was assumed a 53 foot truck would be utilized. The number of network trucks was calculated based on estimates of mail volume per truck.[8] Network trucks were assumed to travel at 47 miles per hour. A minimum cost per trip was set to $0.00 to calibrate the baseline cost. The total trip cost was calculated by summing the minimum cost per trip to the total miles traveled multiplied by the trip rate ($1.80 per mile).

Facility square footage was scored based on the equipment required to process the total workload. A minimum threshold of 21,265 square feet, determined on the basis of regression analysis,[9] was set for each mail processing site.[10]

In the scoring tool, a minimum service standard was set at two days. The workload was converted into an average daily workload by dividing Fiscal Year 2010 MODS data by 302 operating days.[11] The labor costs were calculated using a labor rate of $40.00 per hour. The following assumptions were applied to simulate the time spent from unloading the truck at the origin processing center to dispatch to the network or final destination: The time allotted to unload a truck was twenty minutes, or 0.33 hours.[12] If

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[8] 302,400 letters per truck =24 * 350 * 36, where 24 is the number of APCs of letters per truck (truck backfilled with other products), 350 is the number of letters per tray, and 36 letter trays per APC.

[9] Overhead Cost = -0.000076*(Building Square Feet)^2 + 129.1 (Building Square Feet) – 2,063,303. Overhead costs include the following categories from the Fiscal Year 2010 Postal Service Financial Reporting (PSFR): administrative, supplies, supplies (inventory), rent, and depreciation. The minimum building size was set at 21,265 square feet. The overhead cost was equal to the lower bound of the 95 percent confidence interval, such that building overhead is always greater than zero. The PSFR data are provided in USPS Library Reference N2012-1/36.

[10] Dock space and staging were not a function of determining operating windows. The staging square footage requirement is accounted for in the strategic level capacity modeling and detailed equipment modeling sections later in my testimony.

[11] The number of operating days in a non-leap year is 302.

[12] In the current plant environment, the informal guideline is to attribute fifteen minutes per unload. Given the potential of better utilization of trucks under this concept, twenty minutes per unload was chosen for purposes of the scoring exercise.

a hub was required, an additional hour was added to the travel time from collection site to origin processing site. There were 2.0 hours allotted for mail processing; this included one hour for cancellation and one hour for outgoing primary operations. A total of 4.5 hours was allotted for destination processing; this included 0.75 hours for incoming primary, 0.75 hours for DPS first pass, and 3.0 hours for DPS second pass processing time. These operating times were chosen to mimic the mail flow. Single-piece mail needed to be batched into handling units to move to the next process step.

Cancellation and outgoing operations, under the Network Rationalization concept, would only need to be transported within the building. For this, only a single piece of in-house mail transport equipment needs to be filled before the volume flows down to the next operation. However, the DPS second pass requires that all volume to that delivery unit be sorted completely prior to dispatch. Thus, the operating window of 3.0 hours was used to reflect the time required to process all letter volume assigned for next day delivery by a specific delivery unit, such that a single DPS trip can be dispatched to the delivery unit. Three hours was given to the stations for manual casing. Again, until all volume is cased, the mail cannot move on to the delivery step efficiently.

The parameters described above were evaluated with the Microsoft Excel scoring tool to produce ratings on the scale of impacts to transportation, labor, and overhead costs (including maintenance, rent/depreciation, supplies, and administrative). The scores ranged from a high of 6.44 and to a low score of 5.05, once the DPS window was defined at sixteen hours. In an unconstrained model, the score can range from 0 to 13.5. However, a score of 13.5 would mean that there is no future mail processing or distribution network. Thus, a score of 13.5 is impossible to achieve. The ratings per iteration, including the number of nodes, distance traveled and the resulting operating plan, were compared to the results of models with varying inputs. The result of each model run was also evaluated on six feasibility points set forth below:

- Last Collection Trip Arrives Before Collection Critical Entry Time;
- Last Outgoing Trip Arrives Before Incoming Critical Entry Time;
- Incoming Clearance Time is after Incoming Start Time;
- Trip to DPS First Pass starts before the DPS First Pass is scheduled to start;
- Number of Advanced Facer Canceller System (AFCS) required for cancellation is less than current AFCS inventory (to ensure the proposal did not require a large capital investment in equipment); and
- Total letter automation required is less than current letter automation inventory.

The output of the scoring tool provides a proposed cancellation operating window, a proposed outgoing primary operating window, a proposed incoming primary operating window, and a proposed delivery point sequencing window (including both first and second pass). This scoring exercise reinforced the benefit of an extended DPS window, especially in an environment where all mail volume is available at the beginning of a mail processing operation.

In summary, the Excel tool is a rational way of developing a starting point for discussion to illustrate the opportunities presented by relaxing service standards. By relaxing service standards, operating windows can be expanded. Expanded operating windows allow for the same volume to be processed on fewer machines. Fewer machines mean less facility square footage is required to house the equipment. This is supporting by the initial findings of the MS Excel tool, where the highest score was assigned to the scenario in which outgoing processing was allotted 13 hours for processing. Cancellation and Outgoing Primary were each assigned 12 hours and the two process steps ran simultaneously for 11 hours. Delivery Point Sequencing was assigned a 16 hour window. When the DPS window was set at 16 hours, the cancellation and outgoing operating window ranged from 6 to 15.5 hours.

The scoring tool's outputs were used as the baseline for discussion with subject matter experts and postal service management. The concept of shortening the outgoing processing window and ending processing at midnight was determined to allow for reasonable expansion of the 2-day First-Class Mail service standard reach. All other operating window start times, but not the run-time, were then adjusted to align with the change in cancellation. This scenario fell within the top 25 operating window proposals in the scoring tool when the DPS operating window was set at sixteen hours.

B. Description of the Strategic Level Capacity Modeling Approach

1. Description of the modeling objective

Once the operating windows were established, the operating windows were used in conjunction with MODS FY2010 workload to determine the configuration of the mail processing network under the proposed service standards. This configuration includes both determination of which plants could remain active mail processing centers and the assignment of 3-digit ZIP Code service areas to those plants. The modeling tool used to determine potential future plants and 3-digit ZIP Code assignments was IBM ILOG Logic Net Plus 6.0 XE (Logic Net),[13] which is a least cost optimization software.

The objective of the model is to maximize assignment of 3-digit ZIP Codes to a facility, so ultimately nodes are minimized in the feasible network. The model simultaneously determines which facilities could remain active and the 3-digit ZIP Codes for which it would have processing responsibility. The model drives toward the lowest number of processing nodes, since there is a fixed cost for each processing node that remains active. However, the model is limited in how it can assign the 3-digit ZIP Codes to plants by the distance mail from the outer reaches of a particular 3-digit ZIP Code area can travel to its processing plant. In addition, the total number of 3-digit ZIP Codes assigned to each processing node can not exceed the available current capacity of the processing node. I will describe below in detail the distance constraints, as well as how the processing capacity is defined.

2. Processing plants and ZIP Codes inputs used to build model

For purposes of modeling, I assumed that each 3-digit ZIP Code workload could be transported up to 200 miles to be processed by a plant. The model evaluated processing facility fixed cost, per-piece cost, and cost of distance traveled to determine how best to group 3-digit ZIP Code footprints[14] into the plants. The next portion of my

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[13] The Postal Service has obtained a non-transferrable license for use of the software, which was designed for a network in which plants produce output, ship to warehouses, and then ship to customers. According to the Logic Net Plus website, the software analyzes various tradeoffs between production costs, warehousing costs, transportation costs and service requirements to arrive at a best solution. *See,* http://www-01.ibm.com/software/integration/sca/logicnet-plus-xe/. Information regarding purchase of a copy of the software is available at that link.

[14] The 3-digit ZIP Code processing square footage (footprint) is the sum of square footage for each equipment type that is required to perform both origin and destination processing for the 3-digit ZIP Code.

testimony discusses the data preparation used as inputs for Logic Net Plus -- the model inputs and how they were generated.

The Logic Net model included 476 plants[15] as potential processing sites. Those with no workload or no equipment were removed as potential processing sites. Each facility was assigned a processing role by mail shape—letter, flat, bundle/parcel. For all facilities, the current mail processing square footage was used to constrain the facility size. No capital investments were allowed in the model in light of the Postal Service's current cash flow situation. Current mail processing facility square footage information was acquired from the Facilities Database (FDB), USPS Facility Surveys, and current facility mail processing equipment sets (library references USPS-LR-N2012-1/17 and USPS-LR-N2012-1/NP4).

Cost parameters[16] were input into the Logic Net model to determine the least cost solution. Each potential facility was assigned an opening cost.[17] Operating costs for each facility are equal to the building's fiscal year 2010 accounting log utility costs. The line costs represented the labor cost per facility. A cost was attributed to the facility, if

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[15] The 476 plants included the 440 plants, at the time of modeling, on the L005 SCF plant labeling list and 37 additional plants/annexes that are currently used for package processing, excluding the Network Distribution Centers (NDCs). It should be emphasized that additional consolidation has occurred as part of the June 2008 Network Plan since this modeling was conducted and is ongoing at the time of filing the Request.

[16] The cost parameters include the fixed opening cost, fixed operating cost, fixed closing cost, and line costs. The fixed opening cost is a proxy for either the rental cost for leased facilities or a calculated "opportunity cost" for an owned building. The fixed operating cost is used as a proxy for utility costs from the accounting log. Fixed closing costs are used to proxy the sale of an owned building. The line costs proxy the labor costs.

[17] Opening cost, in Logic Net, was defined as the rental cost for leased facilities or a calculated *opportunity cost* for an owned building. The *opportunity cost* was calculated using regression analysis to determine the sale price of owned buildings. The *opportunity cost* of the building's value was spread over 10 years at the expected rate of inflation. Details are provided in library reference USPS-LR-N2012-1/15.

the facility processed mail in the proposed network.[18] The Logic Net model's objective was to minimize total cost, including transportation costs. The transportation costs are detailed below.

3. 3-digit ZIP Codes were assigned by model to find least cost solution

In all, 920 3-digit ZIP Codes were modeled, with non-contiguous[19] 3-digit ZIP Codes excluded from the analysis. Each 3-digit ZIP Code was assigned a footprint required to process the mail generated by and delivered to that 3-digit ZIP Code. The footprint per 3-digit ZIP Code was calculated by product shape (flat, letter, and parcel/bundle) using fiscal year 2010 data from MODS, April 2010 Transportation Information Management Evaluation System (TIMES), and fiscal year 2010 Origin-Destination Information System (ODIS).[20] The 3-digit ZIP Code footprint for each individual product shape was summed at the 3-digit ZIP Code level, producing the total 3-digit ZIP Code footprint that was used as demand in the Logic Net model.

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[18] Step function was generated to represent the cost per piece based on workload processed at the facility. Three groups were formed: (1) Buildings with square feet from 0 to 210,000, (2) Buildings with square feet from 210K to 450K, and (3) Buildings with square feet from 450K to 750K. Three linear cost functions were calculated by taking the slope of the polynomial function at the mid-points of each group—105,000 square feet, 330,000 square feet, and 525,000 square feet. The slope was applied to a cost function by group as follows: $Cost_{Group1}$ = 170,059 + 238.13 Square Feet, $Cost_{Group2}$ = 8,391,559 + 198.98 Square Feet, and $Cost_{Group3}$ = 39,320,059 + 130.25 Square Feet.

[19] Non- contiguous 3-digit ZIP Codes include all 3-digit ZIP Codes within Alaska, Hawaii, Puerto Rico, US Virgin Islands, and Guam.

[20] Fiscal Year 2010 MODS data were decomposed to the 3-digit ZIP Code level using the April 2010 Transportation Information Management Evaluation System (TIMES). TIMES provided the trucks from Post Office to Plant and their utilization. The trip utilization was rolled up to the 3-digit level, and percent contribution for each three digit was determined based on all the 3-digits serviced by the current plant. This spread was applied to the origin plant's FY2010 workload to determine the workload contributed by each individual 3-digit ZIP Code. The 3-digit ZIP Code workload, by shape and process step, was divided by the machine throughput and operating window to determine the square footage requirement for each 3-digit ZIP Code. This methodology allows for all mail shapes and process steps to compete for a common denominator—facility workroom square footage. Origin Destination Information System (ODIS) was used to decompose the destination volume to 3-digit ZIP Code.

Transportation metrics and constraints were included for the travel between collection/delivery to processing facility, *i.e.*, 3-digit ZIP Code to proposed processing site. The distance between the processing facility and 3-digit ZIP Code was limited to 200 miles. The distance was calculated using PC Miler—a routing, mileage and mapping software program.[21] The mileage between the 3-digit ZIP Code and the processing facility was multiplied by $1.82[22] to estimate the variable portion of the trip between collection/delivery points and processing facility. A fixed component of $100 was added to each 3-digit ZIP Code for plant lane. This fixed cost was added in to reflect more accurately the cost of local transportation. There is a fixed cost for each trip. Based on Logic Net's transportation cost algorithm, the $100 per lane assumption most accurately represented the current ratio of transportation cost to mail processing costs.

4. The model applied mail processing and mail processing equipment constraints.

To sustain a simplified network, all letter mail for a 3-digit ZIP Code was processed at one plant, all flats mail for that 3-digit ZIP Code was processed at one plant, and all parcel mail for a 3-digit ZIP Code was processed at one plant. At most two plants can process the letters, flats, and parcels for a single 3-digit ZIP Code. If the facility had no cancellation equipment, its production capacities for cancellation were cut by 67 percent to allow for additional travel time to be transported to an automated cancellation processing facility. If a facility had no current cancellation

[21] The Postal Service has obtained a non-transferrable license for use of the software. Information about purchasing the software is available at the following link -- http://pcmiler.com/products/.

[22] This value is based on lessons learned and refined assumptions.

workload and no automation equipment, it was not available as a letter processing facility in the future.

If a facility currently had no flat sorting equipment, the future facility was allotted a maximum of 2,000 square feet for flat processing or 12.5 percent of its current square feet. If a facility had no package sorting equipment, the future facility could have a minimum of 50 percent of its current workroom square footage or 13,500 square feet to process packages in a future environment. For all other situations, the building could allow processing equipment for each shape to fill its entire workroom floor when it has that type of equipment.

The Logic Net optimization model activated 177 processing facilities—168 with flat processing operations, 163 with letter sorting operations, and 152 with package and bundle sorting operations. Sixty one buildings activated by the model were later deactivated; 71 sites were activated based on site specific capacity analysis and discussion with the Area.[23] This is discussed in more detail below in sections IV.C and IV.D.

C. Site Specific National Capacity Estimation

Using the 3-digit ZIP Code assignments provided by the Logic Net model, equipment sets were calculated for the proposed mail processing centers. The results for facilities, equipment sets, and 3-digit ZIP Code assignments were discussed with both Headquarters and local subject matter experts to assess the proposal and ensure it is practical and actionable.

[23] The Logic Net model inputs and outputs are presented in library references USPS-LR-N2012-1/13, USPS-LR-N2012-1/NP2, USPS-LR-N2012-1/15, and USPS-LR-N2012-1/16.

Preliminary equipments sets for Advanced Facer Canceller Systems (AFCS), Delivery Bar Code Sorters (DBCS), Automated Flats Sorting Machines (AFSM100), Small Parcel Bundle Sorters (SPBS), and Automated Package Processing Systems (APPS) were calculated using the 3-digit ZIP Code assignments produced by Logic Net. Older, obsolete, or less productive equipment such as the UFSM 1000 and the Mark canceller were eliminated. The workload for all 3-digit ZIP Codes processed at a plant was summed to the plant level by product and process step based on the assignments agreed upon by the subject matter experts. The total workload was divided by equipment throughput and operating window. For this strategic initiative, USPS Handbook AS-504, *Space Requirements*[24] equipment square footage (which includes space for aisles and staging) was inflated by an additional twenty percent to ensure there was adequate staging room under this new concept when all volume is available at the start of the windows.[25] The equipment throughputs and square footage are provided below in Figure 1. The column labeled *Actual* is the square footage assigned to the equipment in the AS-504. The *Model* column is the AS-504 equipment square footage multiplied by an additional 25 percent used in our modeling to account for the additional staging space required under this new mail processing concept. Operating windows by process step and shape are detailed below in Figure 2.

[24] Handbook AS–504, *Space Requirements*, provides rules and guidelines for developing the various types and sizes of facilities found in the Postal Service network. It also provides templates for much of the equipment to be housed in those facilities. *See* library reference USPS-LR-N2012-1/19.

[25] As part of the specification for each site, a blueprint will be generated for each node to ensure appropriate staging and dock space exists. The building layout is one of the criteria for review and approval of each Area Mail Processing consolidation study as described by Witness Neri (USPS-T-4).

Figure 1: Model Equipment Throughput

		Sqft	
	Throughput	Actual	Model
AFCS	25,000	3,893	4,866
DBCS	27,500	2,491	3,114
AFSM100	13,500	7,792	9,740
SPBS	3,000	16,384	20,480
APPS		59,079	73,848
FSS		28,000	35,000

Figure 2: Model Operating Windows

	Op #	Machine	Start		End		Operating Window (Hours)
Letter	Cancellation	AFCS	Day 0	17:00	Day 1	00:00	7
	Outgoing Primary	DBCS	Day 0	17:30	Day 1	00:30	7
	Incoming Primary	DBCS	Day 0	08:00	Day 0	12:00	4
	DPS First Pass/Second Pass	DBCS	Day 0	12:00	Day 1	04:00	16
Flat	Outgoing Primary/Secondary	AFSM100	Day 0	17:00	Day 1	02:00	9
	Incoming Primary	AFSM100	Day 0	08:00	Day 0	14:00	6
	Incoming Secondary	AFSM100	Day 0	14:00	Day 0	04:00	14
	Delivery Point Sequencing	FSS	No changes from today				
Parcel / Priority	Outgoing Primary	SPBS	Day 0	15:10	Day 0	22:50	7.7
	Incoming Primary	SPBS	Day 0	17:00	Day 1	04:00	11

D. Local Insight and Analysis Refined The Network Concept

The preliminary modeling results were shared with Area management. Maps were generated to depict the plant-to-ZIP Code mapping by product shape. The information sharing was followed by in-person and teleconference meetings with each Area to discuss each plant's proposed 3-digit ZIP Code mapping. The participants included subject matter experts in processing operations and transportation. These discussions walked through the results; follow-up meetings and teleconferences were arranged to discuss plant and ZIP Code assignments that impacted more than one Area. ZIP Code assignment mapping to plants was modified on the basis of Area management expertise and judgments about feasibility. The updates to 3-digit ZIP

Code plant assignments by mail shape and activated nodes were based on knowledge of local geography, traffic, and proximity to highway and other access points. For example, LogicNet Plus assigned 3-digit ZIP Code 798 to Midland, TX instead of El Paso, TX, where it is currently processed. El Paso is an activated site based on the model, so the ZIP Code assignment was reverted back to its current processing facility to avoid migrating workload that precluded other cascading consolidation opportunities. Local economic factors were also considered. For example, the 3-digit ZIP Code 439 area (Steubenville, OH) was mapped to Columbus, OH. However, Area mail processing and transportation managers suggested re-assigning that 3-digit ZIP Code to Pittsburgh because most cities in the 439 ZIP Code area are economically and socially associated with Pittsburgh, PA rather than Columbus. As stated above, local geography was considered. The Western Area mail processing and transportation managers preferred to relax the 200-mile distance constraint so as to reduce the number of smaller processing centers in their more remote locations. Due to the geography in the West, many Customer Service Mail Processing Centers (CSMPC) are required to accommodate the current overnight First-Class Mail service standard. The Western Area proposed moving Colby, KS volume 240 miles to Denver, CO.

For letter processing plant to 3-digit ZIP Code assignments, 45 percent of the ZIP Code assignments were modified. Over 150 of those 3-digit ZIP Code changes were the result of adding letter processing locations not activated by the Logic Net Model. Nearly 280 of the 3-digit ZIP Code changes resulted from deactivating more than 70 nodes to which Logic Net plus had assigned letter processing.

E. Detailed Equipment Modeling Was The Next Logical Step

The Microsoft Excel tool and Logic Net modeling provided a theoretical and rational way of testing the feasibility of the network rationalization concept and provided a strategic structure. The organized meetings with headquarters and field mail processing and transportation experts helped the strategic structure evolve. It was then important to perform a detailed equipment analysis because it is the equipment, not location, which drives building requirements and associated labor. Thus, this section of my testimony details the equipment modeling and staging requirements.

After the expert feedback was incorporated, the resulting 3-digit ZIP Code assignments were used to conduct site-specific analyses that included origin mail arrival profiles, as well as lunch and break factors, to generate actionable equipment sets as a starting point for discussion. A detailed equipment analysis was completed for AFCS, AFSM100, DBCS, SPBS, APPS, and the Tray Management System (TMS). The detailed analysis is described below by equipment type. For each type of equipment listed above, the equipment set requirement was evaluated based on throughputs, mail volume and its respective arrival profiles.

1. Equipment Determination - AFCS

To estimate the cancellation AFCS requirement, Fiscal Year 2010 MODS data were used at the 75th percentile of volume. To estimate the DBCS requirement for the Outgoing Primary (OGP) processing for letters, Fiscal Year 2010 MODS data were used at the 95th percentile[26] equating to the 14th or 15th highest volume day of the year. In

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[26] The 95th percentile factor is calculated by averaging the quotient of the site 95th percentile day for volume by the site average daily volume; the 95th percentile factor for outgoing primary on the DBCS was 155 percent and was calculated using the Enterprise Data Warehouse MODS data from September 2010 to August 2011.

contrast, the 75th percentile[27] was used for AFCS. There is more flexibility in the AFCS operating window, as it is dedicated to letter cancellation. Accordingly, it can be started earlier if sufficient volume is available without encroaching on maintenance or other operating windows. For example, today peak volumes are managed by early collection trips and opening up the operating window by starting cancellation earlier. In a future network design, this practice could continue. As a result, there would be no need to adjust the equipment for the peak volume since the adjustment in operating windows can address peak processing demands. This can be sustained in the proposed future operating environment for cancellation operations. In the future operating environment, the DBCS will be operating 20 hours a day with the remaining 4 hours dedicated to preventive maintenance. Accordingly, the Outgoing DBCS requirement was modeled at the 95th percentile volume. This level of volume workload was modeled to ensure feasibility on the highest volume days, as there is no flexibility to expand the window to handle the extra volume on peak days.

To assess the equipment requirement accurately for outgoing processing, the mail Volume Arrival Profile (VAP) was simulated using the Transportation Information Management Evaluation System (TIMES) database. The total utilization from all 5-digit ZIP Codes was aggregated by arrival time[28] for both the current origin processing facility

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[27] The 75th percentile factor was calculated by averaging the quotient of dividing the site volume 75th percentile day by site average daily volume; the 75th percentile factor applied was rounded to 115 percent. The actual peak factor based on WebEOR FY10 was 114.8 percent.

[28] Direct Collection VAP = (Scheduled Arrival Time from 5-digit Collection Point to current plant) – (Travel Time from Associate Office to current plant) + (Travel Time AO to proposed node). The Direct Cancellation VAP adjusted the direct collection VAP by assuming that if multiple trucks were used between an AO and the plant, the early trucks have 30 percent cancellation mail and the last truck of the day has 70 percent cancellation mail. If TIMES data were not available for an AO to plant pair then a national average VAP was applied.

and the proposed origin processing facility. The mail arrival and mail processing times were rounded to 15 minute intervals.

If the VAP resulted in mail arriving after the processing window ended, the late arrival volume was spread throughout the processing window proportional with the remainder of the VAP information. An additional 15 minutes was added on to the VAP to transport the mail from the dock to the AFCS machine.

The operating window for AFCS was seven hours (05:00 p.m. to 12:00 a.m.). The throughput used for the AFCS is 22,500 pieces per hour which factors in lunch and breaks. The WebEOR October 2009 to August 2011 throughput was calculated at 22,786 pieces per hour. For a site to earn its first AFCS, it needed a minimum threshold of 39,375 pieces, *i.e.*, the AFCS must be at least 25 percent utilized. For any additional machine after the first added to the equipment set at a proposed cancellation facility, the volume must exceed a 15 minute run-time beyond midnight for all AFCS already allotted to the site.

The operating window for DBCS outgoing primary processing is seven hours (05:30 p.m. to 12:30 a.m.). The throughput used for the outgoing primary on the DBCS is 23,200 pieces per hour, which included lunch and break factor. This was calculated using December 2010 WebEOR data. Similar to AFCS, for a site to earn its first DBCS machine, it needed to be 25 percent utilized. The equipment requirement was rounded up if more than 15 minutes of run-time for all DBCS machines was required to process the excess mail that could not be processed in the operating window, based on the arithmetic floor of the equipment requirement. There are three mail flows to the outgoing primary DBCS machines—down flow from the AFCS, non-cancellation volume that arrives with the collection mail according to the collection VAP,[29] and mailer volume which is entered directly at the plant.[30] All received a 15 minute transport time to the AFCS.

2. Equipment Determination - DBCS

The DBCS equipment was also used for delivery point sequencing the mail. The Delivery Point Sequence (DPS) analysis for letters consists of using the DPS Tool[31] to create and schedule DPS sort plans based on the new 3-digit ZIP assignments at proposed facilities. All DPS mail was assumed to be available at 12:00 p.m. Since the outgoing primary window overlaps with the DPS window, some DBCS machines will be unavailable for a portion of the DPS window.

The DPS Tool Data Manager database[32] was used to determine average daily volume, carrier routes and delivery points for each 5-digit ZIP Code within the 3-digit ZIP Code assigned to a facility. The DBCS requirement for DPS was determined using

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[29] This is sixty percent of the difference between the total outgoing primary volume and cancellation volume.

[30] This mail is assumed to arrive at 5:30 p.m., 6:30 p.m., 7:30 p.m., and 8:00 p.m., with each arrival consisting of 10 percent of the difference between the total outgoing primary volume and cancellation volume.

[31] The DPS Tool is an Microsoft Access based tool that combines 5-digit Zones into DPS sort schemes based on site-specific inputs, including volume, delivery points, operating window, and machine characteristics. The DPS Tool uses a heuristic to combine zones into sort plans and sort plans on machines so as to utilize as few machines as possible while processing all zones and volume. In addition to zone and machine inputs, users can specify combinations of zones to include or exclude as well as start time, end time and non-productive time between runs. The DPS Tool is provided in library reference USPS-LR-N2012-1/18.

[32] The DPS Tool volume data are extracted from the WebEOR system each Postal quarter. The data extract includes average and maximum daily volumes by 5-digit ZIP Code for both first and second DPS passes. Weekends and holidays are excluded from the calculations because they tend to skew the averages incorrectly, specifically for the second pass runs. 5-digit ZIP Codes which do not receive DPS sortation are not represented in the data. Delivery counts are extracted automatically from the Address Management System (AMS) Delivery Point File (DPF) on the first day of each Postal quarter by a mainframe query. The file includes counts of possible deliveries as well as delivery sequences (unique delivery point barcode values) for all 5-digit ZIP Codes and routes.

a peak factor of 120 percent of Fiscal Year 2010 average daily volume from Data Manager.[33]

A standard size DBCS length, 222 bins, was used as the starting point for the modeling. As needed, a DBCS with 254 bins was used to address equipment constraints. The first pass was constrained to only use 213 bins (222 bin DBCS) and 245 bins (254 bin DBCS) for sequencing, reserving the other bins for special holdouts and rejects. The second pass was allowed to use three additional bins, with a total of 216 bins available for sequencing. A turnover time of 20 minutes was blocked out between the first and second pass. If a machine ran more than one scheme, there was a thirty minute break during which the machine could not be run, to account for tear down of the first run and set up on the second scheme. The DPS Tool was unconstrained and allowed to combine 5-digit ZIP Codes within each 3-digit ZIP Code. This adjustment of 5-digit ZIP Code pairings allowed the DPS Tool to create sort programs which minimized total machine requirements.

For DBCS not dedicated to DPS, the DPS operating window for the first and second pass was reduced from 16 hours (12:00 p.m. to 4:00 a.m.) to 9 hours (03:00 p.m. to 12:00 a.m.). The additional 7 hours were left open for outgoing primary letter processing. All other DBCS machines were available for 16 hours. The DPS first pass throughput was 27,500 pieces per hour and the DPS second pass throughput was 30,000 pieces per hour. In an environment where all the mail is available at the start of the window, the throughput is higher when the machines are not starved for mail. DPS second pass has a higher throughput today than first pass. This is because all mail fed

[33] The peak factor was calculated using the 95th percentile for WebEOR Fiscal Year 2009 DPS volume peak factor (126 percent).

into the second pass has run successfully on the first pass and is, thus, cleaner and unlikely to jam. This should be true under the new concept as well.

An analysis was performed to determine if the proposed equipment set for a site was constrained by the facility's workroom square footage. For these facilities, the DPS sort plan scheduling was reviewed. Where possible, three or four DPS schemes were consolidated on to single machines to reduce the total number of machines needed by triple and quadruple banking the machines. The DPS tool only double-banks machines, hence this additional analysis was conducted on an as-needed basis.

3. Equipment Determination – AFSM100

To model the AFSM100 equipment requirement, similar to the AFCS, a direct volume arrival profile (VAP) was used.[34] If volume arrived after the operating window using current trip times, the excess volume was spread throughout the processing window proportional with the remainder of the VAP information. The outgoing mail arrival and mail processing time was broken into 15 minute intervals. A 15-minute block of time was built into the origin processing to account for transport from the dock to the AFSM100.

The volume estimated per site was based on Fiscal Year 2010 MODS data. The volume was adjusted to represent a peak day (95th percentile volume)[35] and further adjusted to account for FSS locations.[36] The outgoing secondary volume was estimated

[34] See footnote 28 for details on arrival profile methodology.

[35] Peak factors for outgoing primary, incoming primary, and incoming secondary are 150 percent, 120 percent, and 120 percent, respectively.

[36] The following 3-digit ZIP Code specific information was extracted from WebEOR (8/21-30/11) to calculate separation and scheme requirements: City routes, Highway contract routes, Rural routes,, Total 5-digit ZIP Codes, 5-digit ZIP Codes with carrier routes and PO boxes, 5-digit ZIP Codes with carrier routes and no PO boxes, 5-digit ZIP Codes with PO boxes and no carrier routes, Total manual routes,

at 30 percent of outgoing primary.[37] The incoming secondary workload was deflated at FSS sites for two reasons: FSS was not full-up in 2010 and mail processed on FSS does not need an incoming secondary sort. In addition, six percent of flats were deemed non-machinable and thus did not require processing capacity based on AFSM100.

The operating windows were dependent upon mail processing step, each of which had a unique operating window and throughput. The operating windows used to determine the number of AFSM100s required for each proposed facility were defined by the length and time of day allowed for each processing step. These operating windows were defined as follows:

- The outgoing primary window was seven hours (05:00 p.m. to12:00 a.m.) with a throughput[38] of 12,231 pieces per hour;
- The outgoing secondary window was eight hours (05:30 p.m. to 1:30 a.m.) with a throughput of 12,835 pieces per hour;
- The incoming primary window was six hours (08:00 a.m. to 2:00 p.m.) with a throughput of 13,321 pieces per hour;
- The incoming secondary window was fourteen hours (2:00 p.m. to 4:00 a.m.) with a throughput of 14,017 pieces per hour; and,
- The FSS operation window was set at eighteen hours with a throughput of 10,000 pieces per hour.[39]

Total FSS routes, FSS PO Box routes, FSS General delivery routes, and Manual PO box routes. Also a breakdown for FSS and manual operations included 5-digit ZIP Codes with carrier routes and PO boxes, 5-digit ZIP Codes with carrier routes and no PO boxes, and 5-digit ZIP Codes with PO boxes and no carrier routes.

[37] The percentage of outgoing primary that flows down to outgoing secondary was calculated using Fiscal Year 2010 quarter 4 to Fiscal Year 2011 quarter 3 WebEOR data for AFSM100s and UFSM1000s.

[38] Throughput for all process steps was determined by WebEOR FY10 Q4 - FY11 Q3, with the exception of FSS. FSS throughput was based on the September 12, 2011 FSS daily report for the Columbus P&DC. The Columbus throughput was 10,021 pieces per hour and was full-up for FY2010. This latter fact makes it a reasonable benchmark for future FSS sites.

[39] This is important to determine how much volume can flow to FSS rather than AFSM100.

Changeover time between processing steps was set at 15 minutes. Additional changeover time of 10 minutes was allowed between incoming primary and incoming secondary sort plans. The number of incoming secondary sort plants per 3-digit ZIP Code was determined using the following algorithm:

> (City Routes + Highway Routes + Rural Routes - (manual routes - manual PO boxes) – (FSS routes – FSS PO boxes – FSS General Delivery) + 2 * (carrier only routes + PO box only routes) + 3*(routes with PO boxes and carrier routes)) / (117 bins available per sort plan * 90 percent bin usage)[40]

For a site to earn its first AFSM100, it must be at least 25 percent utilized. For any additional machine after the first machine to be added to the equipment set at a proposed flat processing facility, the volume must exceed a 15 minute run-time beyond midnight for all AFSM100 machines already allotted to the site.

The site specific incoming primary bins required were calculated for each 3-digit ZIP Code using the following algorithm:

> Total 5-digit ZIP Codes – 5-digit ZIP Codes with carrier routes and PO boxes – 5-digit ZIP Codes with carrier routes only.

Then the bins for each 3-digit ZIP Code within the facility were summed to determine the total bin requirements. If there were more separations than the required bins, the re-handled volume was calculated using the following methodology. If the sum of the number of sort plans and additional 5-digit ZIP Code bins was greater than 90, the workload that needed to be re-handled was calculated as 10 percent of the incoming

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[40] Incoming secondary sort plan assumptions were: Bins available after 3 housekeeping bins removed (120 - 3 = 117); incoming secondary sort plan bin usage = 90 percent; incoming secondary bins needed for 5-digit ZIP Codes with box sections = 3; incoming secondary bins needed for 5-digit ZIP Codes without box sections = 2; round up sort plan count for calculated need over 0.1 sort plans: round down; sort plan count for calculated need under 0.1 sort plans, incoming secondary sort plans are rounded up by 3-digit ZIP and then summed for each site.

primary volume. The AFSM100 equipment requirement was calculated based on this revised workload by determining a minimal equipment requirement for incoming primary. If there was remaining incoming primary workload,[41] the overage was compared to what the proposed AFSM100s could process in an additional 15 minutes. If more than 15 minutes was required, the proposed number of AFSM100s was incremented by one. The overage was recalculated based on the new proposed number of AFSM100s and then increased until less than 15 minutes of mail processing across all machines was left at the end of the processing window. The final iteration returned the proposed number of AFSM100s required for incoming primary operations at the processing plant. If the initial proposed number of AFSM100s was zero, there must be at least enough overage to consume 25 percent of a machine to warrant a single AFSM100.

Based on the Volume Arrival Profile described earlier, the minimal AFSM100 equipment set required to process all outgoing mail to the required depth of sort was calculated using the same rollover methodology as outgoing for AFCS and DBCS. The minimal AFSM100 requirement for outgoing primary was calculated assuming all outgoing mail was available at the start of the processing window. Then for each 15-minute segment, based on the VAP, available mail was processed by the previously calculated AFSM100 count. If the VAP had mail arriving after the processing window ended, the late arrival volume was spread throughout the processing window proportional with the remainder of the VAP information. An additional 15 minutes was

[41] The amount of volume unable to be processed using the minimal required equipment set is calculated using the following formula: incoming primary volume + SCF volume – [incoming throughput * (proposed AFSM100s * (operating window – (a 10 minute sort plan change for each 90 (sort plans + additional 5-digit ZIP Codes))))]

added on to the VAP to transport the mail from the dock to the AFSM100. If there was mail still unprocessed after the operating window ends based on the initial AFSM100 requirement, then the additional volume was compared to what the proposed AFSM100 could process in 15 minutes. If more than 15 minutes of processing was required to clear the mail, the proposed number of AFSM100s was incremented by one. This process was repeated until less than 15 minutes across all AFSM100 machines was required to clear the mail. Once this condition was met, it returned the proposed number of outgoing AFSM100s required for the proposed facility.

The incoming secondary window extends before and after the outgoing window. Thus, the available time for incoming secondary on an AFSM100 that also runs outgoing was the difference between the incoming secondary operating window less the hours required to process the outgoing flats less the changeover times.[42] Based on this revised operating window and the reduction based on FSS equipment, the incoming secondary machine requirement was calculated using the same methodology as incoming primary on the AFSM100. The AFSM100 proposal at the flat processing plant was the greater of the incoming primary requirement and the requirement for the combination of incoming secondary and outgoing flats.

4. Equipment Determination – APPS and APBS

The need for parcel sorting equipment, including the Automated Parcel and Bundle Sorter (APBS), single induction APPS, and dual induction APPS, was calculated using a parcel volume peak factor of 118 percent and the Volume Arrival Profile. Outgoing VAP was based on a hub collection concept. Incoming volume was assumed

[42] The changeover time allotted was thirty minutes—15 minutes for tear down and 15 minutes for setup.

to be available at the start of the operating window as per the operational concept. The model was constrained by the total number of package sorting machines we have today and their current length, *i.e.,* number of bins.

The outgoing processing profile was evaluated in 15 minute intervals to determine the total equipment required.[43] There were three types of potential equipment: APBS with an assumed throughput of 4,000 pieces per hour, single induction APPS at 4,000 pieces per hour, and a dual induction APPS at 8,000 pieces per hour. Four different operating windows were taken into account when right-sizing the parcel and bundle sorting equipment. Outgoing parcels and bundles had a 7.5-hour operating window from 03:30 p.m. to 11:00 p.m. This was the same operating window for Outgoing Priority. Standard operating procedure today mandates that these products be run separately. Incoming parcels and bundles (Standard and Periodicals) had a 7.5-hour window from 08:00 a.m. to 03:30 p.m. Incoming Priority volume was processed in five hours between 11:00 p.m. and 04:00 a.m.

This analysis maximized the amount of manual workload going to automation and was constrained so that no additional bundle and parcel sorting equipment was required. Currently, there are 62 APPS in the Processing and Distribution Centers (P&DCs), 12 APPS in the Network Distribution Centers (NDCs), and 185 APBS available for dissemination to all facilities processing parcels and bundles. If the proposed gaining facility had an APPS machine, it kept the asset if volume warranted. A space analysis was completed for APPS that were proposed for re-deployment to determine if sufficient excess square footage was available to meet the needs of the

[43] Given the limited parcel and bundle sorting assets in our network, some volume remains manually sorted.

APPS footprint. APBS were added if machines were needed based on the model results.

Four combinations of operating windows were evaluated: (1) Outgoing Parcels and Outgoing Priority on separate sort plans (current standard operating procedures mandate the products be run separately), (2) Combined Outgoing Parcels and Outgoing Priority on one sort plan, (3) All Incoming Priority together and Incoming Parcels together in different windows, and (4) Incoming Parcels and Surface Priority together and Air Priority in different windows. The final package and bundle sorting equipment set was determined based on the sensitivity analyses, the number of separations needed for Incoming Primary and Incoming Secondary, the number of sacking operations required, overall proposed machine utilization for all operating windows, and square footage available at the proposed facility.

5. Equipment Determination – Material Handling

Additional analysis was conducted concerning material handling and staging requirements. The outputs of the AFSM100 and DBCS models were used as inputs to determine the tray and tub material handling requirements. This included low cost tray sorters (LCTS), high speed tray sorters (HSTS), robots, and Tray Management Systems (TMS). To calculate the equipment requirement, the current material handling tray separation equipment capacity was calculated and compared to the future state run plan data (volumes, separations, and machines) to determine if existing equipment capacity could meet the proposed separation and throughput requirements. If so, no additional equipment was required and the current equipment set became the proposed equipment set. If not, additional tray separation equipment was added until throughput/separations fit. The default accommodation was to add an LCTS.

In the proposed environment, staging space was needed for all DPS volume and carrier route volume at the same time. For the staging model, all letter volume was stored in trays in a general purpose mail container (GPMC). The GPMC had a footprint of 8.4 square feet. The model utilized 10 square feet per GPMC to give a conservative estimate. To convert letter volume to containers, it was assumed that there were 303 letters per tray and 36 letter trays per GPMC.[44] For flats, the volume was converted to containers using the following conversion rates: 45 flats per tub and 40 flat tubs per GPMC.

6. Staging Requirements

To determine staging space, the DPS volumes were converted into trays and then containers for each DPS run. For carrier routes, the total volume was converted into tubs and then containers for a total container count. Each container was multiplied by 10 square feet to determine the total floor space required. If a facility had a TMS, the trays stored in the TMS were subtracted from total count since they would not be staged on the floor.

The results of the detailed equipment modeling are presented in USPS Library Reference N2012-1/37, but they are summarized here. First, I found that the number of DBCS machines could be reduced from 5,768 to 2,995; this would eliminate the need for CSBCS machines because of the expanded processing window. Second, I found that we can reduce the number of AFSM100s from 538 to 522 and completely eliminate the UFSM1000 from our equipment fleet. Third, I found that we can reduce the number

[44] The original assumptions were modified to be more conservative and ensure appropriate staging space was allocated in the facility drawings.

of AFCS by 287 machines. Witness Neri (USPS-T-4) discusses how the additional time and consolidation can in turn reduce the required equipment within the activated sites.

F. AMP Process

The modeling results form the basis for the respective Area Mail Processing consolidation proposals being reviewed using the USPS Handbook PO-408 guidelines at the time of the filing the Request. The basis for any decision whether to consolidate a facility lies in the AMP process, as discussed in greater detail by witness Neri (USPS-T-4).

IV. Future Network

Based on preliminary analyses, the future operating windows will follow the plan as shown in Figures 3 and 4 below. The preliminary analyses demonstrated that the letter volume can be processed in 129 facilities; the flat volume can be processed in 132 facilities (including 2 FSS annexes); and Priority and Parcels can be processed in 105 facilities, excluding the Network Distribution Centers (NDC) and International Service Centers (ISC). Some mail processing facilities are dedicated to sorting a single product shape, while other process letters, flats, bundles, and/ or parcels. The list of 199 total activated facilities is included in USPS Library Reference N2012-1/34.

For these proposed activated nodes, the network will require the following equipment: 617 AFCS; 2,995 DBCS (including DIOSS); 522 AFSM100; 100 FSS (9 currently at NDC); 205 SPBS/APBS (22 at NDC/ISC); and 74 APPS (12 at the NDCs). The number of nodes and equipment sets is used as the basis for witness Dominic

Bratta's (USPS-T-5) equipment maintenance complement estimates and witness Neri's (USPS-T-4) workload adjustments under this concept.

Figure 3: Proposed Letter and Flat Operating Windows

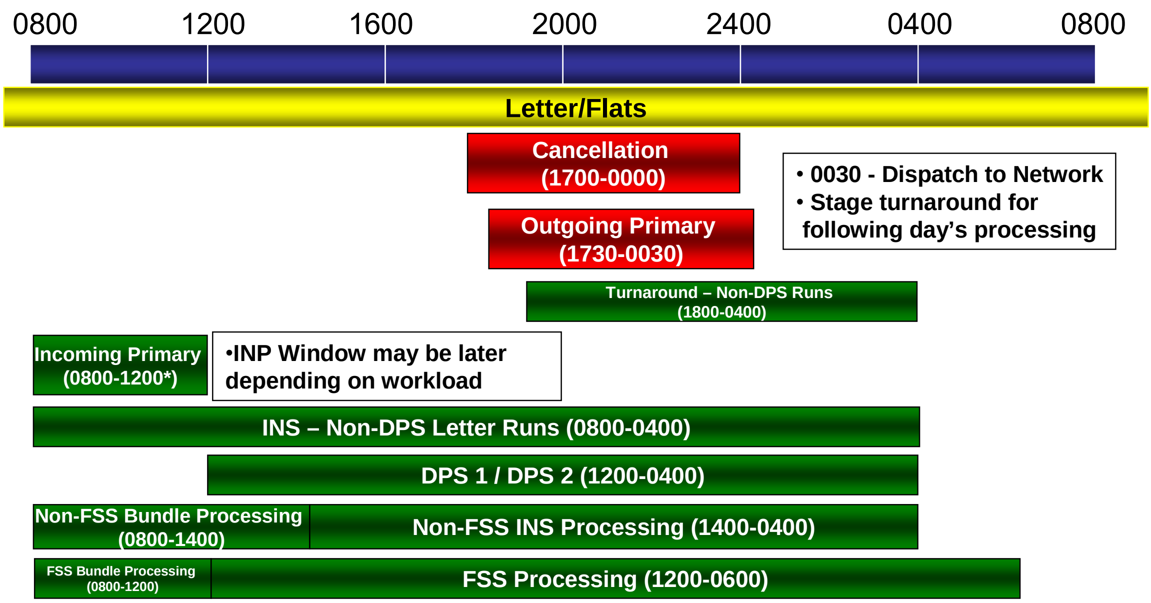
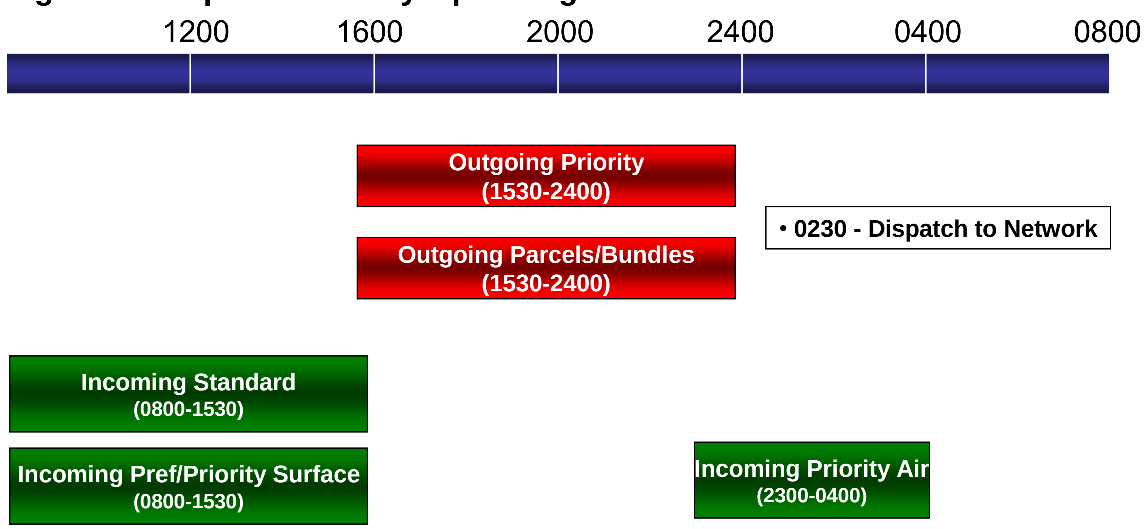


Figure 4: Proposed Priority Operating Window



As shown in Figure 4 above, 4:00 a.m. is the latest time for DPS/INS completion of peak day processing. Earlier clearance times will be established based on volume variability.

Thus, DPS can finish early depending on the day's volume levels and day of week; week of month and seasonal variation can be managed with much greater efficiency.

V. Service Standards

The proposed service standards for First-Class Mail conform to new business rules. The rules will be established based on a mail processing network that will fully utilize facility space, equipment, and labor by expanding mail processing operating windows. This change to the operating plan requires modifications to the First-Class Mail service standards to allow mail processing during the day.

VI. Conclusion

The Postal Service has utilized appropriate data sources and modeling techniques to assess changes in the mail processing network based on a change in proposed service standards. The Postal Service's vision is a transition to a more flexible physical network that will allow it to fully utilize its plant and equipment assets, and improve the efficiency and affordability of its mail processing and transportation networks. The modeling described in my testimony has provided a starting point from which postal management has applied its mail processing and logistics expertise to assess potential network impacts based on the proposed service standard changes. The models are not dispositive and should accordingly be considered decision support tools, rather than decision making tools. The AMP process described in USPS-T-4 by witness Neri will provide the foundation for making the decision on whether to move forward with any given facility-specific operational consolidation.